ENT 84896:2020 PG 1 of 52
JEFFERY SMITH
UTAH COUNTY RECORDER
2020 Jun 19 11:49 am FEE 40.00 BY MA
RECORDED FOR AMERICAN FORK CITY

When Recorded Mail To:
American Fork City
51 East Main
American Fork UT 84003

NOTICE OF INTEREST, BUILDING REQUIREMENTS, AND ESTABLISHMENT OF RESTRICTIVE COVENANTS

This Notice is recorded to bind the attached Geotechnical Study dated Aug 17th, 2017 along with the site grading plan to the property generally located at 700 S. 330 E (address), American Fork, UT 84003 and therefore mandating that all construction be in compliance with said Geotechnical Study and site grading plan per the requirements of American Fork City ordinances and standards and specification including specifically Ordinance 07-10-47, Section 6-5, Restrictive Covenant Required and 6-2-4, Liquefiable Soils. Said Sections require establishment of a restrictive covenant and notice to property owners of liquefiable soils or other unique soil conditions and construction methods associated with the property.

Exhibit A – Legal Description of Property
Exhibit B – Geotechnical Study
Exhibit C – Site Grading Plan

Dated this 22nd day of April, 2020

OWNER(S):

(Signature) _____ (Signature)

Robert Thomson (Printed Name) _____ (Printed Name)

Manager (Title) _____ (Title)

STATE OF UTAH)
§
COUNTY OF Utah)

On the 29 day of April, 2020, personally appeared before me Robert Thompson and _____, Owner(s) of said Property, as (individuals and/or authorized representatives of a company), and acknowledged to me that such individuals or company executed the within instrument freely of their own volition and pursuant to the articles of organization where applicable.

LISA HALVERSEN
NOTARY PUBLIC · STATE OF UTAH
COMMISSION# 705891
COMM. EXP. 06-03-2023

Notary Public
My Commission Expires: 6-3-23

Approved as to form: American Fork City Attorney

Rev. 12/4/18

Exhibit A

Stonecreek Plat D

Commencing at a point which is North 89°48'57" East 497.68 feet and North 10.09 feet from theSouthwest Corner of Section 23, Township 5 South, Range 1 East, Salt Lake Base and Meridian: thence North 01°06'53" East 72.00 feet; thence North 05°54'46" East 200.23 feet; thence North32°26'35" East 217.19 feet; thence North 50°30'55" East 561.02 feet; thence North 73°32'45" East133.86 feet; thence South 00°23'36" West 637.12 feet; thence North 88°35'24" West 17.61 feet;thence South 00°35'17" West 152.64 feet; thence North 89°16'52" West 89.30 feet; thenceNorthwesterly 23.53 feet along the arc of a 15.00 foot radius curve the the right, through a central angle of 89°51'59", the chord of which bears North 44°20'52" West 21.19 feet; thence North 88°55'15"West 62.00 feet; thence Southwesterly 23.70 feet along the arc of a 15.00 foot radius curve the the right, through a central angle of 90°31'46", the chord of which bears South 45°51'00" West 21.31 feet;thence South 01°06'53" West 72.00 feet; thence North 88°53'07" West 493.68 feet to the point ofbeginning. Parcel contains: 9.42 acres more or less. Number of lots = 25

1497 West 40 South
Lindon, Utah - 84042
Phone (801) 225-5711

3662 West 2100 South
Salt Lake City, Utah - 84120
Phone (801) 787-9138

1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516

Geotechnical Study
42 Acre American Fork Property
400 South 400 West
American Fork, Utah

Project No. 178751

August 17, 2017

Prepared For:

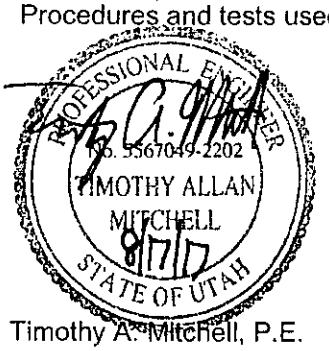
Woodside Homes
Attention: Mr. Garrett Seely
460 West 50 North, Suite 200
Salt Lake City, UT 84101

Prepared By:

EARTHTEC ENGINEERING
Lindon Office

CERTIFICATE

I hereby certify that I am a licensed professional engineer, as defined in the "Sensitive Lands Ordinance" Section of American Fork City Ordinances. I have examined this report to which this certificate is attached and the information and conclusions contained therein are, without any reasonable reservation not stated therein, accurate and complete. Procedures and tests used in this report meet minimum applicable professional standards.



Timothy A. Mitchell, P.E.
Geotechnical Engineer

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APPENDIX A

1.0 EXECUTIVE SUMMARY

This entire report presents the results of Earthtec Engineering's completed geotechnical study for the 42 Acre American Fork Property in American Fork, Utah. This executive summary provides a general synopsis of our recommendations and findings. Details of our findings, conclusions, and recommendations are provided within the body of this report.

- The subject property is approximately 42 acres and is proposed to be developed with a new subdivision with associated residential streets. The proposed structures will consist of wood-framed, one- to two-story houses with the possibility of basements. We anticipate foundation loads for the proposed structures will not exceed 5,000 pounds per linear foot for bearing wall, 30,000 pounds for column loads, and 100 pounds per square foot for floor slabs. (see Section 3)

- Our field exploration included the boring of one (1) boring and fourteen (14) test pits to depths of 8½ to 31½ feet below the existing ground surface. Groundwater was encountered at depths of approximately 3 to 9 feet below the existing ground surface. (see Section 5)

- The native soils have a slight to moderate potential for collapse (settlement) and a slight to moderate potential for compressibility under increased moisture contents and anticipated load conditions. (see Section 6)

- The subsurface soils encountered generally consisted of topsoil overlying near-surface soft to medum stiff clay and silt, and loose to dense sand and gravel. All topsoil should be removed beneath the entire building footprints, exterior flatwork, and pavements prior to construction. (see Section 7)

- The silt and sand layers have a "High" potential for liquefaction during a moderate to large earthquake event; should these layers liquefy, we estimate that up to 2½ inches of liquefaction-induced settlement and up to 3 feet of liquefaction-induced lateral movements could occur. (see Section 9)

- Conventional strip and spread footings may be used to support the structures, with foundations placed entirely on firm, undisturbed, uniform non-porous, non-organic soils (i.e. completely on clay soils, or completely on sand soils, etc.), or entirely on a minimum 18 inches of properly placed, compacted, and tested structural fill extending to undisturbed native soils. (see Section 10)

- Minimum roadway section consists of 3-inch asphalt over 12 inches of road-base. Areas that are soft or deflect under construction traffic should be removed and replaced with granular material or structural fill. (see Section 13)

Based on the results of our field exploration, laboratory testing, and engineering analyses, it is our opinion that the subject site may be suitable for the proposed development, provided the recommendations presented in this report are followed and implemented during design and construction.

Failure to consult with Earthtec Engineering (Earthtec) regarding any changes made during design and/or construction of the project from those discussed herein relieves Earthtec from any liability arising from changed conditions at the site. We also strongly recommend that Earthtec observes the building excavations to verify the adequacy of our recommendations presented herein, and that Earthtec performs materials testing and special inspections for this project to provide continuity during construction.

2.0 INTRODUCTION

The project is located at approximately 400 South 400 West in American Fork, Utah. The general location of the site is shown on Figure No. 1, *Vicinity Map* and Figure No. 2, *Aerial Photograph Showing Location of Boring and Test Pits*, at the end of this report. The purposes of this study are to:

- Evaluate the subsurface soil conditions at the site,
- Assess the engineering characteristics of the subsurface soils, and
- Provide geotechnical recommendations for general site grading and the design and construction of foundations, concrete floor slabs, miscellaneous concrete flatwork, and asphalt paved residential streets.

The scope of work completed for this study included field reconnaissance, subsurface exploration, field and laboratory soil testing, geotechnical engineering analysis, and the preparation of this report.

3.0 PROPOSED CONSTRUCTION

We understand that the proposed project, as described to us by Mr. Garrett Seely with Woodside Homes, consists of developing the approximately 42-acre existing parcel into a new subdivision with associated residential streets. The proposed structures will consist of wood-framed, one- to two-story houses with the possibility of basements We have based our recommendations in this report on the assumption that anticipated foundation loads for the proposed structures will not exceed 5,000 pounds per linear foot for bearing wall, 30,000 pounds for column loads, and 100 pounds per square foot for floor slabs. If structural loads will be greater, Earthtec should be notified so that we may review our recommendations and make modifications, if necessary.

In addition to the construction described above, we anticipate that

- Utilities will be installed to service the proposed buildings,
- Exterior concrete flatwork will be placed in the form of curb, gutter, and sidewalks, and
- Asphalt paved residential streets will be constructed.

4.0 GENERAL SITE DESCRIPTION

4.1 Site Description

At the time of our subsurface exploration the site was an undeveloped lot vegetated with grass and weeds. The center of the site contains a few springs and a stream running through the property approximately east to west. The ground around the springs and stream was very marsh-like with cattails. The ground surface appears to be relatively flat, we anticipate less than 3 feet of cut and fill may be required for site grading. The lot was bounded on the north by 370 South Street, on the east by Storrs Avenue, and on the south and west by undeveloped agricultural fields.

4.2 Geologic Setting

The subject property is located in the northern portion of Utah Valley near the northern shore of Utah Lake. Utah Valley is a deep, sediment-filled basin that is part of the Basin and Range Physiographic Province. The valley was formed by extensional tectonic processes during the Tertiary and Quaternary geologic time periods. The valley is bordered by the Wasatch Mountain Range on the east and the Lake Mountains on the west. Much of northwestern Utah, including Utah Valley, was previously covered by the Pleistocene age Lake Bonneville. Utah Lake, which currently covers much of the western portion of the valley, is a remnant of this ancient fresh water lake. The surficial geology of much of the eastern margin of the valley has been mapped by Constenius, 2011[1]. The surficial geology at the location of the subject site and adjacent properties is mapped as:

- "Younger alluvial-fan deposits" (Qafy) dated to be Holocene and upper Pleistocene. These soil or deposits are generally described in the referenced mapping as "mostly sand, silt, and gravel that is poorly stratified and poorly sorted."
- "Fine-grained lacustrine deposits" (Qlf) dated to be upper Pleistocene. These soil or deposits are generally described in the referenced mapping as "silt and clay with some finegrained sand."
- "Spring and marsh deposits" (Qsm) dated to be Holocene to upper Pleistocene. These soil or deposits are generally described in the referenced mapping as "fine, organic-rich sediment associated with springs, ponds, seeps, and wetlands."

5.0 SUBSURFACE EXPLORATION

5.1 Soil Exploration

Under the direction of a qualified member of our geotechnical staff, subsurface explorations

[1] Constenius, K.N., Clark, D.L., King, J.K., Ehler, J.B., 2011, Interim Geologic Map of the Provo Quadrangle, *Utah, Wasatch and Salt Lake Counties, Utah*; U.S. Geological Survey, Open-File 586DM, Scale 1: 62,500.

were conducted at the site on July 5 and 21, 2017 by the excavation of one (1) boring and fourteen (14) test pits to depths of 8½ to 31½ feet below the existing ground surface using an all-terrain hydraulic drill rig and a mini excavator. The approximate locations of the boring and test pits are shown on Figure No. 2, *Aerial Photograph Showing Location of Boring and Test Pits*. Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 17, *Boring and Test Pit Logs* at the end of this report. The stratification lines shown on the logs represent the approximate boundary between soil units; the actual transition may be gradual. Due to potential natural variations inherent in soil deposits, care should be taken in interpolating between and extrapolating beyond exploration points. A key to the symbols and terms on the logs is presented on Figure No. 18, *Legend*.

As required by the American Fork Sensitive Lands Ordinance a 70-foot boring is required to have been performed within 2,000 feet of the site. The boring labeled AF-06-4 is within 2,000 feet of the site.

Samples of the subsurface soils were collected in the boring at depth intervals of approximately 2½ to 5 feet. Relatively undisturbed samples were collected by pushing thin-walled "Shelby" tubes into undisturbed soils below the augers. Disturbed samples were collected with a 1⅜ inch inside diameter split spoon sampler. The split spoon sampler was driven 18 inches into undisturbed soil with a 140-pound hammer free-falling through a distance of 30 inches. The blows required to drive the sampler through the final 12 inches of penetration is called the "N-value" or "blow count," and is recorded as "blows per foot" on the attached boring logs at the respective sample depths. The blow count provides a reasonable indication of the in-place relative density of sandy soils, but provides only a limited indication of the relative stiffness of cohesive (clayey) materials, since the penetration resistance for these soils is a function of the moisture content. In gravelly soils, the blow count may be higher than it otherwise would be, particularly when one or more gravel particles are larger than the sampler diameter. Disturbed bag samples and relatively undisturbed block samples were collected at various depths in each test pit.

The soil samples collected were classified by visual examination in the field following the guidelines of the Unified Soil Classification System (USCS). The samples were transported to our Lindon, Utah laboratory where they will be retained for 30 days following the date of this report and then discarded, unless a written request for additional holding time is received prior to the 30-day limit.

6.0 LABORATORY TESTING

Representative soil samples collected during our field exploration were tested in the laboratory to assess pertinent engineering properties and to aid in refining field classifications, if needed. Tests performed included natural moisture content, dry density tests, liquid and plastic limits determinations, mechanical (partial) gradation analyses, one-dimensional consolidation tests, organic content burn-off, and a soluble sulfate test. The table below summarizes the laboratory test results, which are also included on the attached *Boring and Test Pit Logs* at the respective

sample depths, and *Consolidation-Swell Test,* on Figure Nos. 19 through 24.

Table 1: Laboratory Test Results

Boring and Test Pit No.	Depth (ft.)	Natural Moisture (%)	Natural Dry Density (pcf)	Atterberg Limits		Grain Size Distribution (%)			Organic Content (%)	Soil Type
				Liquid Limit	Plasticity Index	Gravel (+ #4)	Sand	Silt/Clay (- #200)		
B-1	10	16	---	---	---	58	20	22	---	GM
B-1	20	7	---	---	---	71	27	2	---	GP
B-1	30	49	---	45	23	2	20	78	---	CL
TP-1	4	16	94	26	7	0	29	71	---	CL-ML
TP-2	4	31	---	29	9	2	23	75	---	CL
TP-3	3½	21	95	28	7	0	34	66	---	CL-ML
TP-4	3	37	76	35	10	1	23	76	4.2	CL
TP-4	5	16	---	25	NP*	49	28	23	---	GM
TP-5	4	---	---	48	23	---	---	---	---	CL
TP-5	6½	---	---	25	NP*	---	---	---	---	ML
TP-7	6½	15	---	---	---	56	26	18	---	GM
TP-8	5	29	89	24	NP*	1	45	54	---	ML
TP-9	2½	14	90	38	18	1	21	78	---	CL
TP-10	10	26	---	22	NP*	1	47	52	---	ML
TP-11	8	37	---	39	17	1	15	84	3.4	CL
TP-12	4	3	---	21	2	69	23	8	---	GP-GM
TP-13	3	14	---	23	3	8	45	47	---	SM
TP-14	3	23	91	27	8	4	25	71	---	CL

NP* = Non-Plastic

As part of the consolidation test procedure, water was added to the samples to assess moisture sensitivity when the samples were loaded to an equivalent pressure of approximately 1,000 psf. The native soils have a slight to moderate potential for collapse (settlement) and a slight to moderate potential for compressibility under increased moisture contents and anticipated load conditions.

A water-soluble sulfate test was performed on a representative sample obtained during our field exploration. Testing indicated a value of 184 parts per million. Based on this result, the risk of sulfate attack to concrete appears to be "moderate" according to American Concrete Institute standards. Therefore, we recommend that Type II Portland cement be used for concrete in contact with on-site soils. The results can be found in Appendix A.

7.0 SUBSURFACE CONDITIONS

7.1 Soil Types

On the surface of the site, we encountered topsoil which is estimated to extend about 1 to 3 feet in depth at the boring locations. Below the topsoil we encountered layers of clay, silt, sand, and gravel extending to depths of 8½ to 31½ feet below the existing ground surface. Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 17, *Boring and Test Pit Log* at the end of this report. Based on the blow counts obtained and our experience and observations during field exploration, the clay and silt soils ranged from soft to medum stiff in consistency and the sand and gravel soils had a relative density varying from loose to dense.

It should be considered that small diameter soil borings were used during the course of our subsurface exploration. Fill material composition and contacts are difficult to determine from boring sampling. Variation in fill depths may occur at the site.

7.2 Groundwater Conditions

Groundwater was encountered at depths of approximately 3 to 9 feet below the existing ground surface. Note that groundwater levels will fluctuate in response to the season, precipitation, snow melt, irrigation, and other on and off-site influences. Quantifying these fluctuations would require long term monitoring, which is beyond the scope of this study. The contractor should be prepared to dewater excavations as needed.

8.0 SITE GRADING

8.1 General Site Grading

All surface vegetation and unsuitable soils (such as topsoil, organic soils, undocumented fill, soft, loose, or disturbed native soils, and any other inapt materials) should be removed from below foundations, floor slabs, exterior concrete flatwork, and pavement areas. We encountered topsoil on the surface of the site. The topsoil (including soil with roots larger than about ¼ inch in diameter) should be completely removed, even if found to extend deeper, along with any other unsuitable soils that may be encountered. Over-excavations below footings and slabs also may be needed, as discussed in Section 10.0.

Fill placed over large areas, even if only a few feet in depth, can cause consolidation in the underlying native soils resulting in settlement of the fill. Because the site is relatively flat, we anticipate that less than 3 feet of grading fill will be placed. If more than 3 feet of grading fill will be placed above the existing surface (to raise site grades), Earthtec should be notified so that we may provide additional recommendations, if required. Such recommendations will likely include placing the fill several weeks (or possibly more) prior to construction to allow settlement to occur.

8.2 Temporary Excavations

Temporary excavations that are less than 4 feet in depth and above groundwater should have side slopes no steeper than ½H:1V (Horizontal:Vertical). Temporary excavations where water is encountered in the upper 4 feet or that extend deeper than 4 feet below site grades should be sloped or braced in accordance with OSHA[2] requirements for Type C soils.

8.3 Fill Material Composition

The native soils are not suitable for use as placed and compacted structural fill. Excavated soils, including clay and silt, may be stockpiled for use as fill in landscape areas.

Structural fill is defined as fill material that will ultimately be subjected to any kind of structural loading, such as those imposed by footings, floor slabs, pavements, etc. We recommend that a professional engineer or geologist verify that the structural fill to be used on this project meets the requirements, stated below. We recommend that structural fill consist of imported sandy/gravelly soils meeting the following requirements in the table below:

Table 2: Structural Fill Recommendations

Sieve Size/Other	Percent Passing (by weight)
4 inches	100
3/4 inches	70 – 100
No. 4	40 – 80
No. 40	15 – 50
No. 200	0 – 20
Liquid Limit	35 maximum
Plasticity Index	15 maximum

In some situations, particles larger than 4 inches and/or more than 30 percent coarse gravel may be acceptable, but would likely make compaction more difficult and/or significantly reduce the possibility of successful compaction testing. Consequently, stricter quality control measures than normally used may be required, such as using thinner lifts and increased or full time observation of fill placement.

We recommend that utility trenches below any structural load be backfilled using structural fill. Note that most local governments and utility companies require Type A-1-a or A-1-b (AASHTO classification) soils (which overall is stricter than our recommendations for structural fill) be used as backfill above utilities in certain areas. In other areas or situations, utility trenches may be backfilled with the native soil, but the contractor should be aware that native clay and silt soils (as observed in the explorations) may be time consuming to compact due to potential difficulties in controlling the moisture content needed to obtain optimum compaction. All backfill soil should have a maximum particle size of 4 inches, a maximum Liquid Limit of 35 and a maximum

[2] OSHA Health and Safety Standards, Final Rule, CFR 29, part 1926.

Plasticity Index of 15.

If required (i.e. fill in submerged areas), we recommend that free draining granular material (clean sand and/or gravel) meet the following requirements in the table below:

Table 3: Free-Draining Fill Recommendations

Sieve Size/Other	Percent Passing (by weight)
3 inches	100
No. 10	0 – 25
No. 40	0 – 15
No. 200	0 – 5
Plasticity Index	Non-plastic

Three-inch minus washed rock (sometimes called river rock or drain rock) and pea gravel materials usually meet these requirements and may be used as free draining fill. If free draining fill will be placed adjacent to soil containing a significant amount of sand or silt/clay, precautions should be taken to prevent the migration of fine soil into the free draining fill. Such precautions should include either placing a filter fabric between the free draining fill and the adjacent soil material, or using a well-graded, clean filtering material approved by the geotechnical engineer.

8.4 Fill Placement and Compaction

Fill should be placed on level, horizontal surfaces. Where fill will be placed on slopes steeper than 5H:1V, the existing ground should be benched prior to placing fill. We recommend bench heights of 1 to 4 feet, with the lowest bench being a minimum 3 feet below adjacent grade and at least 10 feet wide.

The thickness of each lift should be appropriate for the compaction equipment that is used. We recommend a maximum lift thickness prior to compaction of 4 inches for hand operated equipment, 6 inches for most "trench compactors" and 8 inches for larger rollers, unless it can be demonstrated by in-place density tests that the required compaction can be obtained throughout a thicker lift. The full thickness of each lift of structural fill placed should be compacted to at least the following percentages of the maximum dry density, as determined by ASTM D-1557:

- In landscape and other areas not below structurally loaded areas: 90%
- Less than 5 feet of fill below structurally loaded areas: 95%
- Greater than 5 feet of fill below structurally loaded areas: 98%

Generally, placing and compacting fill at moisture contents within ±2 percent of the optimum moisture content, as determined by ASTM D-1557, will facilitate compaction. Typically, the further the moisture content deviates from optimum the more difficult it will be to achieve the required compaction.

Fill should be tested frequently during placement and we recommend early testing to demonstrate that placement and compaction methods are achieving the required compaction.

The contractor is responsible to ensure that fill materials and compaction efforts are consistent so that tested areas are representative of the entire fill.

8.5 Stabilization Recommendations

Near surface layers of soils may rut and pump during grading and construction. The likelihood of rutting and/or pumping, and the depth of disturbance, is proportional to the moisture content in the soil, the load applied to the ground surface, and the frequency of the load. Consequently, rutting and pumping can be minimized by avoiding concentrated traffic, minimizing the load applied to the ground surface by using lighter equipment, partially loaded equipment, tracked equipment, by working in dry times of the year, and/or by providing a working surface for equipment. However, because of the relatively shallow depth of groundwater, it is likely that rutting and pumping may not be avoidable.

During grading the soil in any obvious soft spots should be removed and replaced with granular material. If rutting or pumping occurs traffic should be stopped in the area of concern. The soil in rutted areas should be removed and replaced with granular material. In areas where pumping occurs the soil should either be allowed to sit until pore pressures dissipate (several hours to several days) and the soil firms up, or be removed and replaced with granular material. Typically, we recommend removal to a minimum depth of 24 inches.

For granular material, we recommend using angular well-graded gravel, such as pit run, or crushed rock with a maximum particle size of four inches. We suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor. A finer granular material such as sand, gravelly sand, sandy gravel or road base may also be used. Materials which are more angular and coarse may require thinner lifts in order to achieve compaction. We recommend that the fines content (percent passing the No. 200 sieve) be less than 15%, the liquid limit be less than 35, and the plasticity index be less than 15.

Using a geosynthetic fabric, such as Mirafi 600X or equivalent, may also reduce the amount of material required and avoid mixing of the granular material and the subgrade. If a fabric is used, following removal of disturbed soils and water, the fabric should be placed over the bottom and up the sides of the excavation a minimum of 24 inches. The fabric should be placed in accordance with the manufacturer's recommendations, including proper overlaps. The granular material should then be placed over the fabric in compacted lifts. Again, we suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor.

9.0 SEISMIC AND GEOLOGIC CONSIDERATIONS

9.1 Seismic Design

The residential structures should be designed in accordance with the 2015 International Residential Code (IRC). The IRC designates this area as a seismic design class D_1.

The site is located at approximately 40.366 degrees latitude and -111.809 degrees longitude from the approximate center of the site. The IRC site value for this property is 0.803g. The design spectral response acceleration parameters are given below.

Table 4: Design Acceleration for Short Period

S_S	F_a	Site Value (S_{DS})
		2/3 S_S*F_a
1.166g	1.034	0.803g

S_S = Mapped spectral acceleration for short periods
F_a = Site coefficient from Table 1613.3.3(1)
S_{DS} = ⅔S_{MS}= ⅔ (F_a·S_s) = 5% damped design spectral response acceleration for short periods

9.2 Faulting

The subject property is located within the Intermountain Seismic Belt where the potential for active faulting and related earthquakes is present. Based upon published geologic maps[3], no active faults traverse through or immediately adjacent to the site and the site is not located within local fault study zones. The nearest mapped fault trace is the Wasatch Fault located about 4¼ miles east of the site.

9.3 Liquefaction Potential

According to current liquefaction maps[4] for Utah County, the site is located within an area designated as "High" in liquefaction potential. Liquefaction can occur when saturated subsurface soils below groundwater lose their inter-granular strength due to an increase in soil pore water pressures during a dynamic event such as an earthquake. As part of this study, the potential for liquefaction to occur in the soils we encountered was assessed using Youd *et al*[5] and Boulanger & Idriss[6]. Potential liquefaction-induced movements were evaluated using Tokimatsu & Seed[7] and Youd, Hansen & Bartlett[8].

Loose, saturated sands are most susceptible to liquefaction, but some loose, saturated gravels and relatively sensitive silt to low-plasticity silty clay soils can also liquefy during a seismic event. Subsurface soils were composed of clay, silt, sand, and gravel soils. Our analysis indicates that approximately up to 2½ inches of liquefaction-induced settlement and possibly up to 3 feet of lateral spreading could occur during a moderate to large earthquake event. The

[3] U.S. Geological Survey, Quaternary Fault and Fold Database of the United States, November 3, 2010
[4] Utah Geological Survey, Liquefaction-Potential Map for a Part of Utah County, Utah, Public Information Series 28, August 1994
[5] Youd, T.L. (Chair), Idriss, I.M. (Co-Chair), and 20 other authors, 2001, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, October 2001, p. 817-833.
[6] Boulanger, R.W. and Idriss, I.M., 2006, Liquefaction Susceptibility Criteria for Silts and Clays, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, November 2006, p. 1413-1426.
[7] Tokimatsu, K. and Seed, H.B., 1987, Evaluation of Settlements in Sands due to Earthquake Shaking, Journal of Geotechnical Engineering, ASCE, p. 861-878.
[8] Youd, T.L., Hansen, C.M. and Bartlett, S.F., 2002, Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, December 2002, p. 1007-1017.

liquefaction potential at the site can be mitigated using one of the following alternatives:

- Install earthquake drains, such as Nilex drains, to relieve increases in pore water pressure during a seismic event.
- Connect/tie all footings together using reinforced grade beams and connect reinforced slabs to the footings so that the building will react as a cohesive unit. This may result in some tilting of the building due to differential liquefaction-induced movements. The building may also move laterally due to lateral spreading.

10.0 FOUNDATIONS

10.1 General

The foundation recommendations presented in this report are based on the soil conditions encountered during our field exploration, the results of laboratory testing of samples of the native soils, the site grading recommendations presented in this report, and the foundation loading conditions presented in Section 3.0, *Proposed Construction*, of this report. If loading conditions and assumptions related to foundations are significantly different, Earthtec should be notified so that we can re-evaluate our design parameters and estimates (higher loads may cause more settlement), and to provide additional recommendations if necessary.

Conventional strip and spread footings may be used to support the proposed structures after appropriate removals as outlined in Section 8.1. Foundations should not be installed on topsoil, undocumented fill, debris, combination soils, organic soils, frozen soil, or in ponded water. If foundation soils become disturbed during construction, they should be removed or compacted.

10.2 Strip/Spread Footings

We recommend that conventional strip and spread foundations be constructed entirely on firm, undisturbed, uniform non-porous, non-organic soils (i.e. completely on clay soils, or completely on sand soils, etc.), or entirely on a minimum 18 inches of properly placed, compacted, and tested structural fill extending to undisturbed native soils For foundation design we recommend the following:

- Footings founded on native soils may be designed using a maximum allowable bearing capacity of 1,500 pounds per square foot. Footings founded on a minimum 18 inches of structural fill may be designed using a maximum allowable bearing capacity of 2,000 pounds per square foot. The values for vertical foundation pressure can be increased by one-third for wind and seismic conditions per Section 1806.1 when used with the Alternative Basic Load Combinations found in Section 1605.3.2 of the 2015 International Building Code.
- Continuous and spot footings should be uniformly loaded and should have a minimum width of 20 and 30 inches, respectively.
- Exterior footings should be placed below frost depth which is determined by local building

codes. In general, 30 inches of cover is adequate for most sites; however local code should be verified by the end design professional. Interior footings, not subject to frost (heated structures), should extend at least 18 inches below the lowest adjacent grade.

- Foundation walls and footings should be properly reinforced to resist all vertical and lateral loads and differential settlement.
- The bottom of footing excavations should be compacted with at least 4 passes of an approved non-vibratory roller prior to erection of forms or placement of structural fill to densify soils that may have been loosened during excavation and to identify soft spots. If soft areas are encountered, they should be stabilized as recommended in Section 8.5.
- Footing excavations should be observed by the geotechnical engineer prior to beginning footing construction to evaluate whether suitable bearing soils have been exposed and whether excavation bottoms are free of loose or disturbed soils.
- Because of shallow groundwater conditions encountered at the site, we anticipate that 24 inches of structural fill will be required below the proposed structure to provide a firm surface upon which to construct the proposed structure. In lieu of traditional structural fill, clean 1- to 2-inch clean gravel may be used in conjunction with a stabilization fabric, such as Mirafi 600X or equivalent, which should be placed between the native soils and the clean gravel (additional recommendations for placing clean gravel and stabilization fabric are given in Section 8.5 of this report).
- Due to shallow groundwater encountered at the site, lowest floor slab depths should be limited to existing site grades. This is intended to provide a minimum of 3 feet of separation between the observed groundwater condition and the bottom of the floor slab.
- Structural fill used below foundations should extend laterally a minimum of 6 inches for every 12 vertical inches of structural fill placed. For example, if 18 inches of structural fill is required to bring the excavation to footing grade, the structural fill should extend laterally a minimum of 9 inches beyond the edge of the footings on both sides.

10.3 Estimated Settlements

If the proposed foundations are properly designed and constructed using the parameters provided above, we estimate that total settlements should not exceed one inch and differential settlements should be one-half of the total settlement over a 25-foot length of continuous foundation, for non-earthquake conditions. Additional settlement could occur during a seismic event due to ground shaking, if more than 3 feet of grading fill is placed above the existing ground surface, if loading conditions are greater than anticipated in Section 3, and/or if foundation soils are allowed to become wetted.

10.4 Lateral Earth Pressures

Below grade walls act as soil retaining structures and should be designed to resist pressures induced by the backfill soils. The lateral pressures imposed on a retaining structure are

dependent on the rigidity of the structure and its ability to resist rotation. Most retaining walls that can rotate or move slightly will develop an active lateral earth pressure condition. Structures that are not allowed to rotate or move laterally, such as subgrade basement walls, will develop an at-rest lateral earth pressure condition. Lateral pressures applied to structures may be computed by multiplying the vertical depth of backfill material by the appropriate equivalent fluid density. Any surcharge loads in excess of the soil weight applied to the backfill should be multiplied by the appropriate lateral pressure coefficient and added to the soil pressure. For static conditions, the resultant forces are applied at about one-third the wall height (measured from bottom of wall). For seismic conditions, the resultant forces are applied at about two-third times the height of the wall both measured from the bottom of the wall. The lateral pressures presented in the table below are based on drained, horizontally placed native soils as backfill material using a 30° friction angle and a dry unit weight of 110 pcf.

Table 5: Lateral Earth Pressures (Static and Dynamic)

Condition	Case	Lateral Pressure Coefficient	Equivalent Fluid Pressure (pcf)
Active	Static	0.33	37
	Seismic	0.50	55
At-Rest	Static	0.50	55
	Seismic	0.71	79
Passive	Static	3.00	330
	Seismic	3.91	430

*Seismic values combine the static and dynamic values

These pressure values do not include any surcharge, and are based on a relatively level ground surface at the top of the wall and drained conditions behind the wall. It is important that water is not allowed to build up (hydrostatic pressures) behind retaining structures. Retaining walls should incorporate drainage behind the walls as appropriate, and surface water should be directed away from the top and bottom of the walls.

Lateral loads are typically resisted by friction between the underlying soil and footing bottoms. Resistance to sliding may incorporate the friction acting along the base of foundations, which may be computed using a coefficient of friction of soils against concrete of 0.30 for native clay and silts, 0.40 for native sands, and 0.55 for native gravels or structural fill meeting the recommendations presented herein. Concrete or masonry walls shall be selected and constructed in accordance to the provision of Section R404 of the 2015 International Residential Code or sections referenced therein. Retaining wall lateral resistance design should further reference Section R404.4 for reference of Safety Factors.

The pressure and coefficient values presented above are ultimate; therefore, an appropriate factor of safety may need to be applied to these values for design purposes. The appropriate factor of safety will depend on the design condition and should be determined by the project structural engineer.

11.0 FLOOR SLABS AND FLATWORK

Due to shallow groundwater encountered at the site, lowest floor slab depths should be limited to existing site grades. This is intended to provide a minimum of 3 feet of separation between the observed groundwater condition and the bottom of the floor slab.

Concrete floor slabs and exterior flatwork may be supported on native soils after appropriate removals and grading as outlined in Section 8.1 are completed. We recommend placing a minimum 4 inches of free-draining fill material (see Section 8.3) beneath floor slabs to facilitate construction, act as a capillary break, and aid in distributing floor loads. For exterior flatwork, we recommend placing a minimum 4 inches of road-base material. Prior to placing the free-draining fill or road-base materials, the native sub-grade should be proof-rolled to identify soft spots, which should be stabilized as discussed above in Section 8.5.

For slab design, we recommend using a modulus of sub-grade reaction of 120 pounds per cubic inch. The thickness of slabs supported directly on the ground shall not be less than 3½ inches. A 6-mil polyethylene vapor retarder with joints lapped not less than 6 inches shall be placed between the ground surface and the concrete, as per Section R506 of the 2015 International Residential Code.

To help control normal shrinkage and stress cracking, we recommend that floor slabs have adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints, frequent crack control joints, and non-rigid attachment of the slabs to foundation and bearing walls. Special precautions should be taken during placement and curing of all concrete slabs and flatwork. Excessive slump (high water-cement ratios) of the concrete and/or improper finishing and curing procedures used during hot or cold weather conditions may lead to excessive shrinkage, cracking, spalling, or curling of slabs. We recommend all concrete placement and curing operations be performed in accordance with American Concrete Institute (ACI) codes and practices.

12.0 DRAINAGE

12.1 Surface Drainage

Due to the collapse potential of native soils, wetting of subsurface soils (including those below foundations) could result in adverse settlement. Accordingly, we recommend the following:

- The contractor should take precautions to prevent significant wetting of the soil at the base of the excavation. Such precautions may include: grading to prevent runoff from entering the excavation, excavating during normally dry times of the year, covering the base of the excavation if significant rain or snow is forecast, backfill at the earliest possible date, frame floors and/or the roof at the earliest possible date, other precautions that might become evident during construction.

- Adequate compaction of foundation backfill should be provided i.e. a minimum of 90% of ASTM D-1557. Water consolidation methods should not be used.
- The ground surface should be graded to drain away from the building in all directions. We recommend a minimum fall of 10 inches in the first 10 feet.
- Roof runoff should be collected in rain gutters with down spouts designed to discharge well outside of the backfill limits, or at least 10 feet from foundations, whichever is greater.
- Sprinkler nozzles should be aimed away, and all sprinkler components kept at least 10 feet, from foundation walls. Also, sprinklers should not be placed at the top or on the face of slopes. Sprinkler systems should be designed with proper drainage and well maintained. Over-watering should be avoided.
- Any additional precautions which may become evident during construction.

12.2 Subsurface Drainage

Section R405.1 of the 2015 International Residential Code states, "Drains shall be provided around all concrete and masonry foundations that retain earth and enclose habitable or usable spaces located below grade." Section R310.2.3.2 of the 2015 International Residential Code states, "Window wells shall be designed for proper drainage by connecting to the building's foundation drainage system." An exception is allowed when the foundation is installed on well drained ground consisting of Group 1 soils, which include those defined by the Unified Soil Classification System as GW, GP, SW, SP, GM, and SM. The soils observed in the explorations at the depth of foundation consisted primarily of clay (CL) and silt (ML) which are not Group 1 soils. The recommendations presented below should be followed during design and construction of the foundation drains:

- A perforated 4-inch minimum diameter pipe should be enveloped in at least 12 inches of free-draining gravel and placed adjacent to the perimeter footings. The perforations should be oriented such that they are not located on the bottom side of the pipe, as much as possible. The free-draining gravel should consist of primarily ¾- to 2-inch size gravel having less than 5 percent passing the No. 4 sieve, and should be wrapped with a separation fabric such as Mirafi 140N or equivalent.
- The highest point of the perforated pipe bottom should be equal to the bottom elevation of the footings. The pipe should be uniformly graded to drain to an appropriate outlet (storm drain, land drain, other gravity outlet, etc.) or to one or more sumps where water can be removed by pumping.
- A perforated 4-inch minimum diameter pipe should be installed in all window wells and connected to the foundation drain.
- To facilitate drainage beneath basement floor slabs we recommend that the minimum thickness of free-draining fill beneath the slabs be increased to at least 10 inches

(approximately equal to the bottom of footing elevations). A separation fabric such as Mirafi 140N or equivalent should be placed beneath the free-draining gravel. Connections should be made to allow any water beneath the slabs to reach the perimeter foundation drain.

- The drain system should be periodically inspected and clean-outs should be installed for the foundation drain to allow occasional cleaning/purging, as needed. Proper drain operation depends on proper construction and maintenance.

13.0 PAVEMENT RECOMMENDATIONS

We understand that asphalt paved residential streets will be constructed as part of the project. The native soils encountered beneath the topsoil during our field exploration were predominantly composed of clays. We estimate that a California Bearing Ratio (CBR) value of 3 is appropriate for these soils. Also, the near-surface native clay/silt soils are potentially collapsible, and over-excavation may be needed to minimize the potential settlement of pavements. If the topsoil is left beneath concrete flatwork and pavement areas, increased maintenance costs over time should be anticipated.

We anticipate that the traffic volume will be about 2,000 vehicles a day (54.5 ESAL/day) or less for the residential streets, consisting of mostly cars and pickup trucks, with a daily delivery truck and a weekly garbage truck. Based on these traffic parameters, the estimated CBR given above, and the procedures and typical design inputs outlined in the UDOT Pavement Design Manual (1998), we recommend the minimum asphalt pavement section presented below.

Table 6: Pavement Section Recommendations

Asphalt Thickness (in)	Compacted Roadbase Thickness (in)	Compacted Subbase Thickness (in)
3	12*	0
3	6	14*
3	8	10*

* Stabilization may be required

If the pavement will be required to support construction traffic, more than an occasional semi-tractor or fire truck, or more traffic than listed above, our office should be notified so that we can re-evaluate the pavement section recommendations. The following also apply:

- The subgrade should be prepared by proof rolling to a firm, non-yielding surface, with any identified soft areas stabilized as discussed above in Section 8.5.
- Site grading fills below the pavements should meet structural fill composition and placement recommendations per Sections 8.3 and 8.4 herein.
- Asphaltic concrete, aggregate base and sub-base material composition should meet local, APWA or UDOT requirements.

- Aggregate base and sub-base is compacted to local, APWA, or UDOT requirements, or to at least 95 percent of maximum dry density (ASTM D 1557).
- Asphaltic concrete is compacted to local or UDOT requirements, or to at least 96 percent of the laboratory Marshall density (ASTM D 6927).

14.0 GENERAL CONDITIONS

The exploratory data presented in this report was collected to provide geotechnical design recommendations for this project. The explorations may not be indicative of subsurface conditions outside the study area or between points explored and thus have a limited value in depicting subsurface conditions for contractor bidding. Variations from the conditions portrayed in the explorations may occur and which may be sufficient to require modifications in the design. If during construction, conditions are different than presented in this report, Earthtec should be advised immediately so that the appropriate modifications can be made.

The findings and recommendations presented in this geotechnical report were prepared in accordance with generally accepted geotechnical engineering principles and practice in this area of Utah at this time. No warranty or representation is intended in our proposals, contracts, letters, or reports.

This geotechnical report is based on relatively limited subsurface explorations and laboratory testing. Subsurface conditions may differ in some locations of the site from those described herein, which may require additional analyses and possibly modified recommendations. Thus we strongly recommend consulting with Earthtec regarding any changes made during design and construction of the project from those discussed herein. Failure to consult with Earthtec regarding any such changes relieves Earthtec from any liability arising from changed conditions at the site.

To maintain continuity, Earthtec should also perform materials testing and special inspections for this project. The recommendations presented herein are based on the assumption that an adequate program of tests and observations will be followed during construction to verify compliance with our recommendations. We also assume that we will review the project plans and specifications to verify that our conclusions and recommendations are incorporated and remain appropriate (based on the actual design). Earthtec should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Earthtec also should be retained to provide observation and testing services during grading, excavation, foundation construction, and other earth-related construction phases of the project.

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please contact Earthtec at your convenience.

Respectfully;

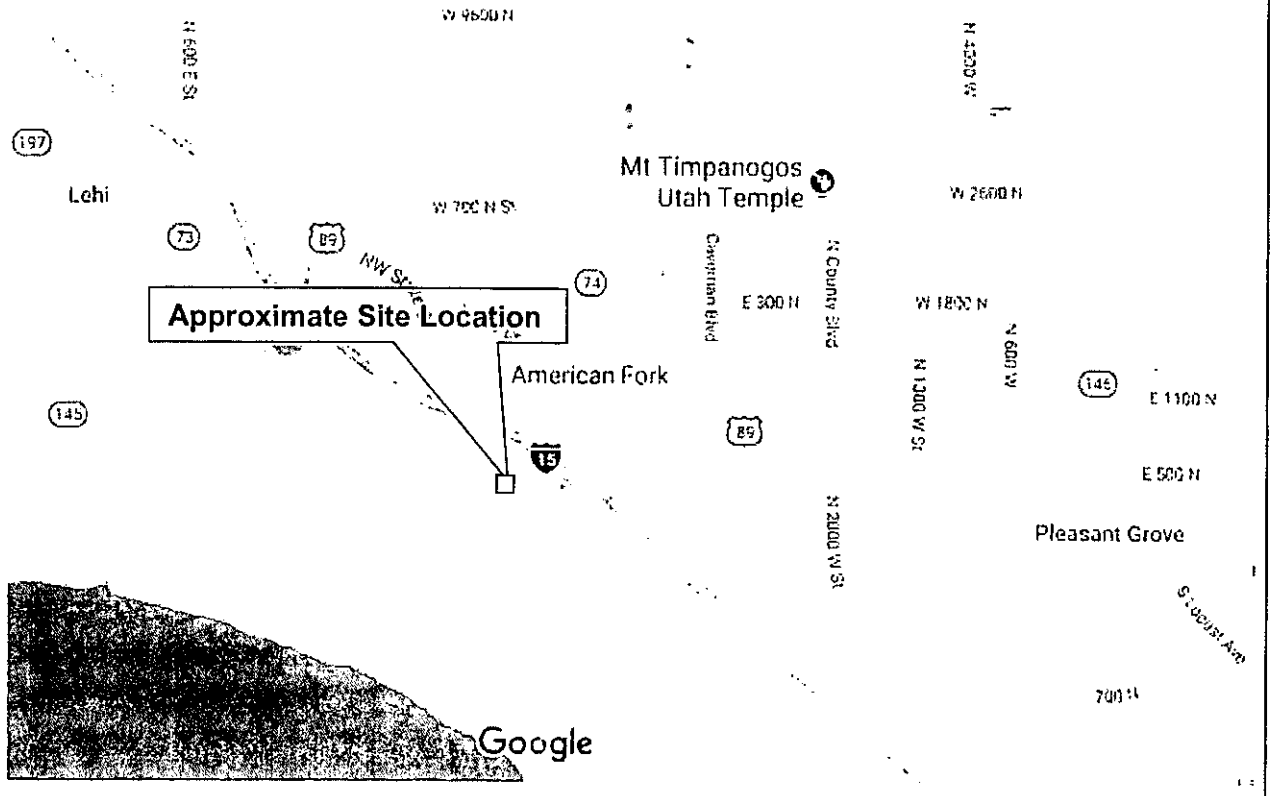
EARTHTEC ENGINEERING

Jeremy A. Balleck, E.I.T.
Staff Engineer

Timothy A. Mitchell, P.E.
Geotechnical Engineer

VICINITY MAP

42 Acre American Fork Property
Approximately 400 South 400 West
American Fork, UTAH



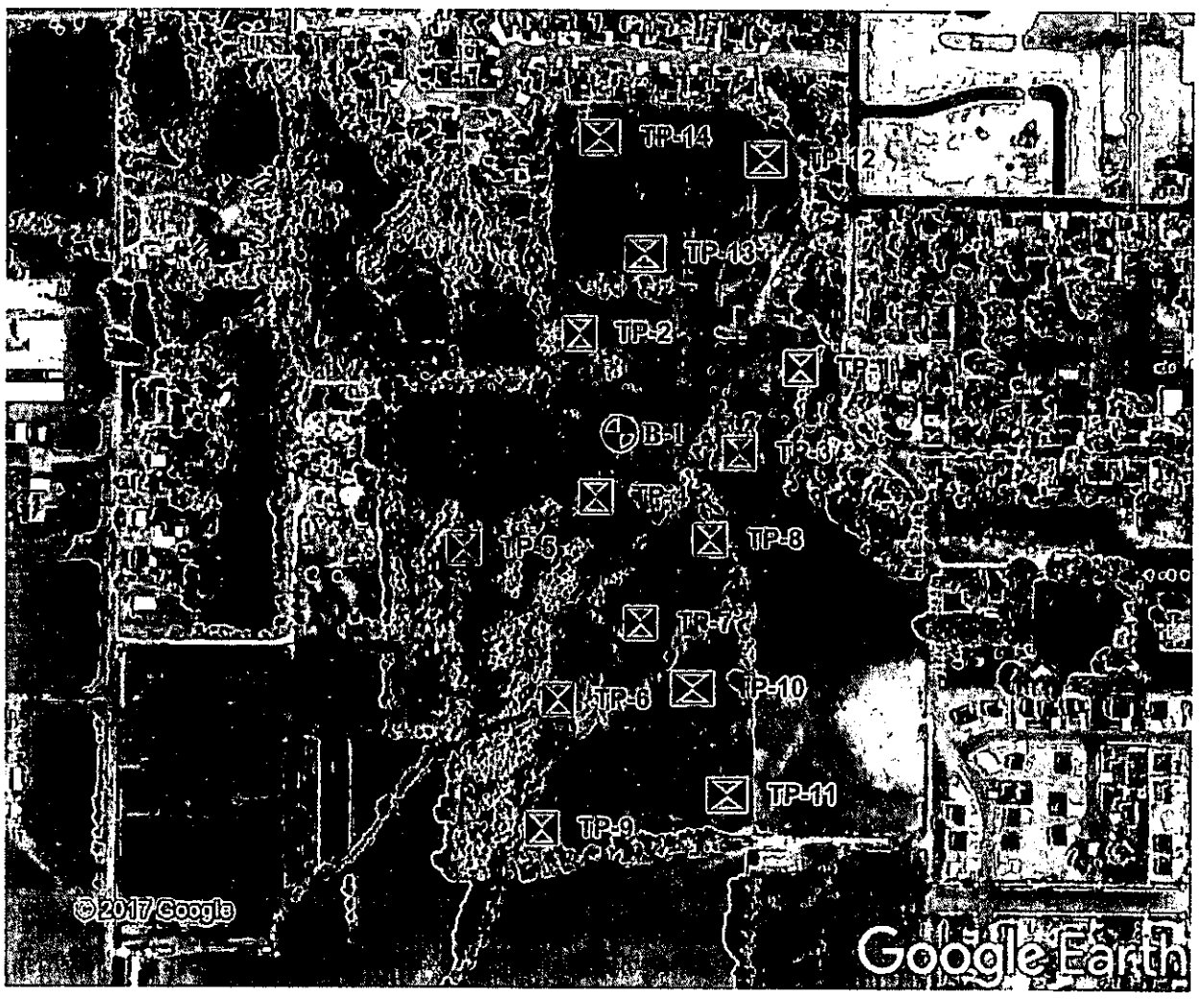
N

Not to Scale

PROJECT NO.: 178751	EARTHTEC ENGINEERING	FIGURE NO.: 1

AERIAL PHOTOGRAPH SHOWING LOCATION OF BORINGS AND TEST PITS

42 Acre American Fork Property
Approximately 400 South 400 West
American Fork, Utah



Approximate Boring Locations

Approximate Test Pit Locations

N

Not to Scale

PROJECT NO.: 178751	EARTHTEC ENGINEERING	FIGURE NO.: 2

BORING LOG

NO.: B-1

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: Great Basin
EQUIPMENT: All Terrain Hydraulic Drill Rig
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 4 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy clay, dry, gray										
3		SM	Silty SAND with gravel, medium dense, moist to wet, brown		13								SS
6					12								
9		CL	Lean CLAY, soft, wet, brown		3								
12		GM	Silty GRAVEL with sand, loose (estimated), wet, brown			16				58	20	22	
15		SM	Silty SAND, medium dense, wet, brown		15								
		GP											

Notes: Groundwater encountered at 4 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity/Nitrates/PH
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 3a

LOG OF TESTHOLE 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

BORING LOG

NO.: B-1

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: Great Basin
EQUIPMENT: All Terrain Hydraulic Drill Rig
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 4 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
18			Poorly Graded GRAVEL with sand, medium dense, wet, brown										
21		GP			30	7				71	27	2	
24													
27		SM	Silty SAND with gravel, medium dense, wet, brown		15								
30		CL	Lean CLAY with sand, soft, wet, gray		2	49		45	23	2	20	78	
33			Maximum depth explored 31½ feet										

Notes: Groundwater encountered at 4 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity/Nitrates/PH
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 3b

LOG OF TESTHOLE 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-1

PROJECT:	42 Acre American Fork Property	**PROJECT NO.:**	178751
CLIENT:	Woodside Homes	**DATE:**	07/05/17
LOCATION:	See Figure 2	**ELEVATION:**	Not Measured
OPERATOR:	JSI	**LOGGED BY:**	J. Balleck
EQUIPMENT:	Backhoe		
DEPTH TO WATER; INITIAL ▽:		**AT COMPLETION ▼:**	7 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty clay with sand, slightly moist, brown									
1												
2			Silty CLAY with sand, medium stiff (estimated), moist, brown, pinholes, root holes									
3			...more moist, dark brown									
4			...pinholes, oxidation		16	94	26	7	0	29	71	C
5		CL-ML	...very moist, no pinholes									
6												
7			▼									
8												
9												
10		CL	Gravelly Lean CLAY with sand, soft (estimated), wet, brown									
11			Maximum depth explored 10 feet due to cave in									
12												

Notes: Groundwater encountered at 7 feet

Tests Key
- CBR = California Bearing Ratio
- C = Consolidation
- R = Resistivity
- DS = Direct Shear
- SS = Soluble Sulfates
- B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 4

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-2

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 4.5 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty clay, slightly moist, brown, weeds									
1												
2			Lean CLAY with sand, medium stiff (estimated), moist, brown									
			...interbedded silty sand layers with clay layers									
3												
4												
				▼	31		29	9	2	23	75	
5		CL										
6												
7												
8												
9												
		GC	Clayey GRAVEL with sand, dense (estimated), wet, brown									
10												
			Maximum depth explored 10 feet due to cave in									
11												
12												

Notes: Groundwater encountered at 4½ feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 5

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-3

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 4 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy lean clay, dry to moist, brown									
1												
2												
3		CL-ML	Sandy Silty CLAY, medium stiff (estimated), moist, brown									
4			▼	■	21	95	28	7	0	34	66	C
5		CL	Lean CLAY, medium stiff (estimated), wet, brown									
6												
7		SM	Silty SAND with gravel, medium dense (estimated), wet, brown	X								
8												
9		GM	Silty GRAVEL with sand, medium dense (estimated), wet, brown, cobbles	X								
10			Maximum depth explored 9½ feet due to cave in									
11												
12												

Notes: Groundwater encountered at 4 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 6

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-4

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 4 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty clay with sand, slightly moist, brown, organics									
1				X								
2												
3				X								
4		CL	Lean CLAY with sand, medium stiff (estimated), moist, gray, organics		37	76	35	10	1	23	76	C, B
5			Silty GRAVEL with sand, medium dense (estimated), wet, brown, cobbles, organics									
6				X	16		25	NP	49	28	23	
7		GM										
8				X								
9												
10												
11			Maximum depth explored 10 feet									
12												

Notes: Groundwater encountered at 4 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 7

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-5

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 4.5 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty clay with sand, slightly moist, brown, roots									
1												
2												
3			Lean CLAY, medium stiff (estimated), moist, brown, roots									
4		CL										
			▼				48	23				
5												
6			Sandy SILT, medium stiff (estimated), wet, brown, roots									
7		ML					25	NP				
8												
9			Silty GRAVEL with sand, medium dense (estimated), wet, gray, cobbles, roots									
10		GM										
11		SM	Silty SAND, medium dense (estimated), wet, gray, roots	X								
12			Maximum depth explored 11 feet									

Notes: Groundwater encountered at 4½ feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 8

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-6

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 4 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty clay with sand, slightly moist, brown, organics									
1												
2												
3				X								
4			Lean CLAY, soft to medium stiff (estimated), moist to wet, brown ▼									
5												
6		CL										
7												
8												
9			Maximum depth explored 8½ feet									
10												
11												
12												

Notes: Groundwater encountered at 4 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 9

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-7

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 4 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy clay, slightly moist, gray, organics									
1												
2												
3			Lean CLAY, soft to medium stiff (estimated), wet, gray									
4		CL ▼										
5												
6			Silty GRAVEL with sand, medium dense to dense (estimated), wet, gray									
7		GM		X	15				56	26	18	
8												
9			Maximum depth explored 9 feet due to cave in									
10												
11												
12												

Notes: Groundwater encountered at 4 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 10

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-8

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 3 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty clay, slightly moist, gray, organics									
1												
2				X								
3												
4		CL	Lean CLAY, medium stiff (estimated), wet, gray									
5												
6			Sandy SILT, medium stiff (estimated), wet, brown	■	29	89	24	NP	1	45	54	C
7		ML										
8												
9		GM	Silty GRAVEL with sand, medium dense (estimated), wet, gray, cobbles									
10												
11			Maximum depth explored 10 feet									
12												

Notes: Groundwater encountered at 3 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 11

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-9

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 5 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy lean clay, slightly moist, gray, roots									
1												
2			Lean CLAY with sand, medium stiff (estimated), moist to wet, gray to red brown, pinholes, root holes									
3				X	14	90	38	18	1	21	78	C
4												
5		CL										
6			...black, roots, organics									
7												
8			Silty GRAVEL with sand, medium dense (estimated), wet, gray									
9		GM										
10				X								
11			Maximum depth explored 10½ feet									
12												

Notes: Groundwater encountered at 5 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 12

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-10

PROJECT: 42 Acre American Fork Property
CLIENT: Woodside Homes
LOCATION: See Figure 2
OPERATOR: JSI
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:

PROJECT NO.: 178751
DATE: 07/05/17
ELEVATION: Not Measured
LOGGED BY: J. Balleck
AT COMPLETION ▼: 5.5 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, lean clay, dry, brown									
1												
2		CL	Lean CLAY, medium stiff (estimated), moist, brown									
3												
4		SC	Clayey SAND, medium dense (estimated), moist, brown									
5												
6		CL	Lean CLAY, soft (estimated), wet, dark brown ▼									
7		GM	Silty GRAVEL with sand, medium dense (estimated), wet, gray, roots									
8												
9				X								
10		ML	Sandy SILT, medium dense (estimated), wet, gray, roots	X	26		22	NP	1	47	52	
11			Maximum depth explored 10½ feet									
12												

Notes: Groundwater encountered at 5½ feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 13

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-11

PROJECT:	42 Acre American Fork Property	**PROJECT NO.:**	178751
CLIENT:	Woodside Homes	**DATE:**	07/05/17
LOCATION:	See Figure 2	**ELEVATION:**	Not Measured
OPERATOR:	JSI	**LOGGED BY:**	J. Balleck
EQUIPMENT:	Backhoe		
DEPTH TO WATER; INITIAL ▽:		**AT COMPLETION ▼:**	6 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0												
1			TOPSOIL, lean clay, dry, brown									
2		CL	Sandy Lean CLAY, medium stiff (estimated), moist, brown, roots									
3			Silty GRAVEL with sand, medium dense (estimated), moist, gray	X								
4		GM										
5												
6												
7			Lean CLAY with sand, medium dense (estimated), wet, gray, organic material	X								
8		CL										
9				X	37		39	17	1	15	84	B
10												
11			Maximum depth explored 10 feet									
12												

Notes: Groundwater encountered at 6 feet

Tests Key
- CBR = California Bearing Ratio
- C = Consolidation
- R = Resistivity
- DS = Direct Shear
- SS = Soluble Sulfates
- B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 14

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-12

PROJECT:	42 Acre American Fork Property	**PROJECT NO.:**	178751
CLIENT:	Woodside Homes	**DATE:**	07/05/17
LOCATION:	See Figure 2	**ELEVATION:**	Not Measured
OPERATOR:	JSI	**LOGGED BY:**	J. Balleck
EQUIPMENT:	Backhoe		
DEPTH TO WATER; INITIAL ▽:		**AT COMPLETION ▼:**	

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty sand, slightly moist, brown									
1												
2		ML	Sandy SILT, medium stiff (estimated), slightly moist, brown, roots									
3												
4												
5		GP-GM	Poorly Graded GRAVEL with silt and sand, medium dense (estimated), slightly moist, brown, cobbles	X	3		21	2	69	23	8	
6												
7												
8												
9												
10												
11				X								
12			Maximum depth explored 11½ feet									

Notes: Groundwater not encountered

Tests Key
- CBR = California Bearing Ratio
- C = Consolidation
- R = Resistivity
- DS = Direct Shear
- SS = Soluble Sulfates
- B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 15

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-13

PROJECT: 42 Acre American Fork Property
PROJECT NO.: 178751
CLIENT: Woodside Homes
DATE: 07/05/17
LOCATION: See Figure 2
ELEVATION: Not Measured
OPERATOR: JSI
LOGGED BY: J. Balleck
EQUIPMENT: Backhoe
DEPTH TO WATER; INITIAL ▽:
AT COMPLETION ▼: 9 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty sand, slightly moist, brown									
1												
2		CL-ML	Silty CLAY, medium stiff (estimated), moist, brown									
3												
4		SM	Silty SAND, medium dense (estimated), moist, brown	X	14		23	3	8	45	47	
			...some gravel									
5			...some clay									
6												
7												
8												
9		GM	Silty GRAVEL with sand, dense (estimated), wet, brown ▼	X								
10												
11			Maximum depth explored 10½ feet									
12												

Notes: Groundwater encountered at 9 feet

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 16

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

TEST PIT LOG
NO.: TP-14

PROJECT:	42 Acre American Fork Property	**PROJECT NO.:**	178751
CLIENT:	Woodside Homes	**DATE:**	07/05/17
LOCATION:	See Figure 2	**ELEVATION:**	Not Measured
OPERATOR:	JSI	**LOGGED BY:**	J. Balleck
EQUIPMENT:	Backhoe		
DEPTH TO WATER; INITIAL ▽:		**AT COMPLETION ▼:**	6 ft.

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty sand, slightly moist, brown									
1												
2			Lean CLAY with sand, medium stiff (estimated), moist, brown									
3		CL			23	91	27	8	4	25	71	C
4												
5												
6		ML ▼	Silty SAND, loose (estimated), moist, brown	X								
7												
8		GM	Silty GRAVEL, medium dense (estimated), wet, brown									
9												
10			Maximum depth explored 9 feet									
11												
12												

Notes: Groundwater encountered at 6 feet

Tests Key
- CBR = California Bearing Ratio
- C = Consolidation
- R = Resistivity
- DS = Direct Shear
- SS = Soluble Sulfates
- B = Burnoff

PROJECT NO.: 178751

EARTHTEC ENGINEERING

FIGURE NO.: 17

LOG OF TESTPIT 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

LEGEND

PROJECT: 42 Acre American Fork Property **DATE:** 07/05/17
CLIENT: Woodside Homes **LOGGED BY:** J. Balleck

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR SOIL DIVISIONS			USCS SYMBOL	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 50% retaining on No. 200 Sieve)	GRAVELS (More than 50% of coarse fraction retained on No. 4 Sieve)	CLEAN GRAVELS (Less than 5% fines)	GW	Well Graded Gravel, May Contain Sand, Very Little Fines
			GP	Poorly Graded Gravel, May Contain Sand, Very Little Fines
		GRAVELS WITH FINES (More than 12% fines)	GM	Silty Gravel, May Contain Sand
			GC	Clayey Gravel, May Contain Sand
	SANDS (50% or more of coarse fraction passes No. 4 Sieve)	CLEAN SANDS (Less than 5% fines)	SW	Well Graded Sand, May Contain Gravel, Very Little Fines
			SP	Poorly Graded Sand, May Contain Gravel, Very Little Fines
		SANDS WITH FINES (More than 12% fines)	SM	Silty Sand, May Contain Gravel
			SC	Clayey Sand, May Contain Gravel
FINE GRAINED SOILS (More than 50% passing No. 200 Sieve)	SILTS AND CLAYS (Liquid Limit less than 50)		CL	Lean Clay, Inorganic, May Contain Gravel and/or Sand
			ML	Silt, Inorganic, May Contain Gravel and/or Sand
			OL	Organic Silt or Clay, May Contain Gravel and/or Sand
	SILTS AND CLAYS (Liquid Limit Greater than 50)		CH	Fat Clay, Inorganic, May Contain Gravel and/or Sand
			MH	Elastic Silt, Inorganic, May Contain Gravel and/or Sand
			OH	Organic Clay or Silt, May Contain Gravel and/or Sand
HIGHLY ORGANIC SOILS			PT	Peat, Primarily Organic Matter

SAMPLER DESCRIPTIONS

- SPLIT SPOON SAMPLER (1 3/8 inch inside diameter)
- MODIFIED CALIFORNIA SAMPLER (2 inch outside diameter)
- SHELBY TUBE (3 inch outside diameter)
- BLOCK SAMPLE
- BAG/BULK SAMPLE

WATER SYMBOLS

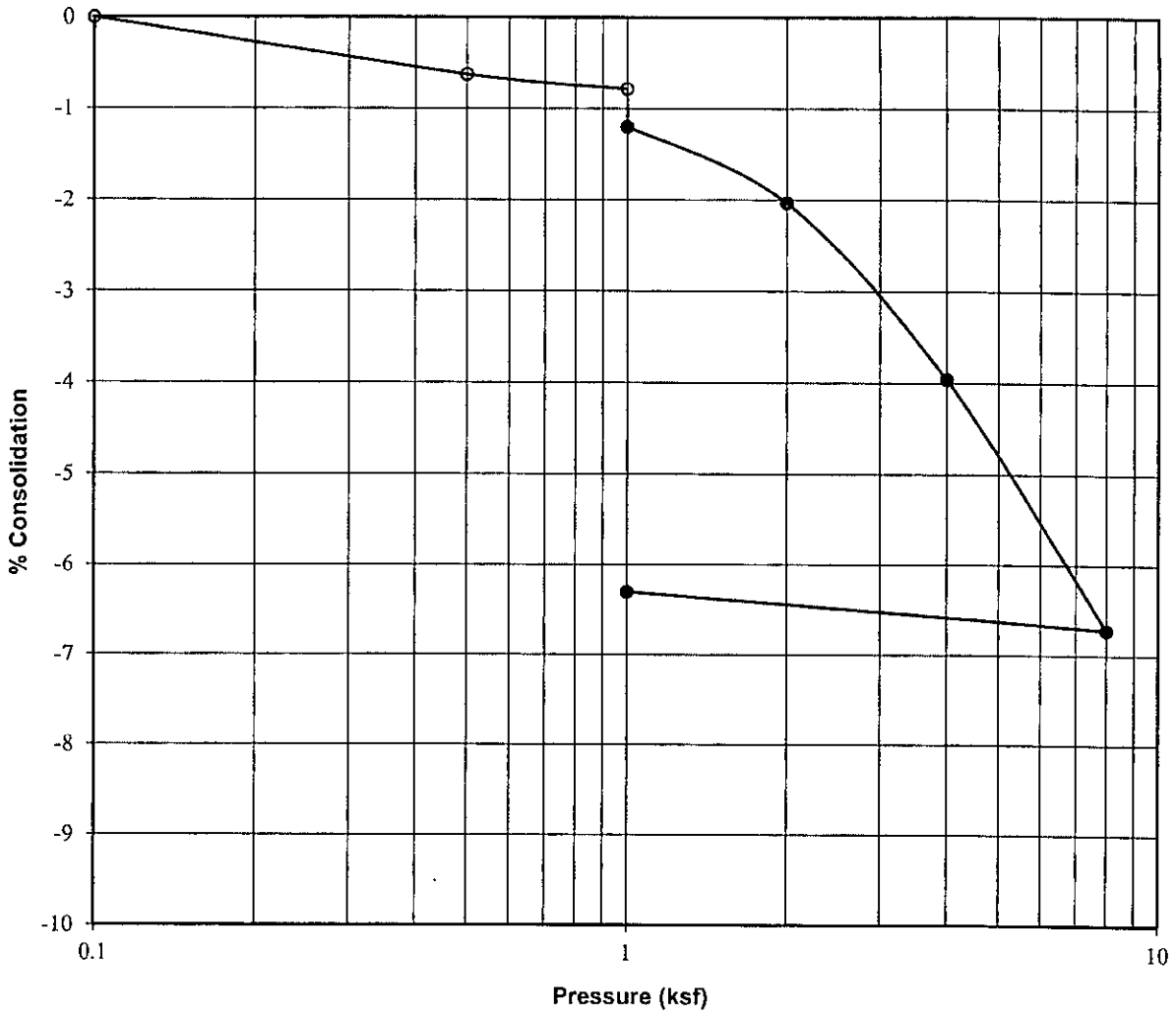
- ▽ Water level encountered during field exploration
- ▼ Water level encountered at completion of field exploration

NOTES:
1. The logs are subject to the limitations, conclusions, and recommendations in this report.
2. Results of tests conducted on samples recovered are reported on the logs and any applicable graphs.
3. Strata lines on the logs represent approximate boundaries only. Actual transitions may be gradual.
4. In general, USCS symbols shown on the logs are based on visual methods only: actual designations (based on laboratory tests) may vary.

PROJECT NO.: 178751 | EARTHTEC ENGINEERING | **FIGURE NO.:** 18

LEGEND 178751 LOGS.GPJ EARTHTEC.GDT 8/17/17

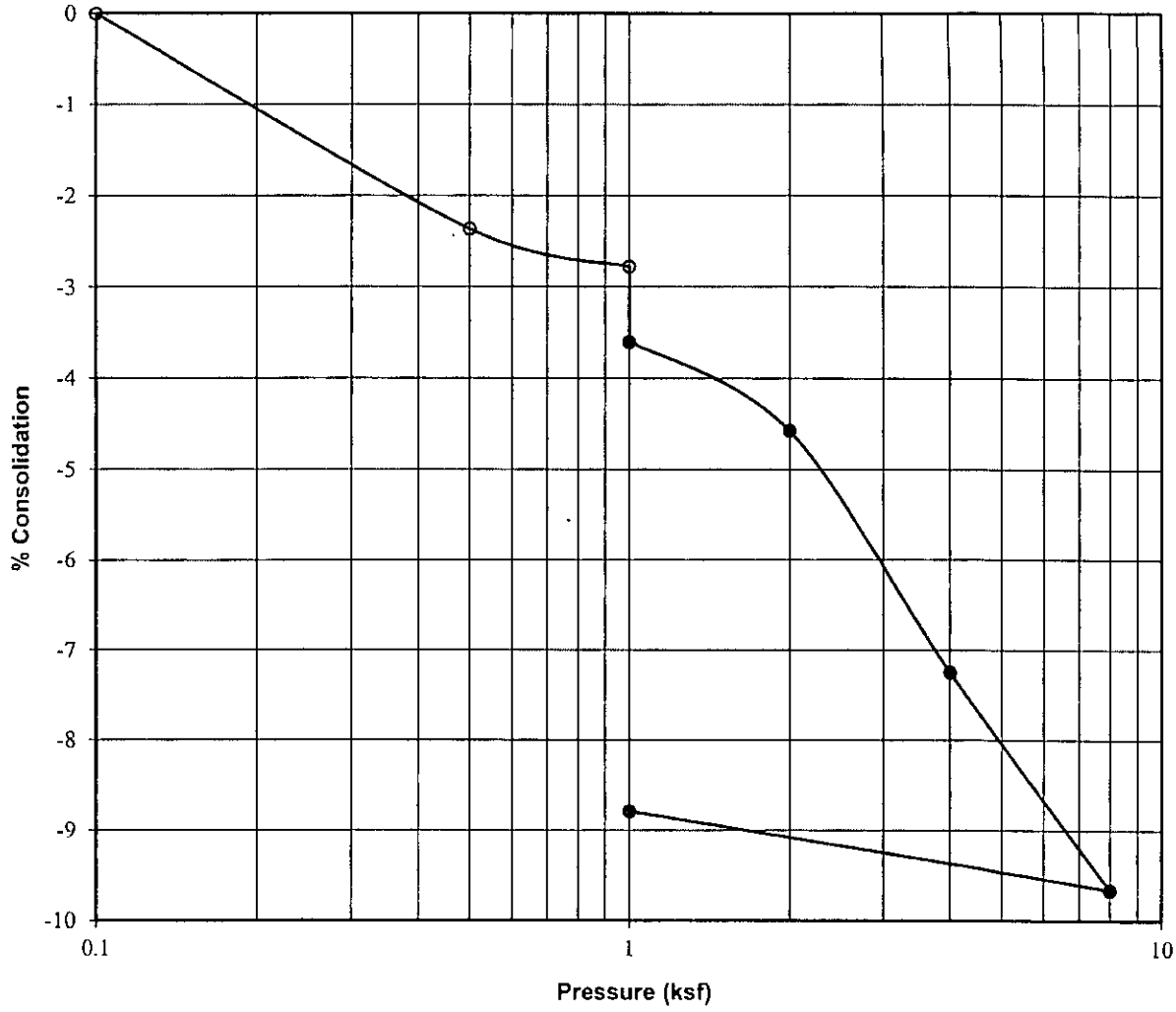
CONSOLIDATION - SWELL TEST



Project:	42 Acre AF Property
Location:	TP-1
Sample Depth, ft:	4
Description:	Block
Soil Type:	Silty CLAY with sand (CL-ML)
Natural Moisture, %:	16
Dry Density, pcf:	94
Liquid Limit:	26
Plasticity Index:	7
Water Added at:	1 ksf
Percent Collapse:	0.4

PROJECT NO.: 178751		**FIGURE NO.:** 19

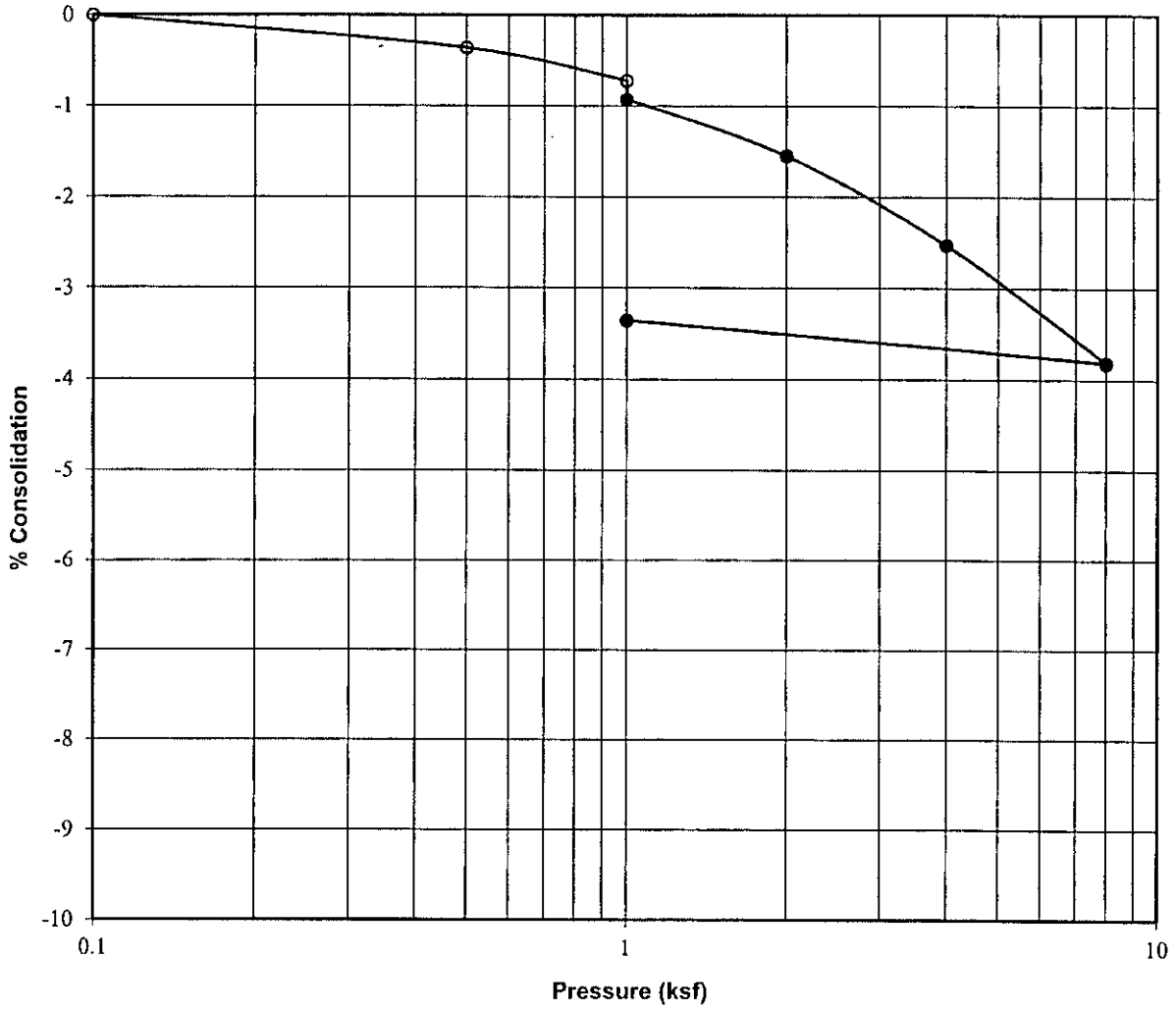
CONSOLIDATION - SWELL TEST



Project:	42 Acre AF Property
Location:	TP-3
Sample Depth, ft:	3½
Description:	Block
Soil Type:	Sandy Silty CLAY (CL-ML)
Natural Moisture, %:	21
Dry Density, pcf:	95
Liquid Limit:	28
Plasticity Index:	7
Water Added at:	1 ksf
Percent Collapse:	0.8

PROJECT NO.: 178751		**FIGURE NO.:** 20

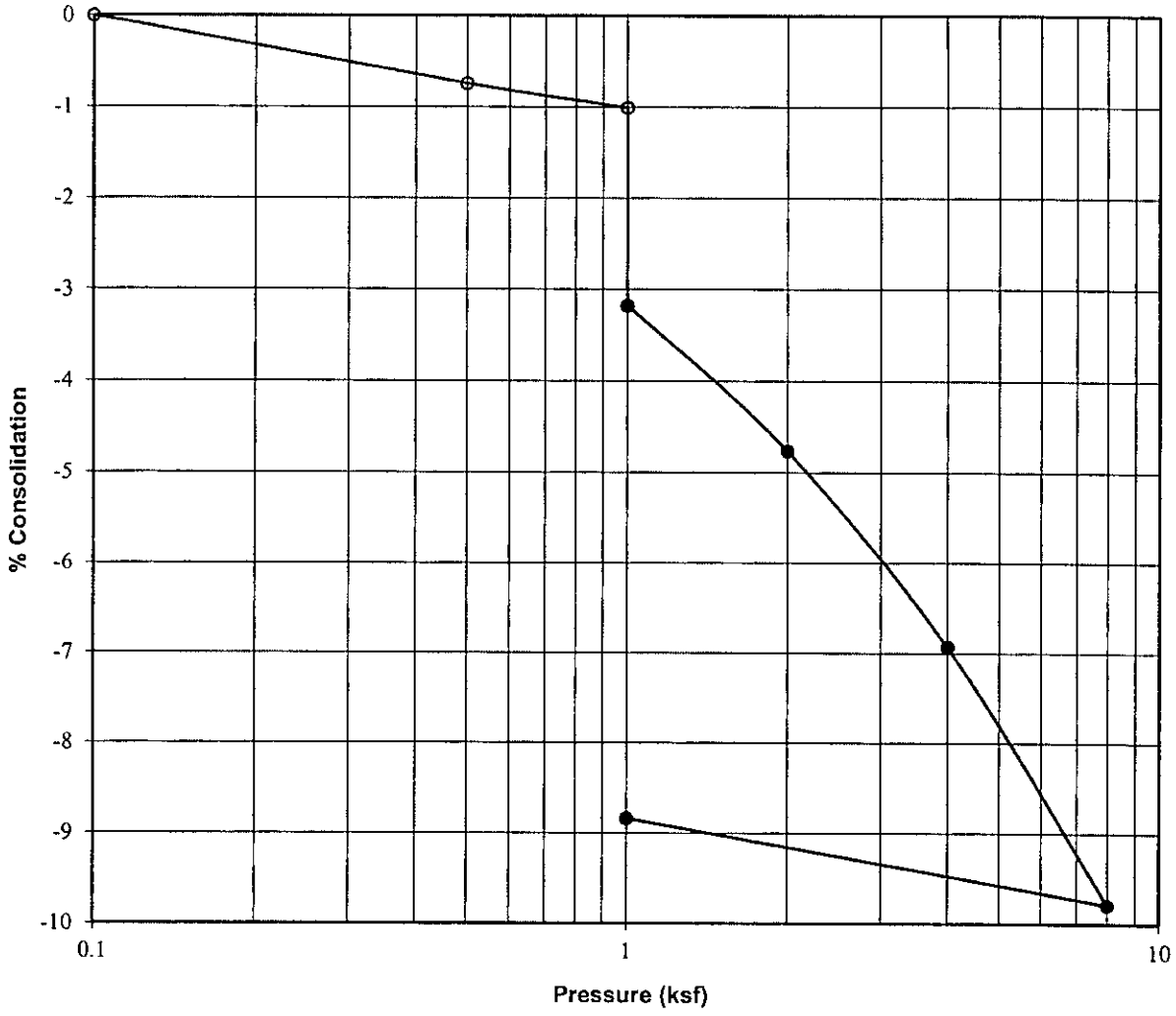
CONSOLIDATION - SWELL TEST



Project:	42 Acre AF Property
Location:	TP-4
Sample Depth, ft:	3
Description:	Block
Soil Type:	Lean CLAY with sand (CL)
Natural Moisture, %:	37
Dry Density, pcf:	76
Liquid Limit:	35
Plasticity Index:	10
Water Added at:	1 ksf
Percent Collapse:	0.2

PROJECT NO.: 178751		**FIGURE NO.:** 21

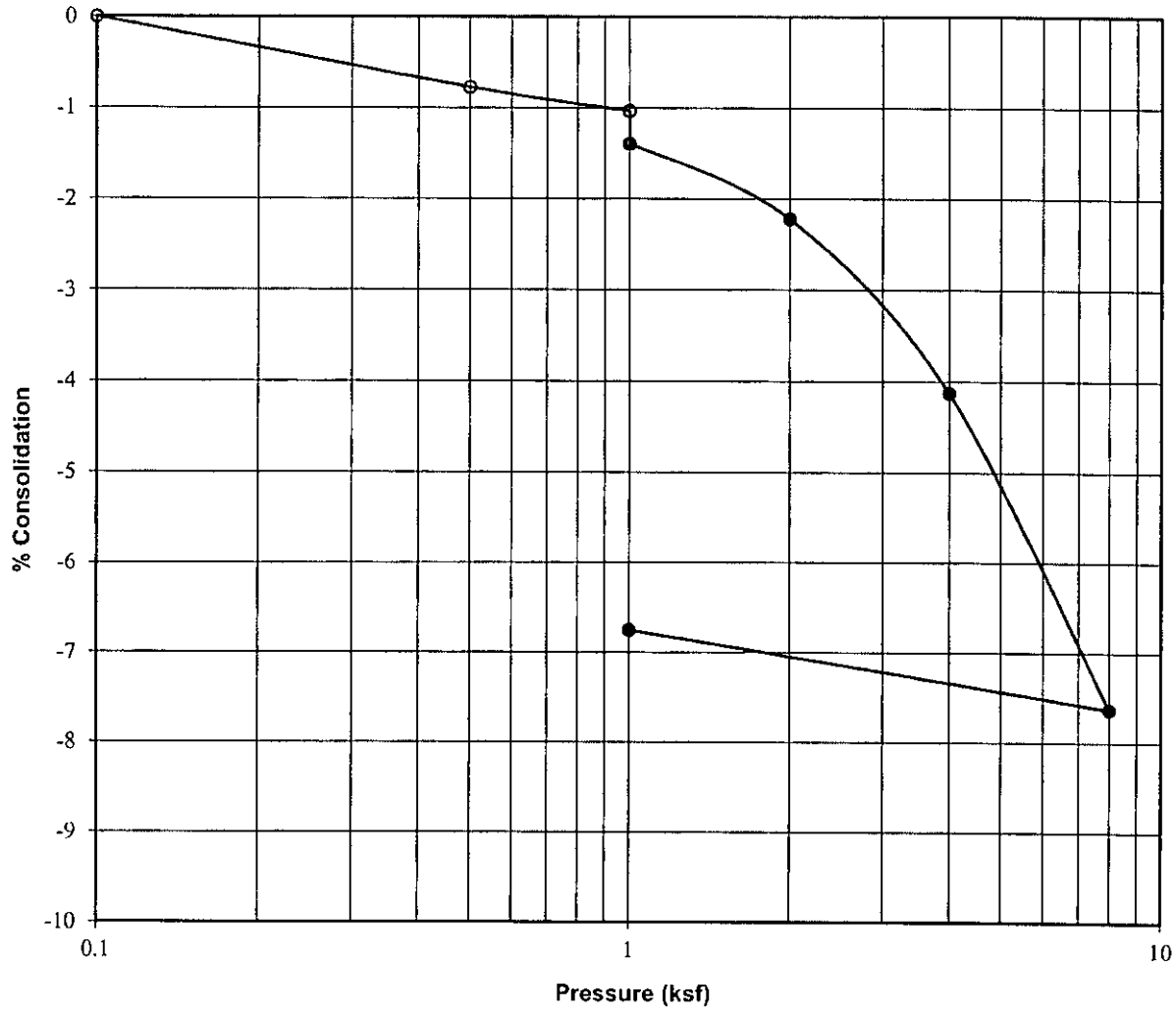
CONSOLIDATION - SWELL TEST



Project:	42 Acre AF Property
Location:	TP-8
Sample Depth, ft:	5
Description:	Block
Soil Type:	Sandy SILT (ML)
Natural Moisture, %:	29
Dry Density, pcf:	89
Liquid Limit:	24
Plasticity Index:	NP
Water Added at:	1 ksf
Percent Collapse:	2.2

PROJECT NO.: 178751		**FIGURE NO.:** 22

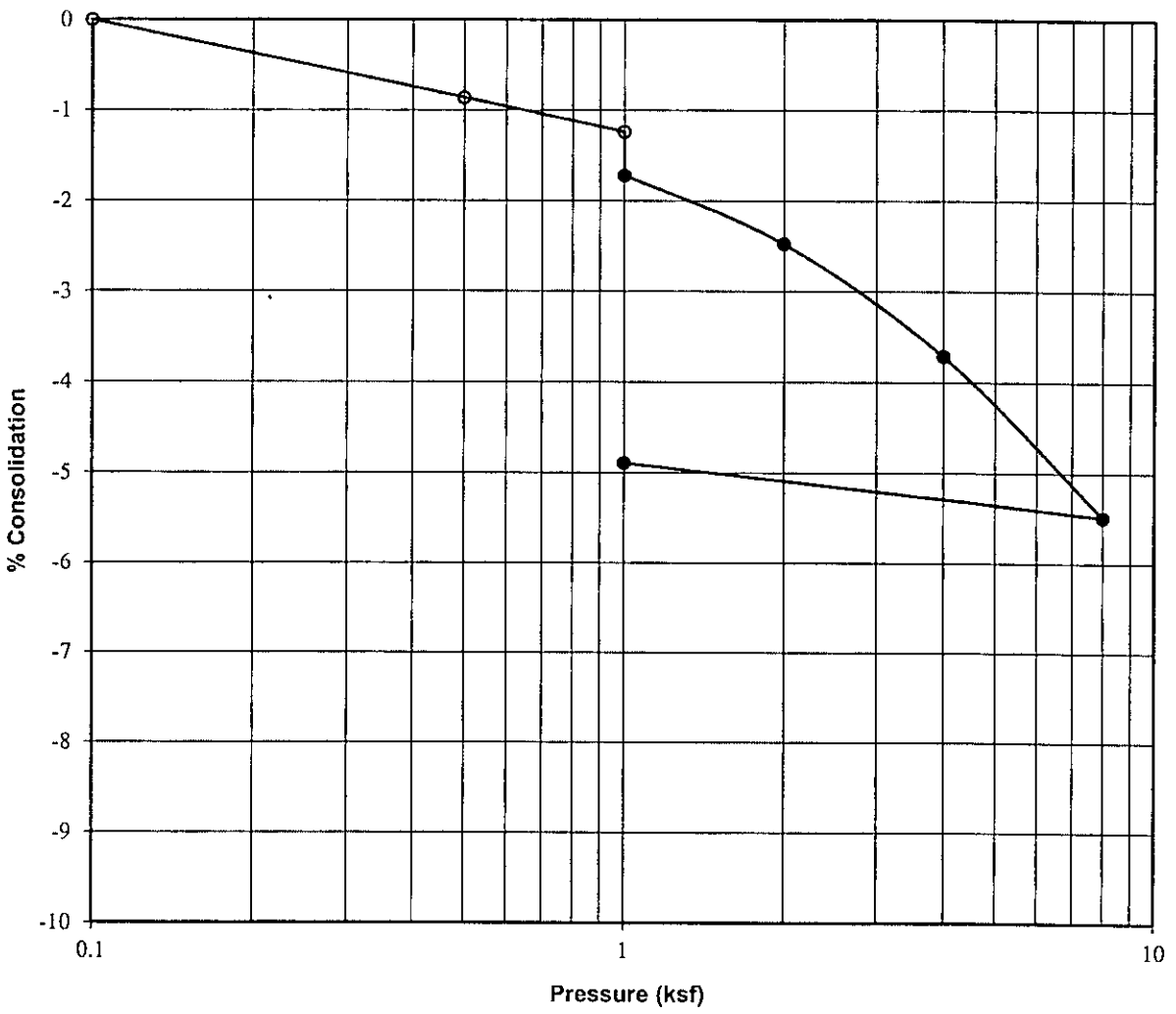
CONSOLIDATION - SWELL TEST



Project:	42 Acre AF Property
Location:	TP-9
Sample Depth, ft:	2½
Description:	Block
Soil Type:	Lean CLAY with sand (CL)
Natural Moisture, %:	14
Dry Density, pcf:	90
Liquid Limit:	38
Plasticity Index:	18
Water Added at:	1 ksf
Percent Collapse:	0.4

PROJECT NO.: 178751		**FIGURE NO.:** 23

CONSOLIDATION - SWELL TEST



Project:	42 Acre AF Property
Location:	TP-14
Sample Depth, ft:	3
Description:	Block
Soil Type:	Lean CLAY with sand (CL)
Natural Moisture, %:	23
Dry Density, pcf:	91
Liquid Limit:	27
Plasticity Index:	8
Water Added at:	1 ksf
Percent Collapse:	0.5

PROJECT NO.: 178751		**FIGURE NO.:** 24

APPENDIX A

Timpview Analytical Laboratories
A Chemtech-Ford, Inc. Affiliate
1165 North 1600 West Orem, UT 84057 (801) 229-2282

Certificate of Analysis

Earthtec Testing & Engineering
Caleb Allred
1497 W 40 S
Lindon, UT 84042
DW System # :

Work Order #: 17G0338
PO# / Project Name: 178751
Receipt: 7/11/17 14:54
Batch Temp °C: 28.0
Date Reported: 7/17/2017

Sample Name: B-1 @ 2.5ft 178751
Collected: 7/7/17 14:00 **Matrix:** Solid **Collected By:** Client

Parameter	Lab ID #	Method	Analysis Date / Time	Result	Units	MRL	Flags
Sulfate, Soluble (IC)	17G0338-01	EPA 300.0	7/15/17	184	mg/kg dry	11	
Total Solids	17G0338-01	SM 2540G	7/13/17	89.2	%	0.1	

Comment:

Reviewed by: Joyce Applegate
Joyce Applegate, Project Manager

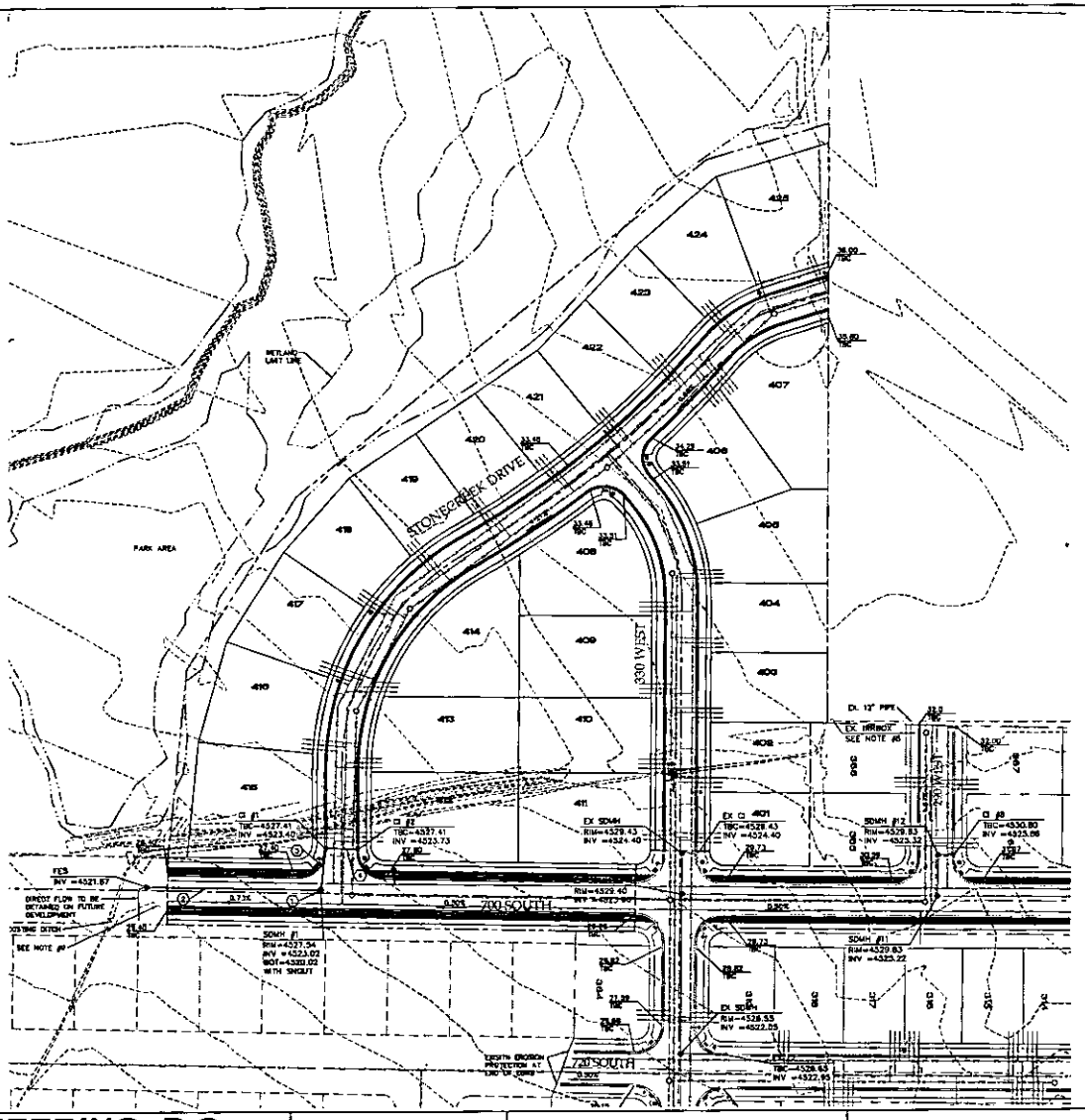
Analyses presented in this report were performed in accordance with the National Environmental Laboratory Accreditation Program by a Chemtech-Ford affiliate company, except where otherwise noted.

GENERAL NOTES

1. ALL CONSTRUCTION TO BE DONE ACCORDING TO THE AMERICAN FORK CITY STANDARDS AND SPECIFICATIONS.
2. PRIOR TO CONSTRUCTION, AN EROSION & SEDIMENTATION CONTROL PLAN WILL BE SUBMITTED TO THE PUBLIC WORKS DIRECTOR FOR APPROVAL.
3. PRIOR TO COMMENCEMENT OF ANY WORK, A PRECONSTRUCTION MEETING WILL BE HELD WITH THE PUBLIC WORKS DIRECTOR, CHIEF BUILDING OFFICE, CITY INSPECTORS, THE CONTRACTOR AND THE PROPERTY OWNER.
4. ALL ADA REQUIREMENTS TO BE CONSTRUCTED IN ACCORDANCE WITH THE AMERICAN FORK CITY STANDARDS AND SPECIFICATIONS. CONTRACTOR TO ENSURE ALL ADA STANDARDS ARE MET.
5. ALL STORM DRAIN TO BE 15" RCP UNLESS OTHERWISE NOTED.
6. ALL CURB INLET BOXES TO BE 3.5' DEEP UNLESS OTHERWISE NOTED.
7. THE STORM WATER FROM THIS AREA IS DIRECTED TO THE SOUTHWEST CORNER OF THE DEVELOPMENT AND WILL BE DIRECTED TO THE EXISTING DITCH WHICH WILL ULTIMATELY BE DIRECTED AND DETAINED ON THE PROPERTY TO THE SOUTH IN THE FUTURE OVERALL MASTER PLANNED DETENTION AREA.
8. CONTRACTOR TO ENSURE THAT THE PIPE TO THE SOUTH IN THE EXISTING IRRIGATION BOX HAS BEEN ABANDONED AND THAT THE PIPING TO THE EAST AND NORTH HAS BEEN PRESERVED.
9. INSTALL GRAVEL AT THE END OF THE ROADWAY TO DIRECT ANY EXCESS RUNOFF TO THE SOUTH AND ONTO THE PROPERTY TO BE RETAINED UNTIL FUTURE CONNECTION IS MADE.

KEY NOTES

1. CONST. STORM DRAIN MANHOLE WITH SWOUT
2. CONST. 302' OF 15" SD PIPE @ 0.63%
3. CONST. 37.8' OF 18" SD PIPE @ 1.0%
4. CONST. 33.4' OF 15" SD PIPE @ 1.0%



0 60 120 180

(24"x36") SCALE: 1" = 60'

(11"x17") SCALE: 1" = 120'

811 Know what's below. Call before you dig.

REVISIONS					
NO.	DATE	DESCRIPTION	BY	DESIGNED BY:	TGT
1	2/29/16	ADJUSTED GRADES	TGT	DRAWN BY:	TJT
2	3/16/16	EX ALONG EXPANSION	TGT	CHECKED BY:	TGT
3				DATE:	1/29/2020
4				CODE FILE:	
J:\SUBDIVISIONS\AMERICAN FORK\Stonecreek\GRADING.dwg					

TRANE ENGINEERING, P.C.
CONSULTING ENGINEERS AND LAND SURVEYORS
27 EAST MAIN LEHI, UTAH 84043 (801) 768-4544

AMERICAN FORK, UTAH

STONECREEK PLAT "D"
A RESIDENTIAL SUBDIVISION

GRADING AND DRAINAGE

JOB WS-AF

SHEET NO. 3