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PAVEMENT DESIGN REPORT
RISING MOON, FILING NO. 1
EL PASO COUNTY, COLORADO

PCD File No. SF2522

Prepared for:
Habitat for Humanity
2802 North Prospect Street
Colorado Springs, CO 80907

Attn: Terry Anderson

Revision 2: May 12, 2026
Revision 1: April 15, 2026
March 5, 2026

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Lucas Morrison
Geotechnical Engineering Staff

Reviewed by:

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JOSEPH C GOODE III
52381
PROFESSIONAL ENGINEER

Digitally signed by Joseph C Goode III
Date: 05/12/26

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Sr. Engineer

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El Paso County Department of Pubic Works

EL PASO COUNTY EST. 1861

LJM:JCG/ed

Entech Job No. 251558

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1 Introduction

Entech Engineering, Inc. (Entech) completed this revised pavement design report for roadways within the Rising Moon, Filing No. 1 subdivision. This revised report supersedes the previous versions dated March 5 and April 15, 2026, and describes the subsurface exploration program and laboratory testing program conducted for the proposed roadway improvements, and provides pavement section alternatives and construction recommendations. Entech participated in this project as a subconsultant to Habitat for Humanity. The contents of this report, including the pavement design recommendations, are subject to the limitations and assumptions presented in Section 7.

This report has been revised to show an additional pavement section alternative utilizing mechanically stabilized subgrade as a means for swell mitigation.

2 Project Description

The site is located north of the intersection of Peaceful Meadow Street and Harvest Moon Terrace within Rising Moon, Filing No. 1, in El Paso County, Colorado (Figure 1). The proposed improvements include paving portions of Harvest Moon Terrace and Lunar Light Lane. The extent of our investigation is shown in Figure 2.

At the time of our subsurface exploration program, the existing roadway was rough-graded, and utilities had been installed. Surrounding properties comprise vacant land, land being developed for future residential lots, and an existing subdivision. Based on the development plans, the roadways are designated as urban local (low-volume) roadways.

3 Subsurface Explorations and Laboratory Testing

3.1 Subsurface Exploration Program

Subsurface conditions within the project site were explored by five test borings, designated TB-1 through TB-5, drilled on February 17, 2026. The locations of the test borings are shown on the Site and Exploration Plan (Figure 2). The borings were drilled to depths of 5 to 10 feet below the existing ground surface (bgs). The drilling was performed using a truck-mounted, continuous flight auger drill rig supplied and operated by Entech. Descriptive boring logs providing the lithologies of the subsurface conditions encountered during drilling are presented in Appendix A. Groundwater levels were measured in each of the open boreholes at the conclusion of drilling.

Soil samples were obtained from the borings utilizing the Standard Penetration Test (ASTM D1586) using a split-barrel California sampler. 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 locations and sample depths. 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 or variable with location.

3.2 Geotechnical Index and Engineering Property Testing

Water content testing (ASTM D2216) was performed on the samples recovered from the borings, and the results are shown on the boring logs. Grain-size analysis (ASTM D422) and Atterberg limits testing (ASTM D4318) were performed on selected samples to assist in classifying the materials encountered in the borings.

For pavement design, a Standard Proctor (ASTM D698) and a California Bearing Ratio (CBR) test (ASTM D1883) were completed. Soluble sulfate testing was performed on select soil samples to evaluate the potential for below-grade degradation of concrete due to sulfate attack. The laboratory testing results are presented in Appendix B and summarized in Table B-1.

4 Subgrade Conditions

Two primary soil types were encountered in the test borings drilled for the subsurface investigation. Each soil type was classified in accordance with the Unified Soil Classification System (USCS) and the American Association of State Highway and Transportation Officials (AASHTO) soil classification system using the laboratory testing results and the observations made during drilling.

4.1 Subsurface Conditions

Subsurface conditions along the proposed roadways consisted of stiff to very stiff silt with varying amounts of silt fill (Soil Type 1, A-7-5, A-7-6). Native soft to very stiff silt with sand (Soil Type 2, AASHTO A-7-6) was encountered underlying Soil Type 1 in borings TB-2 through TB-4 at 1 to 4 feet bgs and extended to the termination depth of the borings.

Laboratory test results are presented in Appendix B and are summarized in Table B-1.

4.2 Groundwater

Groundwater was not encountered in the test borings. Groundwater fluctuations are possible and will depend on seasonal variations, local precipitation, runoff, and other factors; however, we do not anticipate that groundwater will affect the proposed roadway construction.

5 Pavement Design Recommendations

Pavement design recommendations were made in accordance with the *El Paso County Engineering Criteria Manual (ECM).*

5.1 Subgrade Conditions

California Bearing Ratio (CBR) testing was performed on a representative sample of the Soil Type 1 slightly sandy silt fill from TB-1 to determine the support characteristics of the subgrade soils. The results of the CBR testing are presented in Appendix B and summarized in Exhibit 1.

Exhibit 1: Subsurface Laboratory Testing Summary

Design Parameter	Value
Soil Type	1 – Slightly Sandy Silt
CBR at 95%	2.7
Design CBR	2.7
Liquid Limit	55
Plasticity Index	17
Percent Passing 200	88.8
AASHTO Classification	A-2-4
Unified Soils Classification	MH

5.2 Swell Mitigation

El Paso County requires swell mitigation for soils with swell testing results greater than 2% under a surcharge of 150 pounds per square foot (psf). In order to mitigate swell potential in the roadway, we recommend implementing a combination of moisture treatment and geosynthetic-stabilized base. We recommend mitigating swell potential within the roadway by scarifying 8 inches, moisture conditioning the scarified subgrade to +1% to +3% of the optimum moisture content, and recompacting per specifications discussed in Section 6.1.1. Following the 8 inches of moisture conditioning, a layer of Tensar InterAx NX750 (or equivalent) should be placed on top of the moisture-conditioned subgrade prior to placement of base course. Refer to Exhibit 4 in Section

5.4 for a schematic of the proposed mechanically stabilized roadway section. Properly moisture-conditioned subgrades may pump and deflect during proof rolling. In our opinion, in order to place subgrades at an appropriate moisture content for swell mitigation, up to ½ inch of surficial deflection and pumping is acceptable. Based on discussion with El Paso County, these deflections are acceptable given the moisture conditioning approach to swell mitigation. Swell testing results are presented in Appendix B.

5.3 Traffic Loading

Traffic data is not available for the proposed roadways within Rising Moon, Filing No.1; however, the roadways are classified as urban local (low volume) roadways based on current development plans. The *El Paso County Engineering Criteria Manual* provides default 18-kip equivalent single axle loadings (ESAL) based on the street classification. For design, a default ESAL value of 36,500 was used for the urban local (low volume) road designation.

5.4 Pavement Design

The pavement sections were determined utilizing the *El Paso County Engineering Criteria Manual*, the CBR testing, and default ESALs. Design parameters used in the pavement analysis are presented in Exhibit 2.

Exhibit 2: Pavement Design Parameters

Design Parameter	Value
Reliability	80%
Standard Deviation	0.45
Serviceability Loss (Δ psi)	2.5
Design CBR	2.7
Resilient Modulus	4,050 psi
Structural Coefficients	
Hot Bituminous Pavement	0.44
Aggregate Base Course	0.11
Recycled Concrete Base	0.11

Pavement section alternatives recommended for the proposed roadways are summarized in Exhibit 3. The pavement design calculations are presented in Appendix C.

Exhibit 3: Recommended Pavement Sections

Pavement Area	Design ESAL	Alternative [1]
Harvest Moon Terrace Lunar Light Lane	36,500	4.0 inches HMA over 6.0 inches ABC/RCB with Geosynthetic Reinforcement over 8 inches of moisture-conditioned subgrade [2]

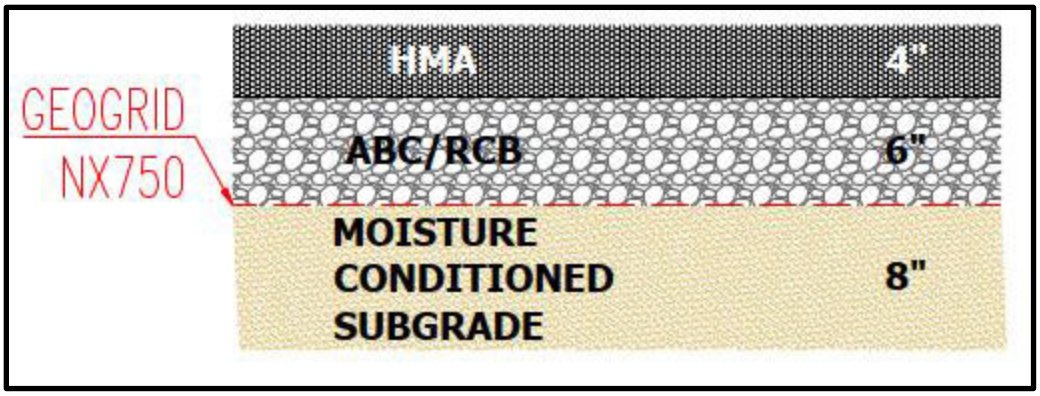
ABC = Aggregate Base Course; ESAL = Equivalent Single Axle Loads; HMA = Hot Mix Asphalt; RCB = Recycled Concrete Base

Notes:

1. Pavement alternative meets the minimum sections required per the *El Paso County Engineering Criteria Manual.*
2. Geosynthetic reinforcement shall consist of Tensar InterAx NX750 (or equivalent) geogrid.

As discussed in Section 5.2, expansive soils will be mitigated with geosynthetic reinforcement and moisture-treated subgrade. The expansive materials will require 8 inches of scarification and moisture conditioning followed by Tensar InterAx NX750 (or equivalent) composite polymer geogrid placed at the top of the moisture-conditioned subgrade. Pavement section alternative with mechanically stabilized subgrade is presented in Exhibit 4.

Exhibit 4: Recommended Mechanically Stabilized Subgrade Pavement Section



6 Construction Recommendations

Pavement design recommendations provided herein are contingent on good construction practices, and poor construction techniques may result in poor performance. Our analyses assumed that this project would be constructed according to the *El Paso County Engineering Criteria Manual* and the *Pikes Peak Region Asphalt Paving Specifications*.

6.1 Earthwork Recommendations for Pavement Subgrade

Proper subgrade preparation is required for adequate pavement performance. Paving areas should be cleared of all deleterious materials, including but not limited to existing pavements,

utility poles, and fence poles. Surface vegetation, if any, should be removed by stripping, with the depth to be field-determined.

6.1.1 Swell Mitigation and Subgrade Preparation

As discussed in Section 5.2, swell mitigation in the form of a geosynthetic-stabilized base over 8 inches of moisture treatment is required for the site. Moisture treatment will require scarifying to a depth of 8 inches, moisture conditioning the scarified subgrade to +1% to +3% of the optimum moisture content, and recompacting to 95% of the Standard Proctor (ASTM D698) maximum dry density. With this method of swell mitigation, we anticipate that up to ½ inch of surficial deflection and pumping of the subgrade may take place during the proof roll. Upon completion of the moisture conditioning, a layer of Tensar InterAx NX750 (or equivalent) geosynthetic reinforcement should be placed beneath the base course.

If significant time passes between moisture conditioning and placement of geosynthetic reinforcement, the final subgrade surface should be scarified to a depth of 8 inches, moisture conditioned within +1% to +3% of the optimum water content, and recompacted to 95% of the Standard Proctor (ASTM D698) maximum dry density. Entech should be contacted for further recommendations if more than 3 days have passed between moisture conditioning and placement of the base course layer.

The compacted surface below pavements should be proof rolled with a fully loaded, tandem-axle, 10-yard dump truck or equivalent. Any areas that are delineated to be soft, loose, or yielding during proof rolling should be removed and reconditioned, or replaced.

6.1.2 Fill Placement and Compaction

Granular fill placed as part of the pavement subgrade shall consist of nonexpansive, granular soil, free of organic matter, unsuitable materials, debris, and cobbles greater than 3 inches in diameter. Additionally, any granular fill placed as part of the roadway subgrade should have a minimum CBR of 5. All granular fill placed within the pavement subgrade should be compacted to a minimum of 95% of the Modified Proctor (ASTM D1557) maximum dry density at +/-2% of optimum moisture content. Fill material should be placed in horizontal lifts such that each finished lift has a compacted thickness of 6 inches or less. Entech should approve any imported fill to be used within the pavement subgrade area prior to delivery to the site.

6.1.3 Aggregate Base Course and Recycled Concrete Base

ABC or RCB materials shall conform to the *El Paso County Standard Specifications Manual*, Appendix D, Table D-6. ABC or RCB materials should be compacted to a minimum of 95% of the Modified Proctor (ASTM D1557) maximum dry density within +/-2% of optimum moisture content.

6.2 Concrete Degradation Due to Sulfate Attack

Sulfate solubility testing was conducted on several samples recovered from the test borings to evaluate the potential for sulfate attack on concrete placed below surface grade. The test results indicated less than 0.01% soluble sulfate (by weight). The test results indicate the sulfate component of the in-place soils presents a negligible exposure threat to concrete placed below the site grade.

Type 1L cement is recommended for concrete on the 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 concrete placement areas. 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.

6.3 Construction Observation

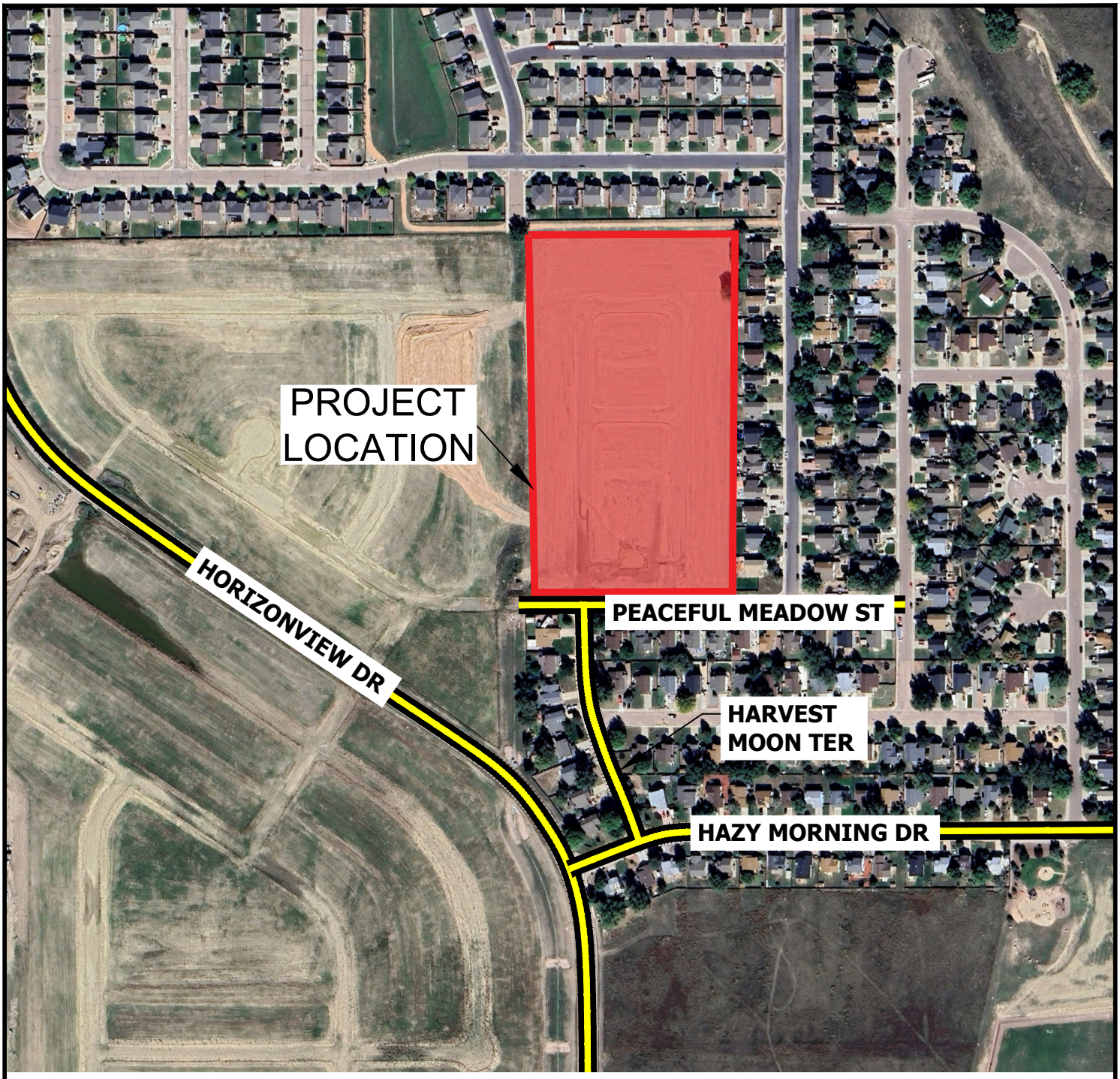
Subgrade preparation for pavement structures should be observed by Entech in order to verify that (1) no anomalies are present, (2) materials similar to those described in this report have been encountered or placed, and (3) no soft spots, expansive or organic soil, or debris are present in the pavement subgrade prior to paving.

7 Closure

The subsurface investigation, geotechnical evaluation, and recommendations presented in this report are intended for use by Habitat for Humanity with application to the paving of Harvest Moon Terrace and Lunar Light Lane within Rising Moon, Filing No. 1, in El Paso County, Colorado. In conducting the subsurface investigation, laboratory testing, engineering evaluation, and reporting, Entech Engineering, Inc. endeavored to work in accordance with generally accepted professional geotechnical and geologic practices and principles consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession currently practicing in the same locality and under similar conditions. No other warranty, expressed or implied, is made. During

final design and/or construction, if conditions are encountered that appear different from those described in this report, Entech Engineering, Inc. requests to be notified so that the evaluation and recommendations presented herein can be reviewed and modified as appropriate.

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



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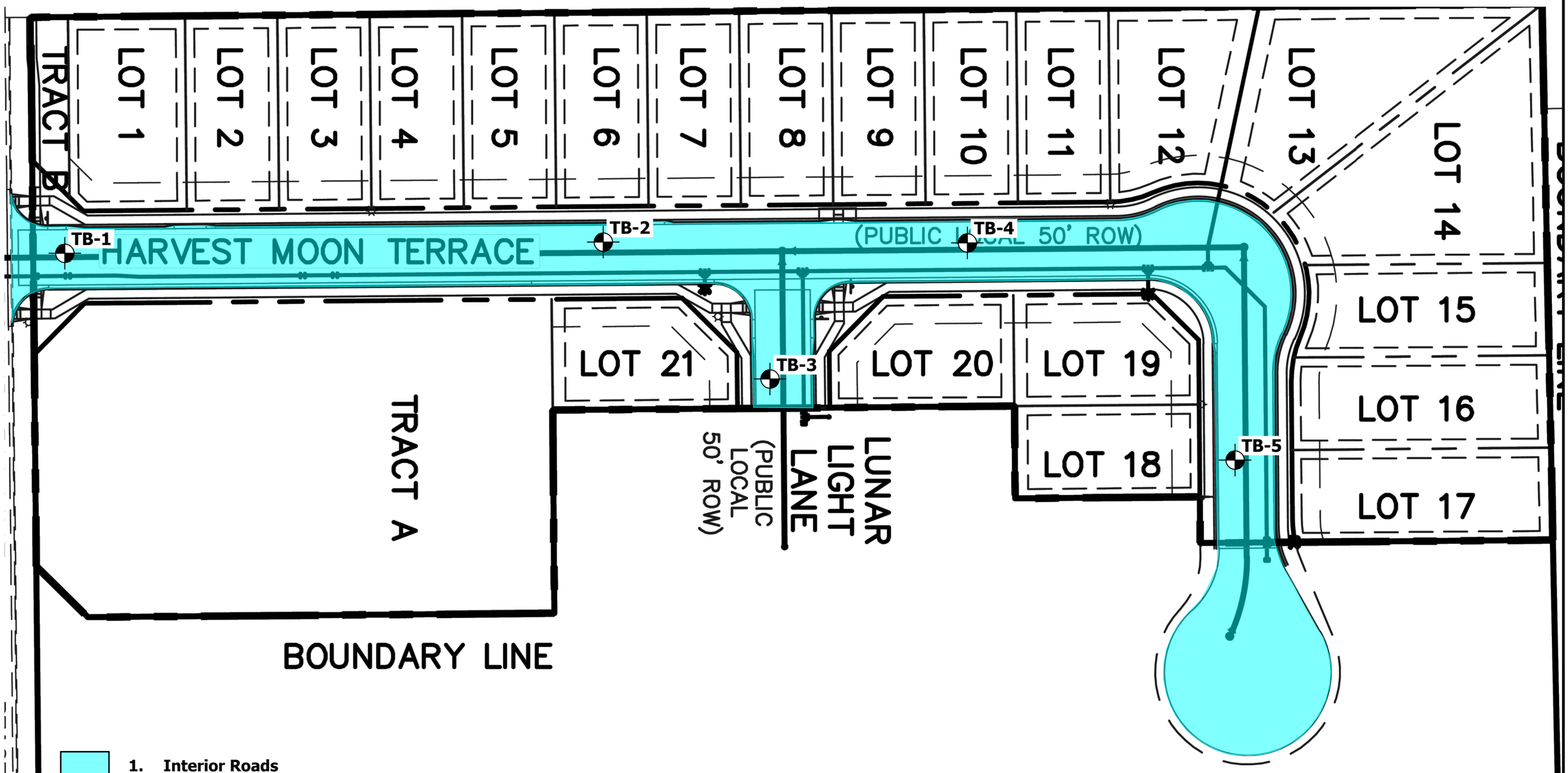
VICINITY MAP

RISING MOON, FILING NO. 1
HABITAT FOR HUMANITY

JOB NO.
251558

FIG. 1



1. **Interior Roads**
   Urban Local Residential
   Design 18-KIP ESAL=36,500
   Pavement Section:
   1. 4.0" HMA Over 6" ABC/RCB

TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

- ROADWAYS INCLUDED WITH THIS INVESTIGATION

SCALE: 0 25 50

ENTECH ENGINEERING, INC.

SITE AND EXPLORATION PLAN

RISING MOON, FILING NO. 1
HABITAT FOR HUMANITY

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FIG. 2

APPENDIX A: Test Boring Logs

TEST BORING 1
DATE DRILLED 2/17/2026

REMARKS

DRY TO 5', 2/17/26

FILL 0-5', SILT, WITH SAND, BROWN to TAN, STIFF, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			11	16.9	1
5			9	16.4	1
10					
15					
20					

TEST BORING 2
DATE DRILLED 2/17/2026

REMARKS

DRY TO 5', 2/17/26

FILL 0-1', SILT, SANDY, BROWN
SILT, WITH SAND, TAN, VERY STIFF to MEDIUM STIFF, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			19	15.7	2
5			4	20.5	2
10					
15					
20					

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TEST BORING LOGS

RISING MOON, FILING NO. 1
HABITAT FOR HUMANITY

JOB NO. 251558

FIG. A-1

TEST BORING 3
DATE DRILLED 2/17/2026

REMARKS

DRY TO 5', 2/17/26

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			23	14.8	1
5			15	13.5	2
10			11	18.4	2
15					
20					

FILL 0-4', SILT, SLIGHTLY SANDY, DARK BROWN, VERY STIFF, MOIST

SILT, WITH SAND, TAN, STIFF, MOIST

TEST BORING 4
DATE DRILLED 2/17/2026

REMARKS

DRY TO 5', 2/17/26

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			20	17.0	1
5			12	18.1	2
10					
15					
20					

FILL 0-4', SILT, WITH SAND, BROWN to TAN, VERY STIFF, MOIST

SILT, WITH SAND, BROWN, STIFF, MOIST

ENTECH ENGINEERING, INC.

TEST BORING LOGS

RISING MOON, FILING NO. 1
HABITAT FOR HUMANITY

JOB NO. 251558

FIG. A-2

TEST BORING 5

DATE DRILLED 2/17/2026

REMARKS

DRY TO 5', 2/17/26

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
FILL 0-5', SILT, SANDY, BROWN to TAN, STIFF to VERY STIFF, MOIST			10	13.7	1
5			16	16.6	1
10					
15					
20					

TEST BORING LOGS

RISING MOON, FILING NO. 1
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FIG. A-3

APPENDIX B: Laboratory Test Results

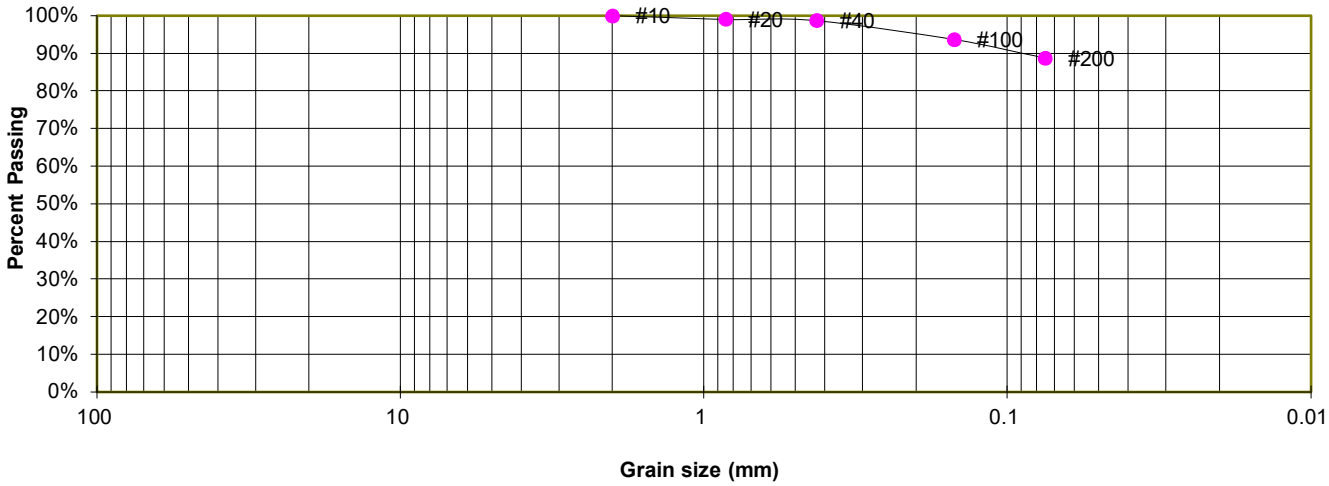
TABLE B-1
SUMMARY OF LABORATORY TEST RESULTS

ENTECH ENGINEERING, INC.

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SULFATE (WT %)	SWELL/ COLLAPSE (%)	AASHTO CLASS. (GROUP INDEX)	USCS	SOIL DESCRIPTION
1, CBR	1	0-3	20.2		88.8	55	38	17			A-7-6 (20)	MH	FILL, SILT, SLIGHTLY SANDY
1	1	1-2	20.2	84.0	74.8	49	32	17	<0.01	2.9	A-7-6 (14)	ML	FILL, SILT, WITH SAND
1	3	1-2	26.0	94.1	87.8	60	36	24		6.1	A-7-6 (26)	MH	FILL, SILT, SLIGHTLY SANDY
1	4	1-2	13.9	80.7	81.2	40	29	11		1.9	A-7-5 (10)	ML	FILL, SILT, WITH SAND
1	5	1-2	11.7	83.6	57.7	45	27	18		0.3	A-7-5 (9)	ML	FILL, SILT, SANDY
2	2	1-2	19.5	89.3	81.0	55	38	17	<0.01	4.4	A-7-6 (17)	MH	SILT, WITH SAND

Project: Rising Moon, Filing No. 1
Client: Habitat for Humanity
Job No: 251558

TEST BORING	1	SOIL DESCRIPTION	FILL, SILT, SLIGHTLY SANDY
DEPTH (FT)	0-3	SOIL TYPE	1, CBR



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	99.1%
40	98.8%
100	93.7%
200	88.8%

ATTERBERG LIMITS

Plastic Limit	38
Liquid Limit	55
Plastic Index	17

SOIL CLASSIFICATION

USCS CLASSIFICATION:	MH
AASHTO CLASSIFICATION:	A-7-6
AASHTO GROUP INDEX:	20

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

RISING MOON, FILING NO. 1
HABITAT FOR HUMANITY

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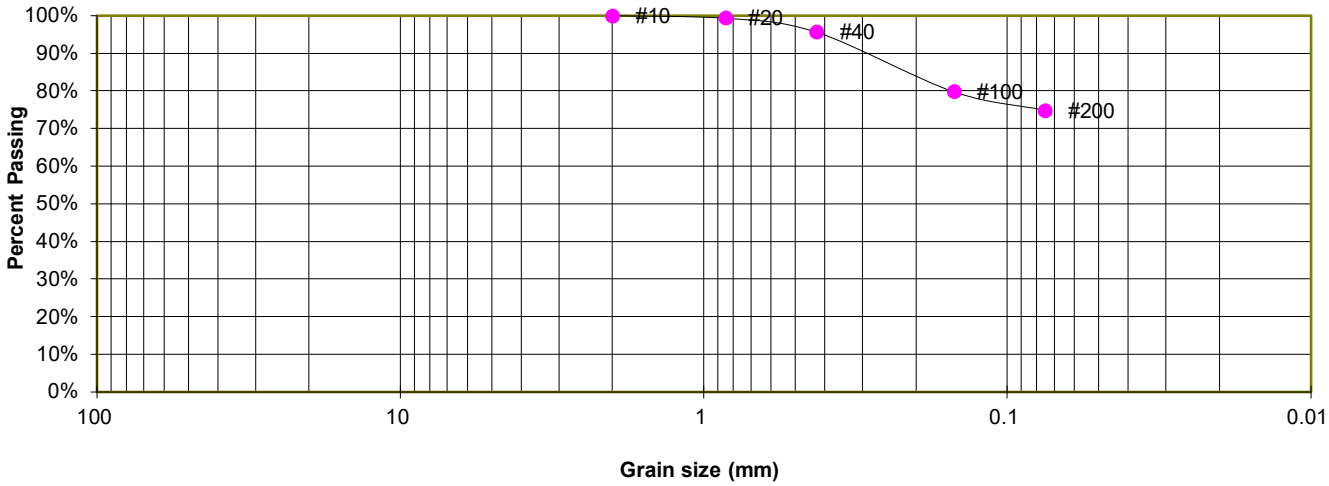
FIG. B-1

TEST BORING	1	SOIL DESCRIPTION	FILL, SILT, WITH SAND
DEPTH (FT)	1-2	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	99.4%
40	95.7%
100	79.8%
200	74.8%

ATTERBERG LIMITS

Plastic Limit	32
Liquid Limit	49
Plastic Index	17

SOIL CLASSIFICATION

USCS CLASSIFICATION:	ML
AASHTO CLASSIFICATION:	A-76
AASHTO GROUP INDEX:	14

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

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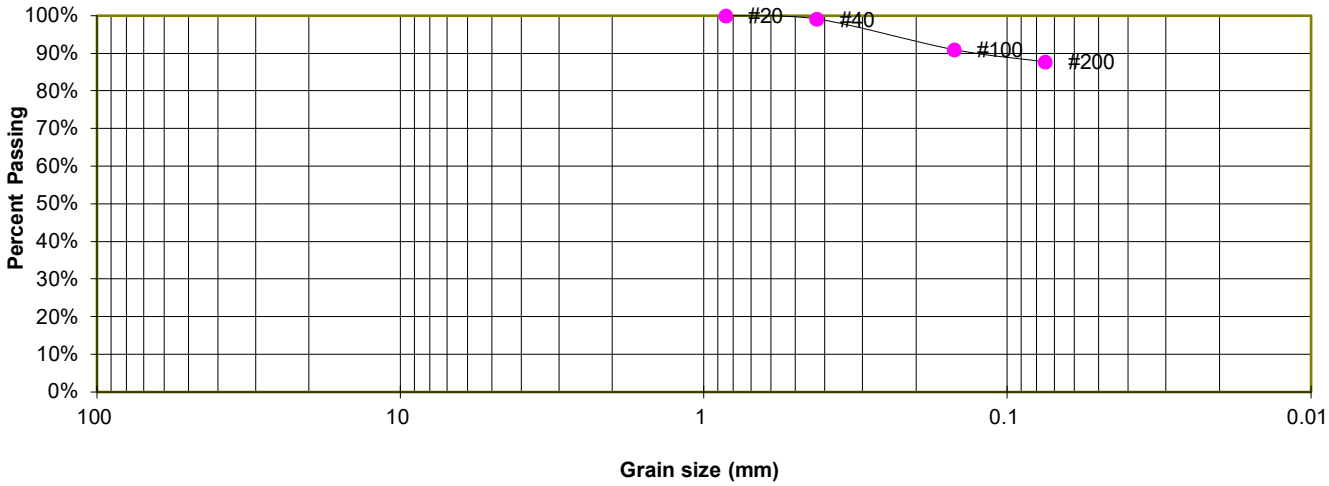
FIG. B-2

TEST BORING	3	SOIL DESCRIPTION	FILL, SILT, SLIGHTLY SANDY
DEPTH (FT)	1-2	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	99.2%
100	91.0%
200	87.8%

ATTERBERG LIMITS

Plastic Limit	36
Liquid Limit	60
Plastic Index	24

SOIL CLASSIFICATION

USCS CLASSIFICATION:	MH
AASHTO CLASSIFICATION:	A-7-6
AASHTO GROUP INDEX:	26

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

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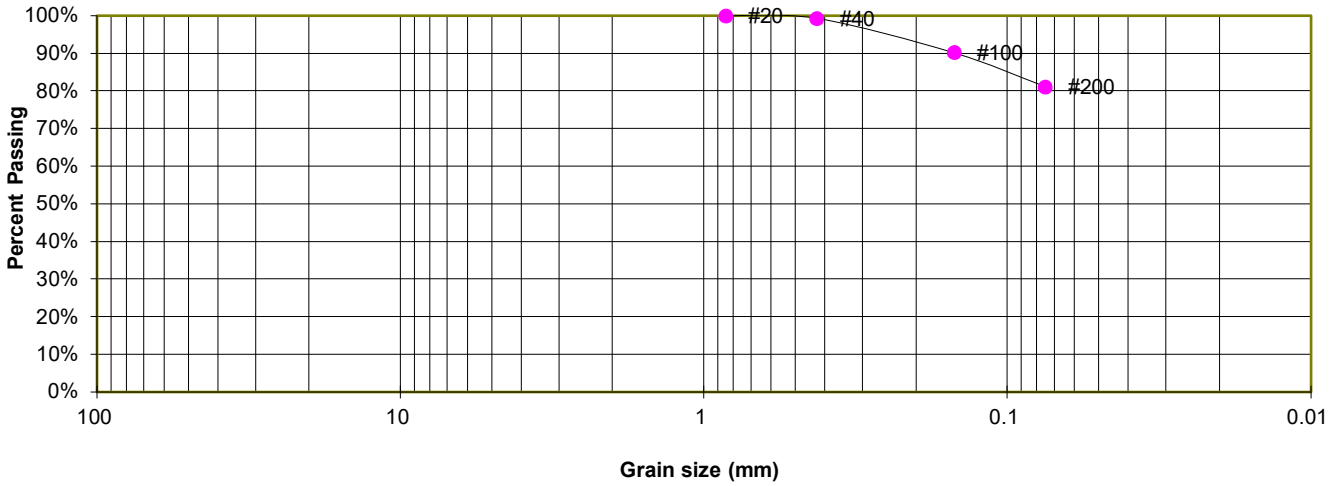
FIG. B-3

TEST BORING	4	SOIL DESCRIPTION	FILL, SILT, WITH SAND
DEPTH (FT)	1-2	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	99.3%
100	90.2%
200	81.2%

ATTERBERG LIMITS

Plastic Limit	29
Liquid Limit	40
Plastic Index	11

SOIL CLASSIFICATION

USCS CLASSIFICATION:	ML
AASHTO CLASSIFICATION:	A-7-5
AASHTO GROUP INDEX:	10

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LABORATORY TEST RESULTS

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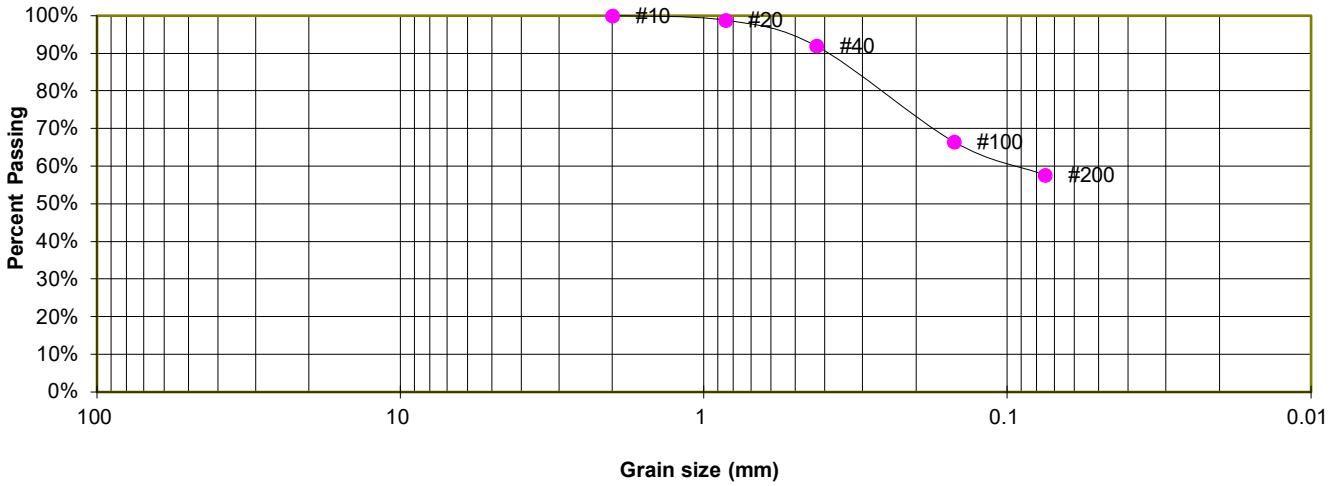
FIG. B-4

TEST BORING	5	SOIL DESCRIPTION	FILL, SILT, SANDY
DEPTH (FT)	1-2	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	98.9%
40	92.0%
100	66.5%
200	57.7%

ATTERBERG LIMITS

Plastic Limit	27
Liquid Limit	45
Plastic Index	18

SOIL CLASSIFICATION

USCS CLASSIFICATION:	ML
AASHTO CLASSIFICATION:	A-7-5
AASHTO GROUP INDEX:	9

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

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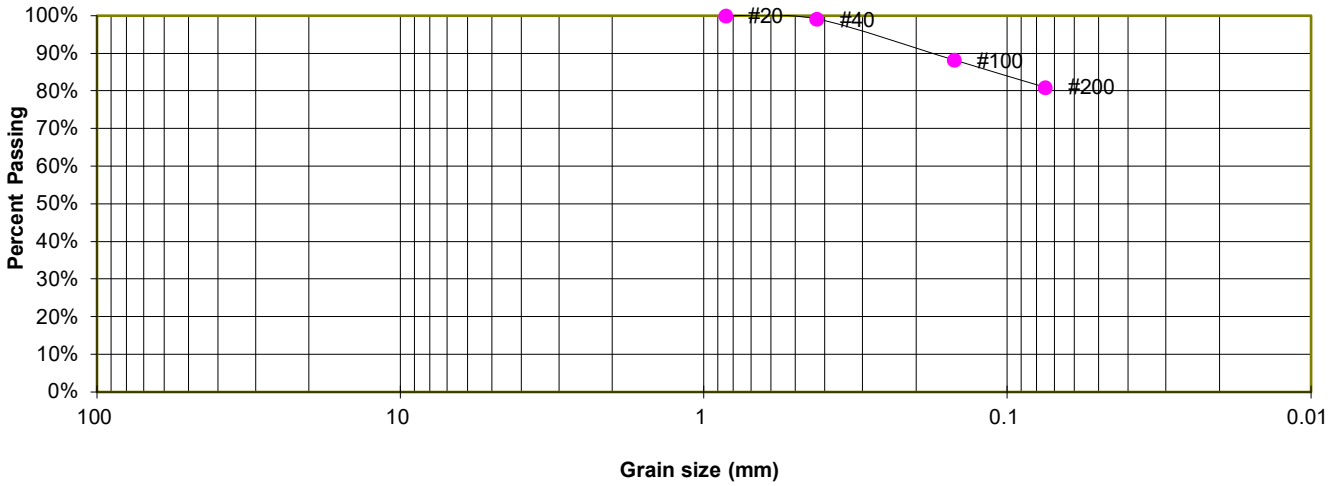
FIG. B-5

TEST BORING	2	SOIL DESCRIPTION	SILT, WITH SAND
DEPTH (FT)	1-2	SOIL TYPE	2

Sieve Analysis
Grain Size Distribution



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	99.1%
100	88.3%
200	81.0%

ATTERBERG LIMITS

Plastic Limit	38
Liquid Limit	55
Plastic Index	17

SOIL CLASSIFICATION

USCS CLASSIFICATION:	MH
AASHTO CLASSIFICATION:	A-7-6
AASHTO GROUP INDEX:	17

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

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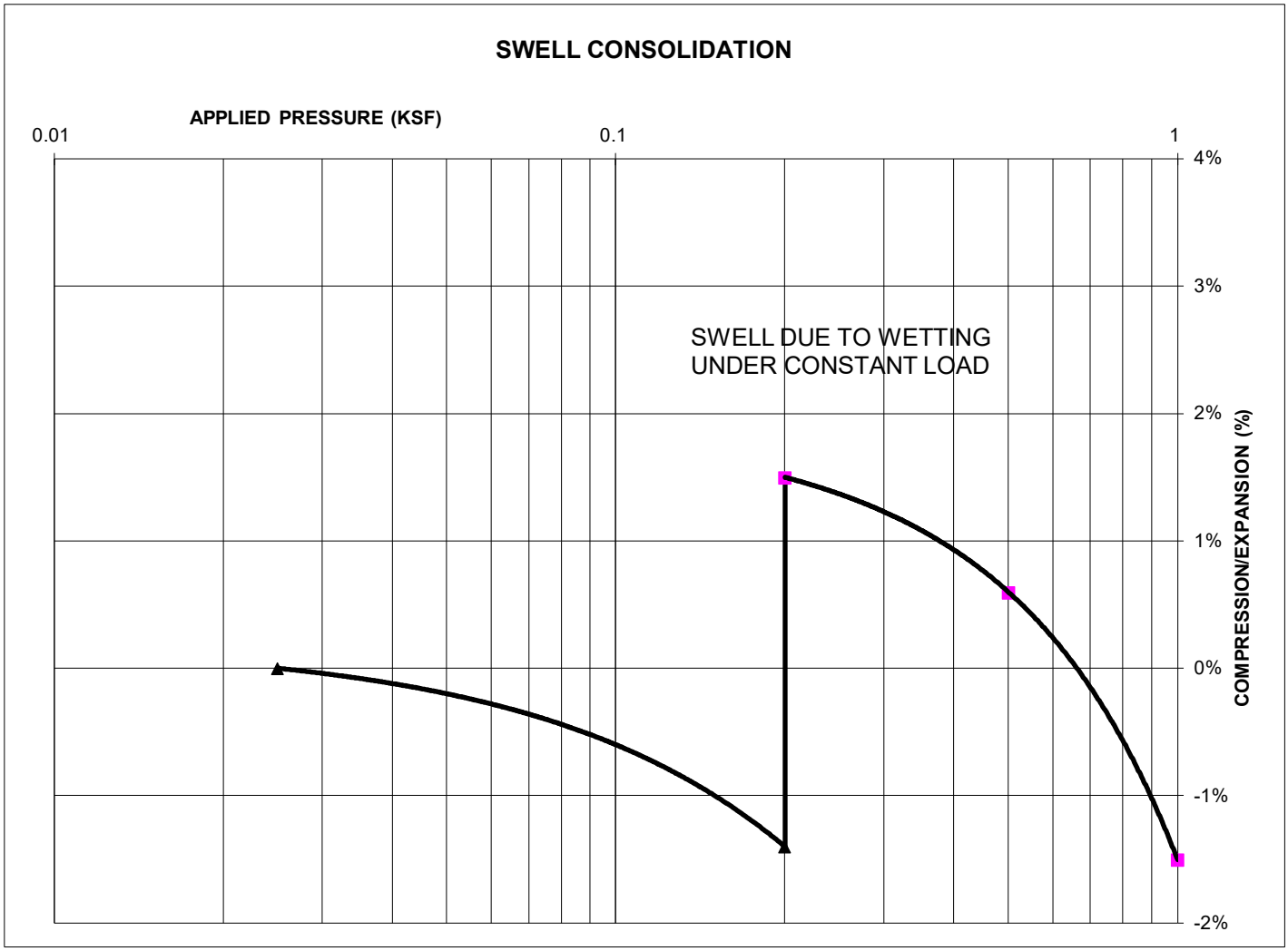
FIG. B-6

TEST BORING	1	SOIL DESCRIPTION	FILL, SILT, WITH SAND
DEPTH (FT)	1-2	SOIL TYPE	1



SWELL/COLLAPSE TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF):	84
NATURAL MOISTURE CONTENT:	20.2%
SWELL/COLLAPSE (%):	2.9%

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SWELL TEST RESULTS

RISING MOON, FILING NO. 1
HABITAT FOR HUMANITY

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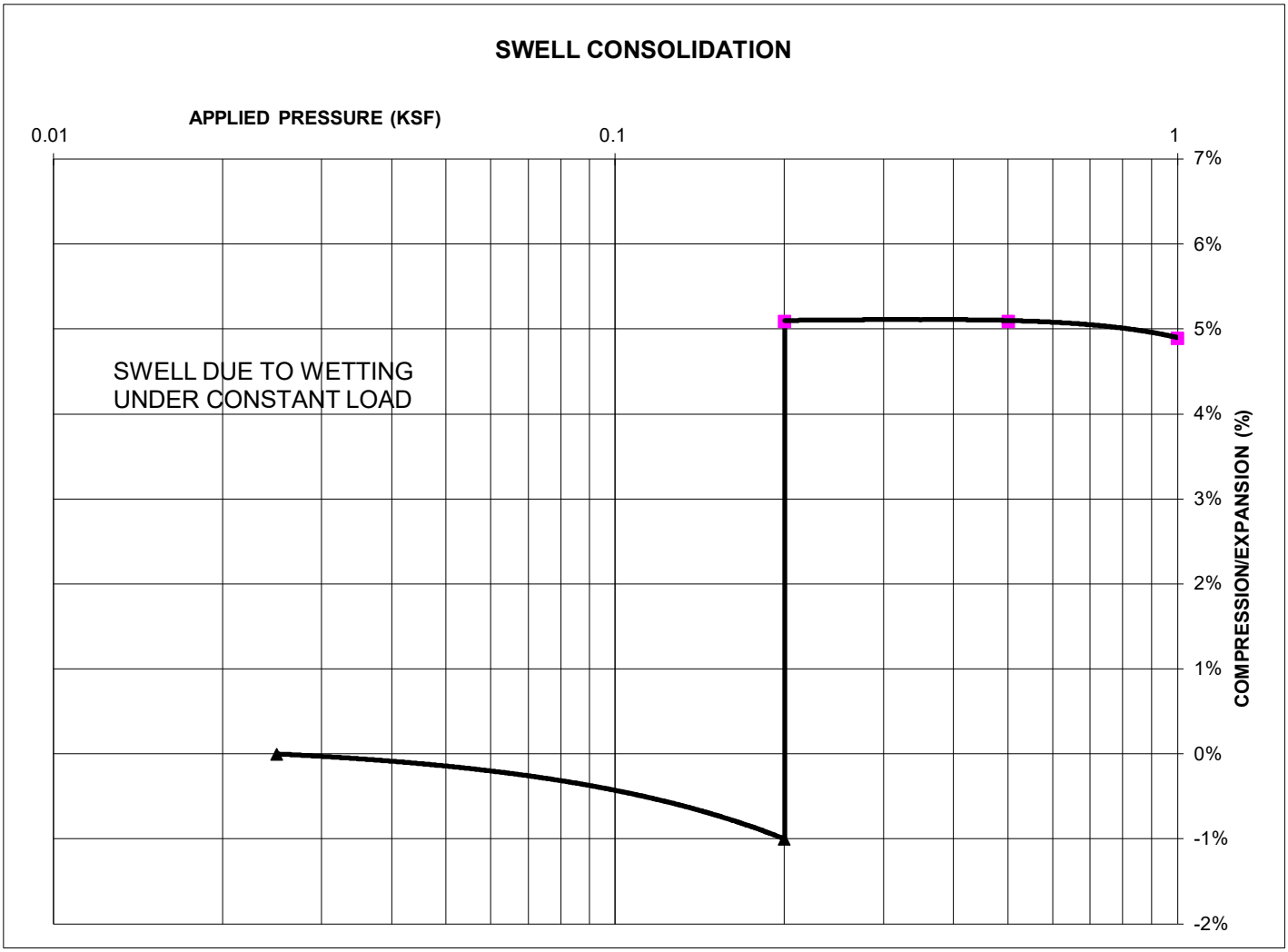
FIG. B-7

TEST BORING	3	SOIL DESCRIPTION	FILL, SILT, SLIGHTLY SANDY
DEPTH (FT)	1-2	SOIL TYPE	1



SWELL/COLLAPSE TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF):	94
NATURAL MOISTURE CONTENT:	26.0%
SWELL/COLLAPSE (%):	6.1%

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SWELL TEST RESULTS

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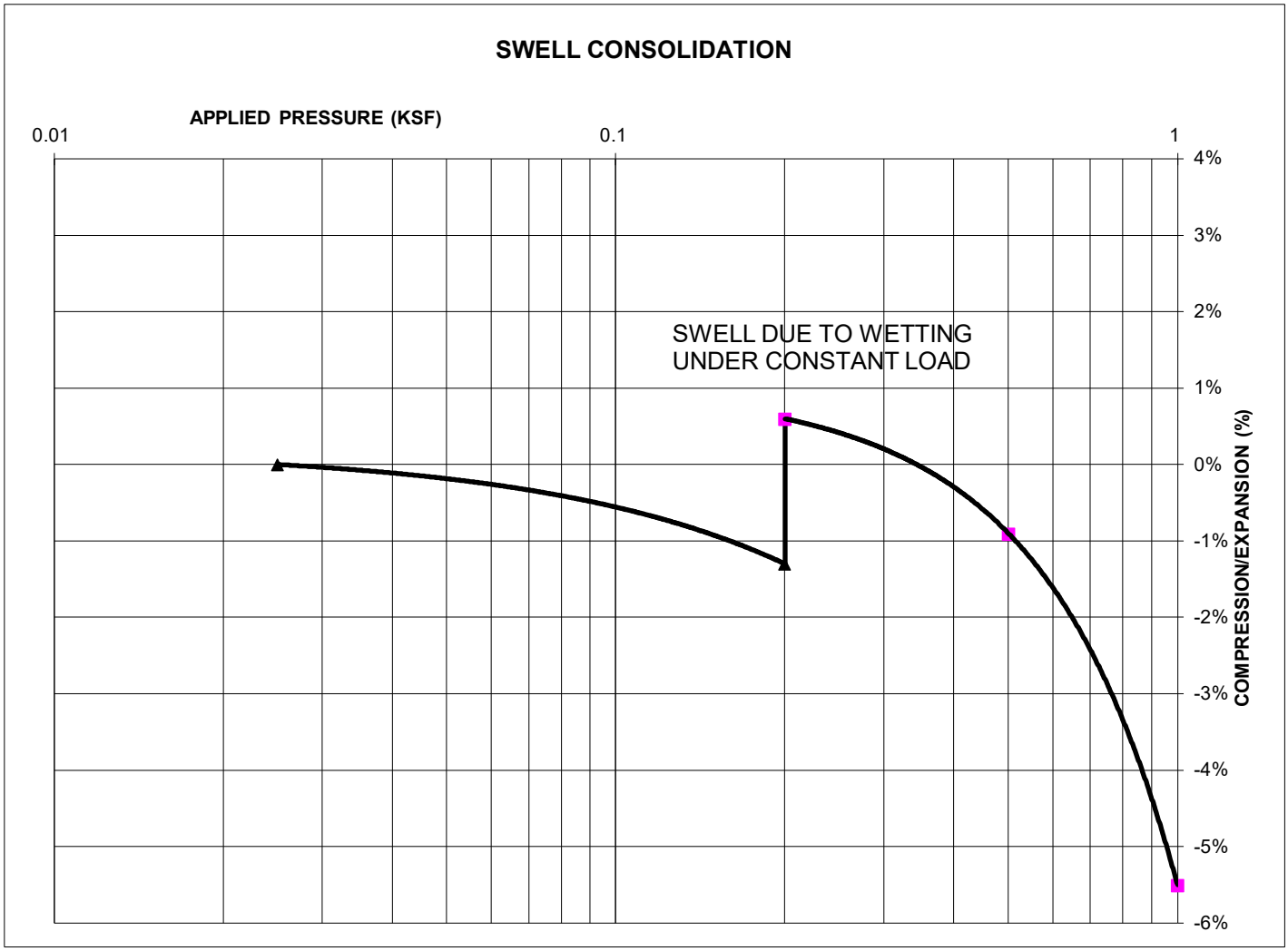
FIG. B-8

TEST BORING	4	SOIL DESCRIPTION	FILL, SILT, WITH SAND
DEPTH (FT)	1-2	SOIL TYPE	1



SWELL/COLLAPSE TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 81
NATURAL MOISTURE CONTENT: 13.9%
SWELL/COLLAPSE (%): 1.9%

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SWELL TEST RESULTS

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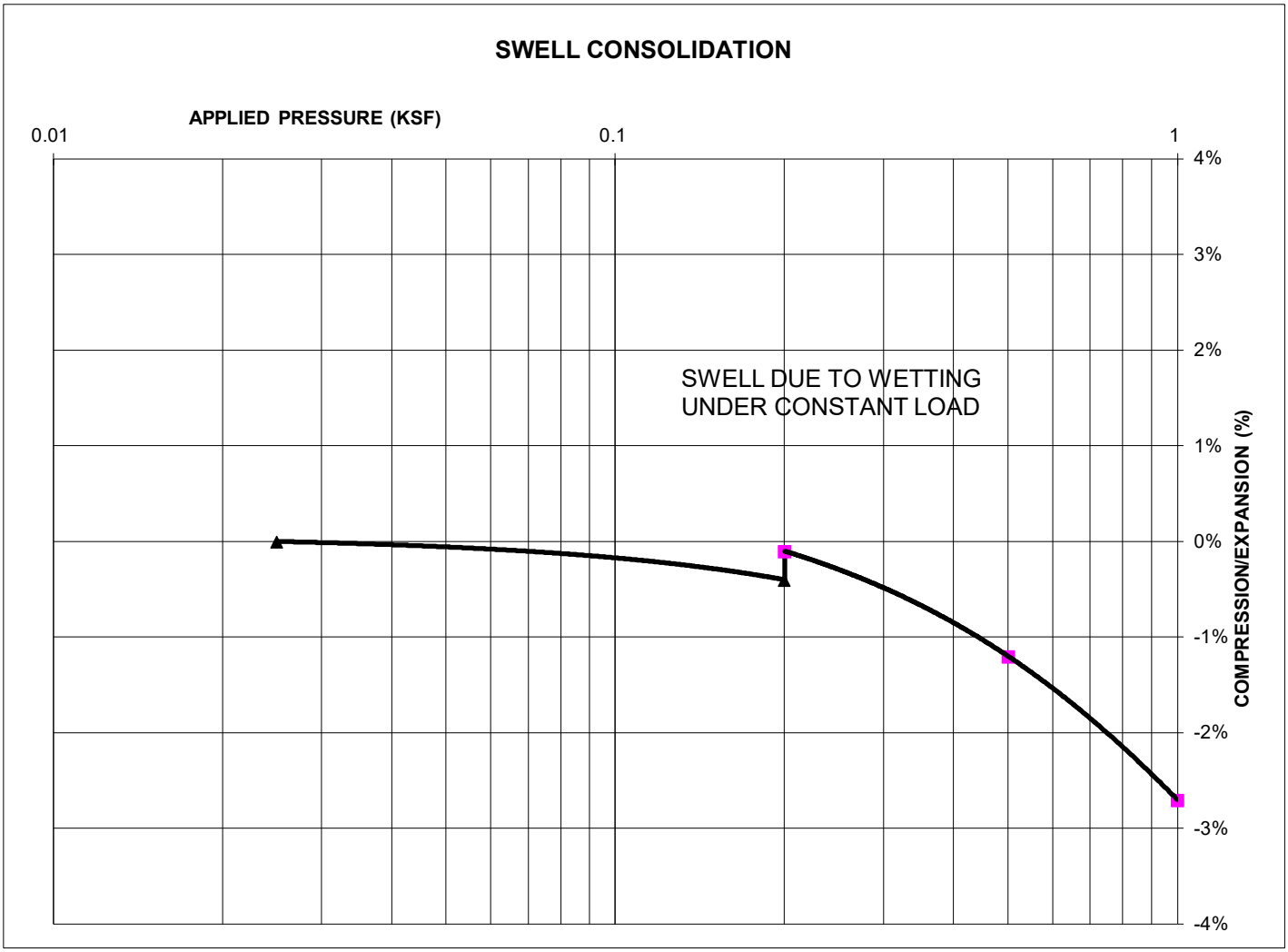
FIG. B-9

TEST BORING	5	SOIL DESCRIPTION	FILL, SILT, SANDY
DEPTH (FT)	1-2	SOIL TYPE	1



SWELL/COLLAPSE TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 84
NATURAL MOISTURE CONTENT: 11.7%
SWELL/COLLAPSE (%): 0.3%

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SWELL TEST RESULTS

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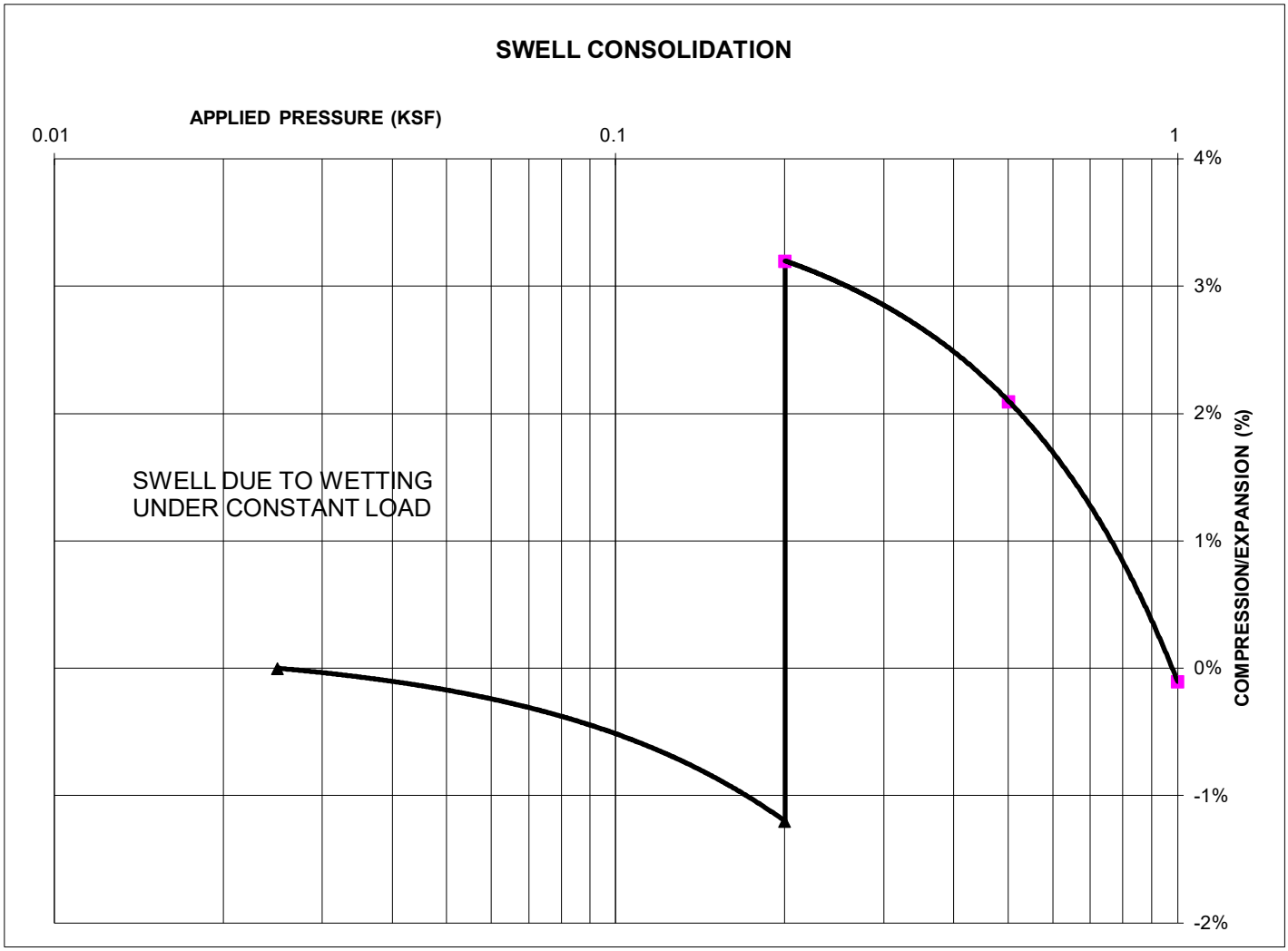
FIG. B-10

TEST BORING	2	SOIL DESCRIPTION	SILT, WITH SAND
DEPTH (FT)	1-2	SOIL TYPE	2



SWELL/COLLAPSE TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 89
NATURAL MOISTURE CONTENT: 19.5%
SWELL/COLLAPSE (%): 4.4%

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SWELL TEST RESULTS

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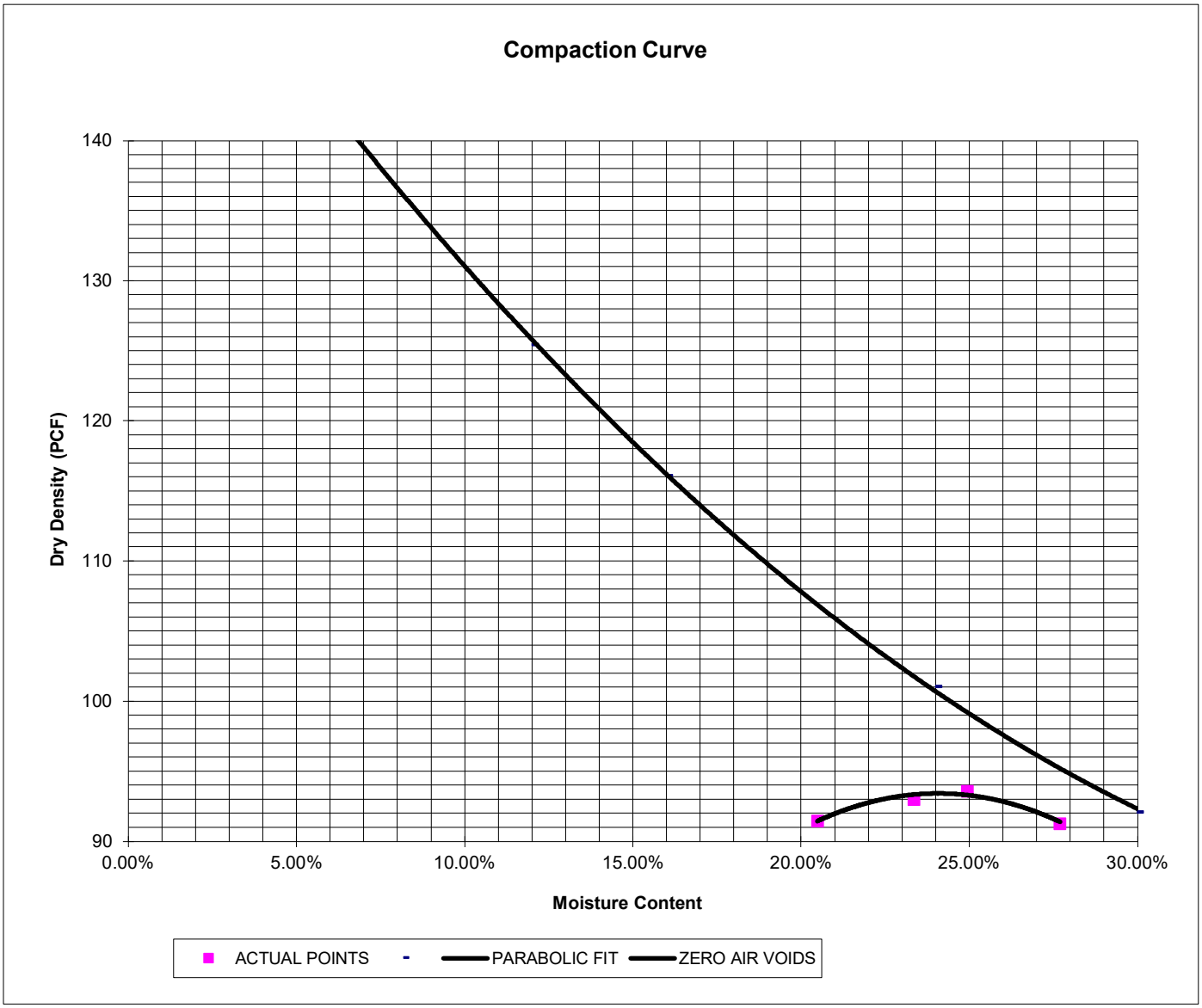
FIG. B-11

SAMPLE LOCATION TB-1 @ 0-3'	SOIL DESCRIPTION FILL, SILT, SLIGHTLY SANDY
	SOIL TYPE 1

PROCTOR DATA

IDENTIFICATION:	MH
PROCTOR TEST #:	1
TEST BY:	DK
TEST DESIGNATION:	ASTM-698-A
MAXIMUM DRY DENSITY (PCF):	93.6
OPTIMUM MOISTURE:	24.2



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LABORATORY TEST RESULTS

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FIG. B-12

SAMPLE LOCATION TB-1 @ 0-3' SOIL DESCRIPTION FILL, SILT, SLIGHTLY SANDY
SOIL TYPE 1

CBR TEST LOAD DATA

Piston Diameter (cm): 4.958
Piston Area (in^2): 2.993

Penetration Depth (inches)	*10 BLOWS* Mold # 1 Load (lbs)	Stress (psi)	*25 BLOWS* Mold # 2 Load (lbs)	Stress (psi)	*56 BLOWS* Mold # 3 Load (lbs)	Stress (psi)
0.000	0	0.00	0	0.00	0	0.00
0.025	29	9.69	43	14.37	58	19.38
0.050	35	11.70	60	20.05	70	23.39
0.075	39	13.03	65	21.72	77	25.73
0.100	40	13.37	68	22.72	83	27.74
0.125	45	15.04	72	24.06	97	32.41
0.150	49	16.37	80	26.73	105	35.09
0.175	53	17.71	88	29.41	108	36.09
0.200	57	19.05	95	31.75	103	34.42
0.300	62	20.72	102	34.09	107	35.76
0.400	65	21.72	105	35.09	115	38.43
0.500	68	22.72	113	37.76	125	41.77

MOISTURE AND DENSITY DATA

	Mold # 1	Mold # 2	Mold # 3
Can #	506	507	508
Wt. Can	8.39	8.37	8.59
Wt. Can+Wet	186	210.43	226.98
Wt. Can+Dry	133.95	156.52	167.67
Wt. H20	52.05	53.91	59.31
Wt. Dry Soil	125.56	148.15	159.08
Moisture Content	41.45%	36.39%	37.28%
Wet Density (PCF)	94.6	103.2	111.1
Dry Density (PCF)	76.1	83.1	89.4
% Compaction	81%	89%	96%
CBR	1.34	2.27	2.77

PROCTOR DATA

Maximum Dry Density (pcf)	93.6
Optimum Moisture	24.2
90% of Max. Dry Density (pcf)	84.2
95% of Max. Dry Density (pcf)	88.9

CBR at 90% of Max. Density = 2.4 ~ R VALUE 6
CBR at 95% of Max. Density = 2.7 ~ R VALUE 6

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

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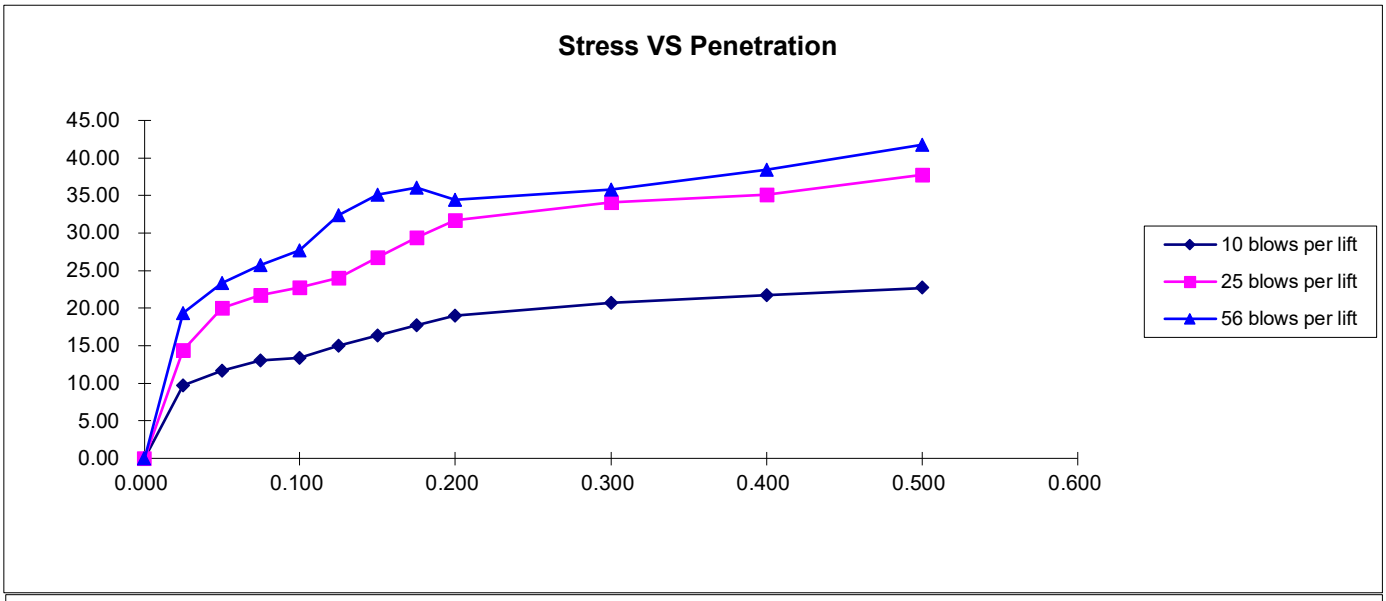
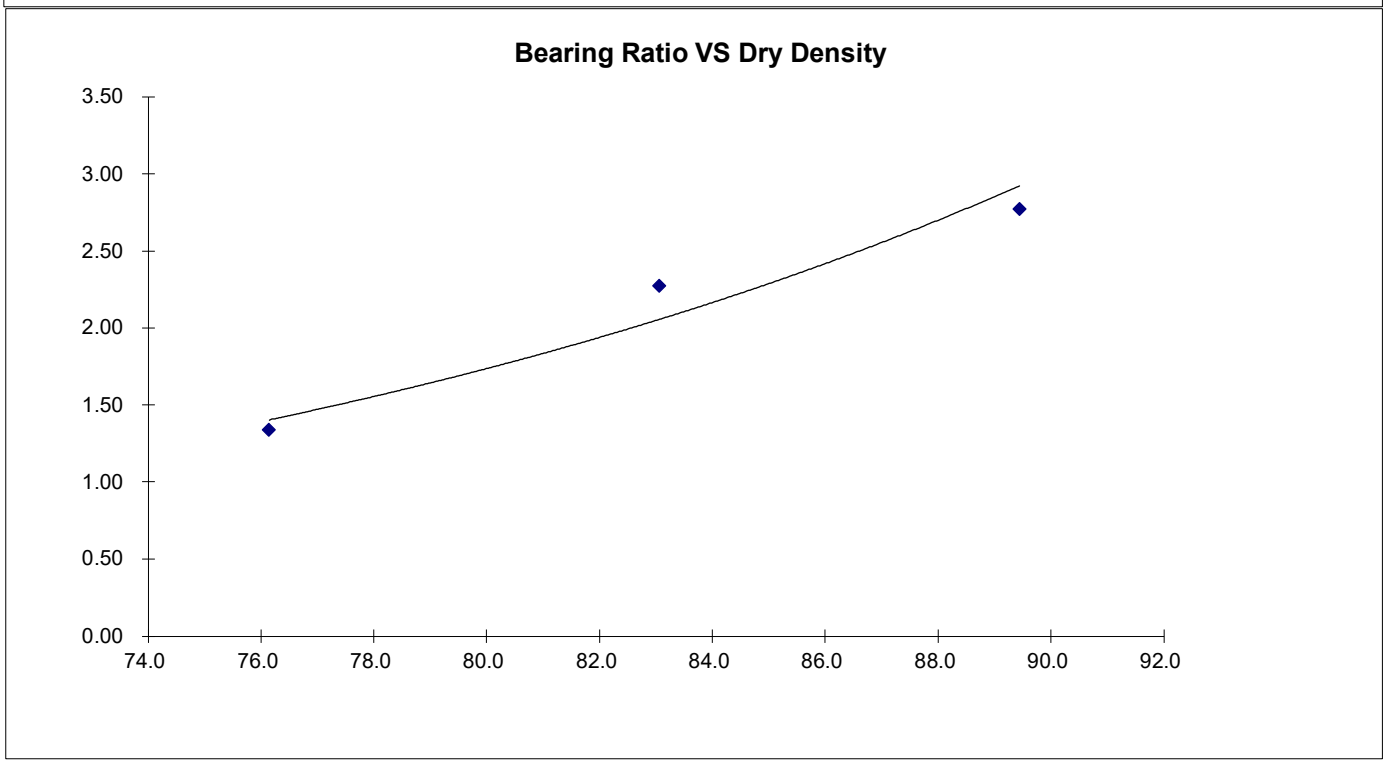
FIG. B-13

SAMPLE LOCATION TB-1 @ 0-3'

SOIL DESCRIPTION FILL, SILT, SLIGHTLY SANDY
SOIL TYPE 1





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LABORATORY TEST RESULTS

RISING MOON, FILING NO. 1
HABITAT FOR HUMANITY

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FIG. B-14

APPENDIX C: Pavement Design Calculations

FLEXIBLE PAVEMENT DESIGN

PROJECT DATA

Project Location: Rising Moon, Filing No. 1

Job Number: 251558

DESIGN DATA

Equivalent (18-kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	36,500
Design CBR	CBR =	2.7
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.5
Reliability	Reliability =	80
Reliability (z-statistic)	Z_R =	-0.84
Soil Resilient Modulus	M_R =	4,050 psi

Required Structural Number (SN): → SN = 2.30

DESIGN EQUATIONS

Resilient Modulus

If using CBR:

M_R = (CBR) x 1,500

If using R-Value:

$M_R = 10^{[(S_1 + 18.72) / 6.24]}$ where: S_1 = [(R-value - 5) / 11.29] + 3

Required Structural Number

$$\log_{10}W_{18} = Z_R * S_O + 9.36*\log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32*\log_{10}M_R - 8.07$$

Pavement Section Thickness

$SN^* = C_1D_1 + C_2D_2$ where:

C_1 = Strength Coefficient - HMA

C_2 = Strength Coefficient - ABC/RCB

D_1 = Depth of HMA (inches)

D_2 = Depth of ABC/RCB (inches)

RECOMMENED THICKNESSES

Layer	Material	Structural Layer	Thickness (D^*_i)	SN^*_i	SN
1	HMA	C_1 = 0.44	4.0 inches	1.760	-
2	ABC/RCB	C_2 = 0.11	6.0 inches	0.660	
			SN* =	2.420	2.30

Pavement SN > Required SN, Design is Acceptable

FIG. C-1