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

ENT 20053:2022 PG 1 of 42
ANDREA ALLEN
UTAH COUNTY RECORDER
2022 Feb 15 10:40 am FEE 0.00 BY JR
RECORDED FOR AMERICAN FORK CITY

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

This Notice is recorded to bind the attached Geotechnical Study dated 5/14/2021 along with the site grading plan to the property generally located at 42 E. 1100 S (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 2 day of FEBRUARY, 2022.

OWNER(S):

(Signature) _____ (Signature) _____

Jacob M Horan (Printed Name) _____ (Printed Name)

MANAGER (Title) _____ (Title)

STATE OF UTAH)
§
COUNTY OF Utah)

On the 2nd day of February, 2022, personally appeared before me Jabob M Horan 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.

NOTARY PUBLIC
TIFFANIE S. MACE
704022
COMMISSION EXPIRES
JANUARY 13, 2023
STATE OF UTAH

Notary Public
My Commission Expires: January 13, 2023

Approved as to form: American Fork City Attorney

Rev. 12/4/18

Deer Park Legal Description

A parcel of land being all or part of those three (3) entire tracts of land described as "Parcel 1" and "Parcel 2" in that Warranty Deed recorded July 1, 2021 as Entry No. 117663:2021 and that Warranty Deed recorded January 6, 2016 as Entry No. 1068:2016 in the Office of the Utah County Recorder. Said entire tract of land is located in the Southeast Quarter of Section 26, Township 5 South, Range 1 East, Salt Lake Base and Meridian and described as follows:

Beginning at the southwesterly corner of said "Parcel 2, which is 631.46 feet S. 89°00'19" E. along a monument line and 1970.35 feet North from a Reference Monument to the South Quarter Corner of said Section 26; said point also being 548.06 feet S. 89°48'53" E. along the Section line and 1899.49 feet North from said South Quarter Corner of Section 26; thence N. 00°28'09" E. 702.30 feet (Record = North 0°28'0" East 705.33 feet) along the westerly boundary line of said entire tract and extension thereof; thence S. 89°12'49" E. (Record = South 89°15'0" East) 738.72 feet to an existing fence; thence S. 00°24'46" W. (Record = South 0°27'17" West) 876.09 feet along said existing fence; thence N. 89°59'51" W. (Record = West 345.9 feet) 346.23 feet along southerly boundary line of said "Parcel 1"; thence N. 64°51'27" W. 432.87 feet (Record = North 64° 51'36" W 435 feet) along the southwesterly boundary line of said "Parcel 2" to the **Point of Beginning**.

The above-described parcel of land contains 615,124 sq. ft. in area or 14.121 acres, more or less. Two (2) Lots.

GSH

REPORT
GEOTECHNICAL STUDY
PROPOSED 6800 NORTH INDUSTRIAL
5900 WEST 6800 NORTH
AMERICAN FORK, UTAH

Submitted To:

Red Pine Construction
520 South 850 East, Suite A4
Lehi, Utah 84043

Submitted By:

GSH Geotechnical, Inc.
473 West 4800 South
Salt Lake City, Utah 84123

May 14, 2021

Job No. 2354-003-21

GSH

May 14, 2021
Job No. 2354-003-21

Mr. Mike Horan
Red Pine Construction
520 South 850 East, Suite A4
Lehi, Utah 84043

Mr. Horan:

Re: Report
Geotechnical Study
Proposed 6800 North Industrial
5900 West 6800 North
American Fork, Utah

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed at the site of the proposed 6800 North Industrial to be located near 5900 West 6800 North in American Fork, Utah. The general location of the site with respect to existing roadways, as of 2021, is presented on Figure 1, Vicinity Map. A more detailed layout of the site showing proposed facilities, existing roadways, and the borings drilled in conjunction with this study is presented on Figure 2, Site Plan.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of the study were planned in discussions between Mr. Mike Horan of Red Pine Construction and Mr. Alan Spilker of GSH Geotechnical, Inc. (GSH).

In general, the objectives of this study were to:

1. Define and evaluate the subsurface soil and groundwater conditions across the site.

2. Provide appropriate foundation, earthwork, pavement, and geoseismic recommendations to be utilized in the design and construction of the proposed facilities.

GSH Geotechnical, Inc.
473 West 4800 South
Salt Lake City, Utah 84123
Tel: 801.685.9190 Fax: 801.685.2990
www.gshgeo.com

In accomplishing these objectives, our scope has included the following:

1. A field program consisting of the exploration, logging, and sampling of 15 borings.

2. A laboratory testing program.

3. An office program consisting of the correlation of available data, engineering analysis, and the preparation of this summary report.

1.3 AUTHORIZATION

Authorization was provided by returning a signed copy of the Professional Services Agreement No. 21-0434 dated April 12, 2021.

1.4 PROFESSIONAL STATEMENTS

Supporting data upon which our recommendations are based are presented in subsequent sections of this report. Recommendations presented herein are governed by the physical properties of the soils encountered in the exploration borings, projected groundwater conditions, and the layout and design data discussed in Section 2, Proposed Construction. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

Our professional services have been performed, our findings developed, and our recommendations prepared in accordance with generally accepted engineering principles and practices in this area at this time.

2. PROPOSED CONSTRUCTION

The site is proposed to be developed with 3 warehouse structures and associated pavements. The structures are anticipated to be one extended level, constructed slab-on-grade, have footprints of 47,040 square feet to 115,808 square feet, and be supported upon conventional spread and continuous wall footings.

Maximum real column and wall loads are anticipated to be on the order of 70 to 225 kips and 3 to 8 kips per lineal foot, respectively. Real loads are defined as the total of all dead plus frequently applied (reduced) live loads.

Paved parking areas, drive lanes, and loading/unloading areas are planned around the structures.

Projected traffic in the parking areas is anticipated to consist of a light volume of automobiles and light trucks, occasional medium-weight trucks, and no heavy-weight trucks.

Projected traffic in the drive lanes and loading/unloading areas is anticipated to consist of a moderate volume of automobiles, light trucks, and medium-weight trucks with a light volume of heavy-weight trucks.

Site development will require some earthwork in the form of minor cutting and filling. At this time, we anticipate that maximum site grading cuts and fills, excluding utilities, will be on the order of 1 to 3 feet.

3. SITE INVESTIGATIONS

3.1 GENERAL

Subsurface conditions in unexplored locations or at other times may vary from those encountered at specific boring locations. If such variations are noted during construction or if project development plans are changed, GSH must review the changes and amend our recommendations, if necessary.

Boring locations were established by estimating distances and angles from site landmarks. If increased accuracy is desired by the client, we recommend that the boring locations and elevations be surveyed.

3.2 FIELD PROGRAM

To define and evaluate the subsurface soil and groundwater conditions across the site, 15 borings were completed within the accessible areas. These borings were completed to depths ranging from 5.0 to 51.5 feet with a truck-mounted drill rig equipped with hollow-stem augers. The approximate locations of the borings are presented on Figure 2.

The field portion of our study was under the direct control and continual supervision of an experienced member of our geotechnical staff. During the course of the drilling operations, a continuous log of the subsurface conditions encountered was maintained. In addition, samples of the typical soils encountered were obtained for subsequent laboratory testing and examination. The soils were classified in the field based upon visual and textural examination. These classifications were supplemented by subsequent inspection and testing in our laboratory. Graphical representation of the subsurface conditions encountered is presented on Figures 3A through 3O, Boring Logs. Soils were classified in accordance with the nomenclature described on Figure 4, Key to Boring Log (USCS).

A 3.0-inch outside diameter, 2.42-inch inside diameter (Dames & Moore) and a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) were utilized at select locations and depths. The blow counts recorded on the boring logs were those required to drive the sampler 12 inches with a 140-pound hammer dropping 30 inches.

Following completion of exploration operations, 1.25-inch diameter slotted PVC pipe was installed in Borings B-1 through B-6, B-8 through B-10, B-12, and B-15 to provide a means of monitoring the groundwater fluctuations. The borings were backfilled with auger cuttings.

3.3 LABORATORY TESTING

3.3.1 General

To provide data necessary for our engineering analysis, a laboratory testing program was performed. This program included moisture, density, partial gradation, Atterberg limits, consolidation, and chemical tests.

Lab testing was ongoing at the time this report was written. Upon completion, an updated version of this report containing lab results will be sent, along with any revised recommendations.

4. SITE CONDITIONS

4.1 SURFACE

The site is located at approximately 5900 West 6800 North in American Fork, Utah. The topography of the site is relatively flat, grading down to the south with a total relief of approximately 6 to 9 feet. Site vegetation consists of agricultural grass fields with undeveloped/vacant grass land in the western portion of the site.

The site is bounded to the north by 6800 North Street followed by agricultural fields; to the east by single-family residential structures along with agricultural fields; to the south by agricultural fields and vacant/undeveloped brush/grass land; and to the west by vacant/undeveloped brush/grass land followed by 100 West Street and a single-family residential structure adjacent to the northwest corner of the site.

4.2 SUBSURFACE SOIL

The following paragraphs provide generalized descriptions of the subsurface profiles and soil conditions encountered within the borings conducted during this study. As previously noted, soil conditions may vary in unexplored locations.

The borings were completed to depths ranging from 5.0 to 51.5 feet. The soil conditions encountered in each of the borings, to the depths completed, were generally similar across the boring locations.

- Approximately 5.0 to 6.0 inches of topsoil was encountered in each boring. Topsoil thickness is frequently erratic and thicker zones of topsoil should be anticipated.

- Natural soils were encountered below the non-engineered fill or the ground surface in each boring. The natural soils consisted primarily of clay with varying silt, sand, and gravel content and sand with varying clay, silt, and gravel content.

The natural clay soils were very soft to stiff, dry to saturated, brown, dark brown, gray, and tan in color. The natural clay soils are anticipated to exhibit moderate strength and compressibility characteristics under the anticipated loading.

The natural sand soils were very loose to medium dense, dry to saturated, and gray and brown in color. The natural sand soils are anticipated to exhibit moderately high strength and moderately low compressibility characteristics under the anticipated load range.

For a more descriptive interpretation of subsurface conditions, please refer to Figures 3A through 3O, Boring Logs. The lines designating the interface between soil types on the boring logs generally represent approximate boundaries. In situ, the transition between soil types may be gradual.

4.3 GROUNDWATER

On May 13, 2021 (21 days following drilling), groundwater was measured within the PVC pipes installed as tabulated below:

Boring No.	Groundwater Depth (feet)
	May 13, 2021
B-1	4.8
B-2	Pipe Damaged
B-3	7.8
B-4	2.8
B-5	5.0
B-6	6.1
B-8	7.8
B-9	Pipe Damaged
B-10	7.1
B-12	4.6
B-15	3.6

Groundwater levels vary with changes in season and rainfall, construction activity, irrigation, snow melt, surface water run-off, and other site-specific factors.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

The proposed structures may be supported upon conventional spread and continuous wall foundations supported upon suitable natural soils and/or structural fill extending to suitable natural soils.

The most significant geotechnical aspects at the site are:

1. The potential to encounter non-engineered fill at the site.

2. The relatively shallow depth to groundwater.

3. The potentially liquefiable sand layers encountered in Borings B-1, B-2, B-4, and B-12.

Prior to proceeding with construction, removal of the surface vegetation, root systems, topsoil, non-engineered fill (if encountered), and any deleterious materials from beneath an area extending out at least 5 feet from the perimeter of the proposed structure footprints and 3 feet beyond pavements and exterior flatwork areas will be required. All existing utility locations should be reviewed to assess their impact on the proposed construction and abandoned and/or relocated as appropriate.

Due to the developed nature of the surrounding area, non-engineered fills may exist in unexplored areas of the site. Based on our experience, non-engineered fills are frequently erratic in composition and consistency. All surficial loose/disturbed soils and non-engineered fills must be removed below all footings, floor slabs, and pavements. The in situ, non-engineered fills may remain below flexible pavements if free of any deleterious materials, of limited thickness, and if properly prepared, as discussed later in this report.

Groundwater was measured as shallow as 2.8 feet below the ground surface. GSH recommends placing floor slabs no closer than 4 feet from the highest groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

Proof rolling of the natural clay subgrade must not be completed if cuts extend to within 1 foot of the groundwater surface. In areas where cuts are to extend to within 1 foot of the groundwater surface, stabilization must be anticipated.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

Very loose to Medium dense, saturated sand layers were encountered in Borings B-1, B-2, B-4, and B-12. Due to liquefiable soils being present, the site has been determined to be Site Class F (in accordance with Section 20.3.1, Site Class F of ASCE 7-16). According to ASCE 7-16, a site-specific response analysis is required. Section 20.3.1 of ASCE 7-16 provides exception to this requirement under certain conditions. These options will need to be reviewed and evaluated by the project structural engineer. GSH is currently conducting a site-specific seismic response analysis and the results will be transmitted upon completion.

Detailed discussions pertaining to earthwork, foundations, pavements, and the geoseismic setting of the site are presented in the following sections.

5.2 EARTHWORK

5.2.1 Site Preparation

Initial site preparation will consist of the removal of the non-engineered fills (if encountered), surface vegetation, root systems, topsoil, and any deleterious materials from beneath an area extending out at least 5 feet from the perimeter of the proposed structure footprint and 3 feet beyond pavements and exterior flatwork areas. All existing utility locations should be reviewed to assess their impact on the proposed construction and abandoned and/or relocated as appropriate.

It must be noted that from a handling and compaction standpoint, soils containing high amounts of fines (silts and clays) are inherently more difficult to rework and are very sensitive to changes in moisture content, requiring very close moisture control during placement and compaction. This will be very difficult, if not impossible, during wet and cold periods of the year. Additionally, the on-site soils are likely above optimum moisture content for compacting at present and would require some drying prior to re-compacting.

Subsequent to stripping and prior to the placement of floor slabs, foundations, structural site grading fills, exterior flatwork, and pavements, the exposed subgrade must be proof rolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If excessively soft or otherwise unsuitable soils are encountered beneath footings, they must be completely removed. If removal depth required is greater than 2 feet below footings, GSH must be notified to provide further recommendations. In pavement, floor slab, and outside flatwork areas, unsuitable natural soils should be removed to a maximum depth of 2 feet and replaced with compacted granular structural fill.

Subgrade preparation as described must be completed prior to placing overlying structural site grading fills.

Due to the relatively high groundwater, site grading cuts should be kept to a minimum. Cuts extending to within 1 foot of the groundwater elevation will likely disturb the natural clay soils and proof rolling must not be completed. Stabilization must be anticipated in areas where cuts are to extend to within 1 foot of the groundwater surface.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

GSH must be notified prior to the placement of structural site grading fills, floor slabs, footings, and pavements to verify that all loose/disturbed soils and non-engineered fills (if encountered) have been completely removed and/or properly prepared.

5.2.2 Temporary Excavations

Temporary excavations up to 8 feet deep in fine-grained cohesive soils, above or below the water table, may be constructed with sideslopes no steeper than one-half horizontal to one vertical (0.5H:1.0V). Excavations deeper than 8 feet are not anticipated at the site.

For granular (cohesionless) soils, construction excavations above the water table, not exceeding 4 feet, should be no steeper than one-half horizontal to one vertical (0.5H:1.0V). For excavations up to 8 feet, in granular soils and above the water table, the slopes should be no steeper than one horizontal to one vertical (1H:1V). Excavations encountering saturated cohesionless soils will be very difficult and will require very flat sideslopes and/or shoring, bracing, and dewatering.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

The static groundwater table was encountered as shallow as 2.8 feet below the existing surface and may be shallower with seasonal fluctuations. Consideration for dewatering of utility trenches, excavations for the removal of non-engineered fill, and other excavations below this level should be incorporated into the design and bidding process.

All excavations must be inspected periodically by qualified personnel. If any signs of instability or excessive sloughing are noted, immediate remedial action must be initiated.

5.2.3 Structural Fill

Structural fill is defined as all fill which will ultimately be subjected to structural loadings, such as imposed by footings, floor slabs, pavements, etc. Structural fill will be required as backfill over foundations and utilities, as site grading fill, and as replacement fill below footings. All structural fill must be free of surface vegetation, root systems, rubbish, topsoil, frozen soil, and other deleterious materials.

Structural site grading fill is defined as structural fill placed over relatively large open areas to raise the overall grade. For structural site grading fill, the maximum particle size shall not exceed 4 inches; although, occasional larger particles, not exceeding 8 inches in diameter, may be incorporated if placed randomly in a manner such that "honeycombing" does not occur and the desired degree of compaction can be achieved. The maximum particle size within structural fill placed within confined areas shall be restricted to 2 inches.

On-site soils may be re-utilized as structural site grading fill if they do not contain construction debris or deleterious material and meet the requirements of structural fill. Fine-grained soils will require very close moisture control and may be very difficult, if not impossible, to properly place and compact during wet and cold periods of the year.

Imported structural fill below foundations and floor slabs shall consist of a well graded sand and gravel mixture with less than 30 percent retained on the three-quarter-inch sieve and less than 20 percent passing the No. 200 Sieve (clays and silts).

To stabilize soft subgrade conditions (if encountered) or where structural fill is required to be placed closer than 2.0 feet above the water table at the time of construction, a mixture of coarse angular gravels and cobbles and/or 1.5- to 2.0-inch gravel (stabilizing fill) should be utilized. It may also help to utilize a stabilization fabric, such as Mirafi 600X or equivalent, placed on the natural ground if 1.5- to 2.0-inch gravel is used as stabilizing fill.

5.2.4 Fill Placement and Compaction

All structural fill shall be placed in lifts not exceeding 8 inches in loose thickness. Structural fills shall be compacted in accordance with the percent of the maximum dry density as determined by the AASHTO[1] T180 (ASTM[2] D1557) compaction criteria in accordance with the following table:

Location	Total Fill Thickness (feet)	Minimum Percentage of Maximum Dry Density
Beneath an area extending at least 5 feet beyond the perimeter of the structure	0 to 10	95
Site grading fills outside area defined above	0 to 5	90
Site grading fills outside area defined above	5 to 10	95
Utility trenches within structural areas	--	96
Road base	--	96

Structural fills greater than 10 feet thick are not anticipated at the site.

Subsequent to stripping and prior to the placement of structural site grading fill, the subgrade shall be prepared as discussed in Section 5.2.1, Site Preparation, of this report. In confined areas, subgrade preparation should consist of the removal of all loose or disturbed soils.

1 American Association of State Highway and Transportation Officials
2 American Society for Testing and Materials

Coarse angular gravel and cobble mixtures (stabilizing fill), if utilized, shall be end dumped, spread to a maximum loose lift thickness of 15 inches, and compacted by dropping a backhoe bucket onto the surface continuously at least twice. As an alternative, the stabilizing fill may be compacted by passing moderately heavy construction equipment or large self-propelled compaction equipment over the surface at least twice. Subsequent fill material placed over the coarse gravels and cobbles shall be adequately compacted so that the "fines" are "worked into" the voids in the underlying coarser gravels and cobbles. Where soil fill materials are to be placed directly over more than about 18 inches of clean gravel, a separation geofabric, such as Mirafi 140N or equivalent, is recommended to be placed between the gravel and subsequent soil fills.

Non-structural fill may be placed in lifts not exceeding 12 inches in loose thickness and compacted by passing construction, spreading, or hauling equipment over the surface at least twice.

5.2.5 Utility Trenches

All utility trench backfill material below structurally loaded facilities (footings, floor slabs, flatwork, pavements, etc.) shall be placed at the same density requirements established for structural fill. If the surface of the backfill becomes disturbed during the course of construction, the backfill shall be proof rolled and/or properly compacted prior to the construction of any exterior flatwork over a backfilled trench. Proof rolling shall be performed by passing moderately loaded rubber tire-mounted construction equipment uniformly over the surface at least twice. If excessively loose or soft areas are encountered during proof rolling, they shall be removed to a maximum depth of 2 feet below design finish grade and replaced with structural fill.

Many utility companies and City-County governments are now requiring that Type A-1a or A-1b (AASHTO Designation – granular soils with limited fines) soils be used as backfill over utilities. These organizations are also requiring that in public roadways, the backfill over major utilities be compacted over the full depth of fill to at least 96 percent of the maximum dry density as determined by the AASHTO T180 (ASTM D1557) method of compaction. GSH recommends that as the major utilities continue onto the site that these compaction specifications are followed.

Fine-grained soils, such as silts and clays, are not recommended for utility trench backfill in structural areas.

The static groundwater table was encountered as shallow as 2.8 feet below the existing surface and may be shallower with seasonal fluctuations. Dewatering of utility trenches and other excavations below this level should be anticipated.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

5.3 GROUNDWATER

On May 13, 2021 (21 days following drilling), groundwater was measured within the PVC pipes installed as tabulated below:

Boring No.	Groundwater Depth (feet)
	May 13, 2021
B-1	4.8
B-2	Pipe Damaged
B-3	7.8
B-4	2.8
B-5	5.0
B-6	6.1
B-8	7.8
B-9	Pipe Damaged
B-10	7.1
B-12	4.6
B-15	3.6

Based on the anticipated cuts necessary to reach design subgrades, we anticipate temporary and permanent dewatering will be necessary. Floor slabs must be placed a minimum of 4 feet from the stabilized groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

The groundwater measurements presented are conditions at the time of the field exploration and may not be representative of other times or locations. Groundwater levels may vary seasonally and with precipitation, as well as other factors including irrigation. Evaluation of these factors is beyond the scope of this study. Groundwater levels may, therefore, be at shallower or deeper depths than those measured during this study, including during construction and over the life of the structure.

The extent and nature of any dewatering required during construction will be dependent on the actual groundwater conditions prevalent at the time of construction and the effectiveness of construction drainage to prevent run-off into open excavations.

5.4 SPREAD AND CONTINUOUS WALL FOUNDATIONS

5.4.1 Design Data

The results of our analysis indicate that the proposed structures may be supported upon conventional spread and continuous wall foundations established upon suitable natural soils and/or structural fill extending to suitable natural soils. Under no circumstances shall foundations be established over non-engineered fills, loose or disturbed soils, topsoil, surface vegetation, root systems, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. More heavily loaded footings will require a certain amount of granular structural replacement fill as specified in Section 5.4.3, Settlements, of this report. For design, the following parameters are provided:

Minimum Recommended Depth of Embedment for Frost Protection	- 30 inches
Minimum Recommended Depth of Embedment for Non-frost Conditions	- 15 inches
Recommended Minimum Width for Continuous Wall Footings	- 18 inches
Minimum Recommended Width for Isolated Spread Footings	- 24 inches
Recommended Net Bearing Capacity for Real Load Conditions for Footings on Granular Structural Replacement Fill Extending to Suitable Natural Soils	- 1,500 pounds* per square foot
Bearing Capacity Increase for Seismic Loading	- 50 percent

* More heavily loaded footings must be underlain with some additional granular structural replacement structural fill to control settlements. See Section 5.4.3, Settlements below for specifics.

The term "net bearing capacity" refers to the allowable pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.4.2 Installation

Under no circumstances shall the footings be installed upon non-engineered fills, loose or disturbed soils, topsoil, surface vegetation, root systems, rubbish, construction debris, or other deleterious materials. If unsuitable soils are encountered, they must be removed and replaced with compacted granular fill. If granular soils become loose or disturbed, they must be recompacted prior to pouring the concrete.

The width of structural replacement fill below footings should be equal to the width of the footing plus one foot for each foot of fill thickness.

5.4.3 Settlements

Granular structural replacement fill will be required under more heavily loaded footings. For the required amount, refer to the table below:

Foundations	Loading	Minimum Thickness of Replacement Structural Granular Fill (feet)
Wall	Up to 8 kips per lineal foot	1.5
Spread	Up to 150 kips	1.5
	150 kips to 225 kips	2.5

Based on column loadings, soil bearing capacities, and the foundation recommendations as discussed above, we expect primary total settlement beneath individual foundations to be less than one inch.

The amount of differential settlement is difficult to predict because the subsurface and foundation loading conditions can vary considerably across the site. However, we anticipate differential settlement between adjacent foundations could vary from 0.5 to 0.75 inch. The final deflected shape of the structure will be dependent on actual foundation locations and loading.

5.5 LATERAL RESISTANCE

Lateral loads imposed upon foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footings and the supporting soils. In determining frictional resistance, a coefficient of friction of 0.35 may be utilized for the footing interface with in situ natural clay soils and 0.40 for footing interface with natural granular soils or granular structural fill. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

A combination of passive earth resistance and friction may be utilized provided that the friction component of the total is divided by 1.5.

5.6 LATERAL PRESSURES

For dock-height fills and/or shallow retaining walls or utility boxes up to 4 feet tall, the following lateral pressure discussion is provided. Parameters, as presented within this section, are for backfills which will consist of drained granular soil placed and compacted in accordance with the recommendations presented herein.

The lateral pressures imposed upon subgrade facilities will, therefore, be basically dependent upon the relative rigidity and movement of the backfilled structure. For active walls, such as retaining walls which can move outward (away from the backfill), granular backfill may be considered equivalent to a fluid with a density of 40 pounds per cubic foot in computing lateral pressures. For more rigid walls that are not more than 10 inches thick, granular backfill may be considered equivalent to a fluid with a density of 50 pounds per cubic foot. For very rigid non-yielding walls, granular backfill should be considered equivalent to a fluid with a density with at least 60 pounds per cubic foot. The above values assume that the surface of the soils slope behind the wall is horizontal and that the granular fill within 3 feet of the wall will be compacted with hand-operated compacting equipment.

For seismic loading of retaining/below-grade walls, the uniform lateral pressures on the following page, in pounds per square foot (psf), should be added based on wall depth and wall case.

Uniform Lateral Pressures			
Wall Height (Feet)	**Active Pressure Case (psf)**	**Moderately Yielding Case (psf)**	**At Rest/Non-Yielding Case (psf)**
4	25	50	80

5.7 FLOOR SLABS

Floor slabs may be established upon suitable natural subgrade soils or structural fill extending to suitable natural soils. Under no circumstances shall floor slabs be established directly over non-engineered fills, loose or disturbed soils, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water.

Additionally, GSH recommends that floor slabs be constructed a minimum of 4.0 feet from the stabilized groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

To facilitate curing of the concrete and to provide a capillary moisture break, it is recommended that floor slabs be directly underlain by at least 4 inches of "free-draining" fill, such as "pea" gravel or three-quarters to one inch minus clean gap-graded gravel.

Settlement of lightly loaded floor slabs designed according to previous recommendations (average uniform pressure of 200 pounds per square foot or less) is anticipated to be less than one-quarter of an inch.

5.8 PAVEMENTS

The natural clay soils will exhibit poor pavement support characteristics when saturated. All pavement areas must be prepared as previously discussed (see Section 5.2.1, Site Preparation). Under no circumstances shall pavements be established over non-engineered fills, loose or disturbed soils, topsoil, surface vegetation, root systems, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. With the subgrade soils and the projected traffic as discussed in Section 2, Proposed Construction, the following pavement sections are recommended:

Parking Areas

(Light Volume of Automobiles and Light Trucks,
Occasional Medium-Weight Trucks,
and No Heavy-Weight Trucks)
[1-3 equivalent 18-kip axle loads per day]

Flexible Pavements:
(Asphalt Concrete)

3.0 inches	Asphalt concrete
8.0 inches	Aggregate base
Over	Properly prepared natural subgrade soils and/or structural site grading fill extending to properly prepared natural subgrade soils

Rigid Pavements:
(Non-reinforced Concrete)

5.0 inches	Portland cement concrete (non-reinforced)
5.0 inches	Aggregate base
Over	Properly prepared natural subgrade soils, and/or structural site grading fill extending to properly prepared natural subgrade soils

Primary Drive Lanes/Loading and Unloading Areas

(Moderate Volume of Automobiles, Light Trucks,
and Medium-Weight Trucks,
with a Light Volume of Heavyweight Trucks)
[18 equivalent 18-kip axle loads per day]

Flexible Pavements:
(Asphalt Concrete)

4.0 inches	Asphalt concrete
8.0 inches	Aggregate base
8.0 inches*	Aggregate subbase
Over	Properly prepared natural subgrade soils and/or structural site grading fill extending to properly prepared natural subgrade soils

* Subbase may consist of granular site grading fills with a minimum California Bearing Ratio (CBR) of 30 percent.

Rigid Pavements:
(Non-reinforced Concrete)

7.0 inches	Portland cement concrete (non-reinforced)
6.0 inches	Aggregate base
Over	Properly prepared natural subgrade soils, and/or structural site grading fill extending to properly prepared natural subgrade soils

In areas with tight maneuvering heavy vehicles, rigid pavements are recommended.

For dumpster pads, we recommend a pavement section consisting of 8.0 inches of Portland cement concrete, 12.0 inches of aggregate base, over properly prepared natural subgrade or site grading structural fills. Dumpster pads should not be constructed overlying non-engineered fills under any circumstances.

These above rigid pavement sections are for non-reinforced Portland cement concrete. Concrete should be designed in accordance with the American Concrete Institute (ACI) and joint details should conform to the Portland Cement Association (PCA) guidelines. The concrete should have a minimum 28-day unconfined compressive strength of 4,000 pounds per square inch and contain 6 percent ±1 percent air-entrainment.

The crushed stone should conform to applicable sections of the current Utah Department of Transportation (UDOT) Standard Specifications. All asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and UDOT. A GSH technician shall observe placement and perform density testing of the base course material and asphalt.

Please note that the recommended pavement section is based on estimated post-construction traffic loading. If the pavement is to be constructed and utilized by construction traffic, the above pavement section may prove insufficient for heavy truck traffic, such as concrete trucks or tractor-trailers used for construction delivery. Unexpected distress, reduced pavement life, and/or premature failure of the pavement section could result if subjected to heavy construction traffic and the owner should be made aware of this risk. If the estimated traffic loading stated herein is not correct, GSH must review actual pavement loading conditions to determine if revisions to these recommendations are warranted.

5.9 CEMENT TYPES

A representative soil sample was collected and sent for laboratory analysis for pH and sulfate content. As of the date of this report, results are still pending and will be transmitted when available and with corresponding cement recommendations, if applicable.

5.10 GEOSEISMIC SETTING

5.10.1 General

Utah municipalities have adopted the International Building Code (IBC) 2018. The IBC 2018 code refers to ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7-16) determines the seismic hazard for a site based upon mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class. The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points). GSH performed refraction microtremor (ReMi) testing to obtain the shear-wave velocities for the site. GSH is currently conducting a site-specific seismic response analysis and the results will be transmitted upon completion within a separate report.

5.10.2 Faulting

Based on our review of available literature, no active faults pass through or immediately adjacent to the site. The nearest active mapped fault consists of the Utah Lake Faults, located about 1.23 miles to the south of the site.

5.10.3 Site Class

Due to liquefiable soils being present, the site has been determined to be Site Class F (in accordance with Section 20.3.1, Site Class F of ASCE 7-16). According to ASCE 7-16, a site-specific response analysis is required. Section 20.3.1 of ASCE 7-16 provides exception to this requirement under certain conditions. These options will need to be reviewed and evaluated by the project structural engineer. GSH is currently conducting a site-specific seismic response analysis and the results will be transmitted upon completion within a separate report.

5.10.4 Ground Motions

The IBC 2018 code is based on USGS mapping, which provides values of short and long period accelerations for average bedrock values for the Western United States and must be corrected for local soil conditions. The following table summarizes the peak ground and short and long period accelerations for the MCE event and incorporates the appropriate soil amplification factor for a Site Class F. Based on the site latitude and longitude (40.3543 degrees north and 111.7982 degrees west, respectively) and Risk Category I, the values for this site are tabulated below:

Spectral Acceleration Value, T	Bedrock Boundary [mapped values] (% g)	Site Coefficient	Site Class * [adjusted for site class effects] (% g)	Design Values* (% g)
Peak Ground Acceleration	*	F_a = *	*	*
0.2 Seconds (Short Period Acceleration)	S_S = *	F_a = *	S_{MS} = *	S_{DS} = *
1.0 Second (Long Period Acceleration)	S_1 = *	F_v = *	S_{M1} = *	S_{D1} = *

* See Section 5.10.3, Site Class

5.10.5 Liquefaction

The site is located in an area that has been identified by the Utah Geological Survey (UGS) as being a "high" liquefaction potential zone. Liquefaction is defined as the condition when saturated, loose, granular soils lose their support capabilities because of excessive pore water pressure, which

develops during a seismic event. Clayey soils, even if saturated, will generally not liquefy during a major seismic event.

Calculations were performed using the procedures described in the 2008 Soil Liquefaction During Earthquakes Monograph by Idriss and Boulanger[3]. Our calculations indicate the very loose to loose, saturated sand layers encountered in Borings B-1, B-2, B-4, and B-12 could liquefy during the design seismic event. Calculated settlement associated with the liquefaction of each layer within the borings was on the order of 1 to 1.5 inches. This magnitude of settlement should be tolerable to design for life safety. Additionally, lateral spread and ground rupture are unlikely to occur.

5.11 SITE VISITS

GSH must verify that all topsoil/disturbed soils and any other unsuitable soils have been removed, that non-engineered fills (if encountered) have been removed and/or properly prepared, and that suitable soils have been encountered prior to placing site grading fills, footings, slabs, and pavements. Additionally, GSH must observe fill placement and verify in-place moisture content and density of fill materials placed at the site.

5.12 CLOSURE

If you have any questions or would like to discuss these items further, please feel free to contact us at (801) 685-9190.

Respectfully submitted,

GSH Geotechnical, Inc.

Nathaniel J. Wulfman
Staff Geologist

Reviewed by:

Alan D. Spilker, P.E.
State of Utah No. 334228
President/Senior Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
No. 334228
ALAN D. SPILKER
STATE OF UTAH

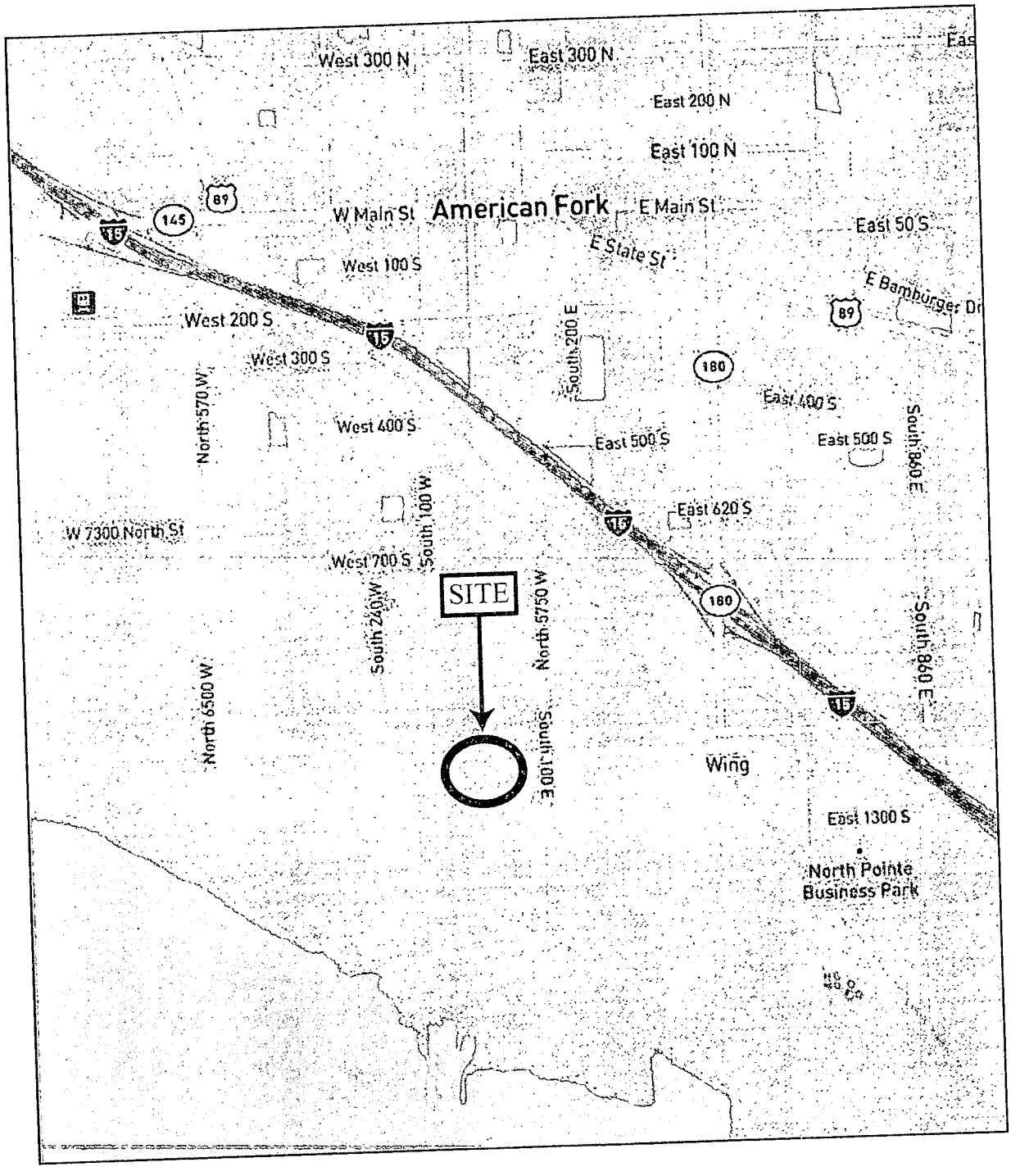
NWU/ADS:sp

Encl. Figure 1, Vicinity Map
Figure 2, Site Plan
Figures 3A through 3O, Boring Logs
Figure 4, Key to Boring Log (USCS)

Addressee (email)

[3] Idriss, I. M., and Boulanger, R. W. (2008), Soil liquefaction during earthquakes: Monograph MNO-12, Earthquake Engineering Research Institute, Oakland, CA, 261 pp.

RED PINE CONSTRUCTION
JOB NO. 2354-003-21



0.5 0 0.5 1 KM 1.5

0.2 0 0.2 0.4 0.6 0.8 1 MI 1.2

FIGURE 1
VICINITY MAP

GSH

REFERENCE:
ALL TRAILS - NATIONAL GEOGRAPHIC TERRAIN
DATED 2021

RED PINE CONSTRUCITON
JOB NO. 2354-003-21

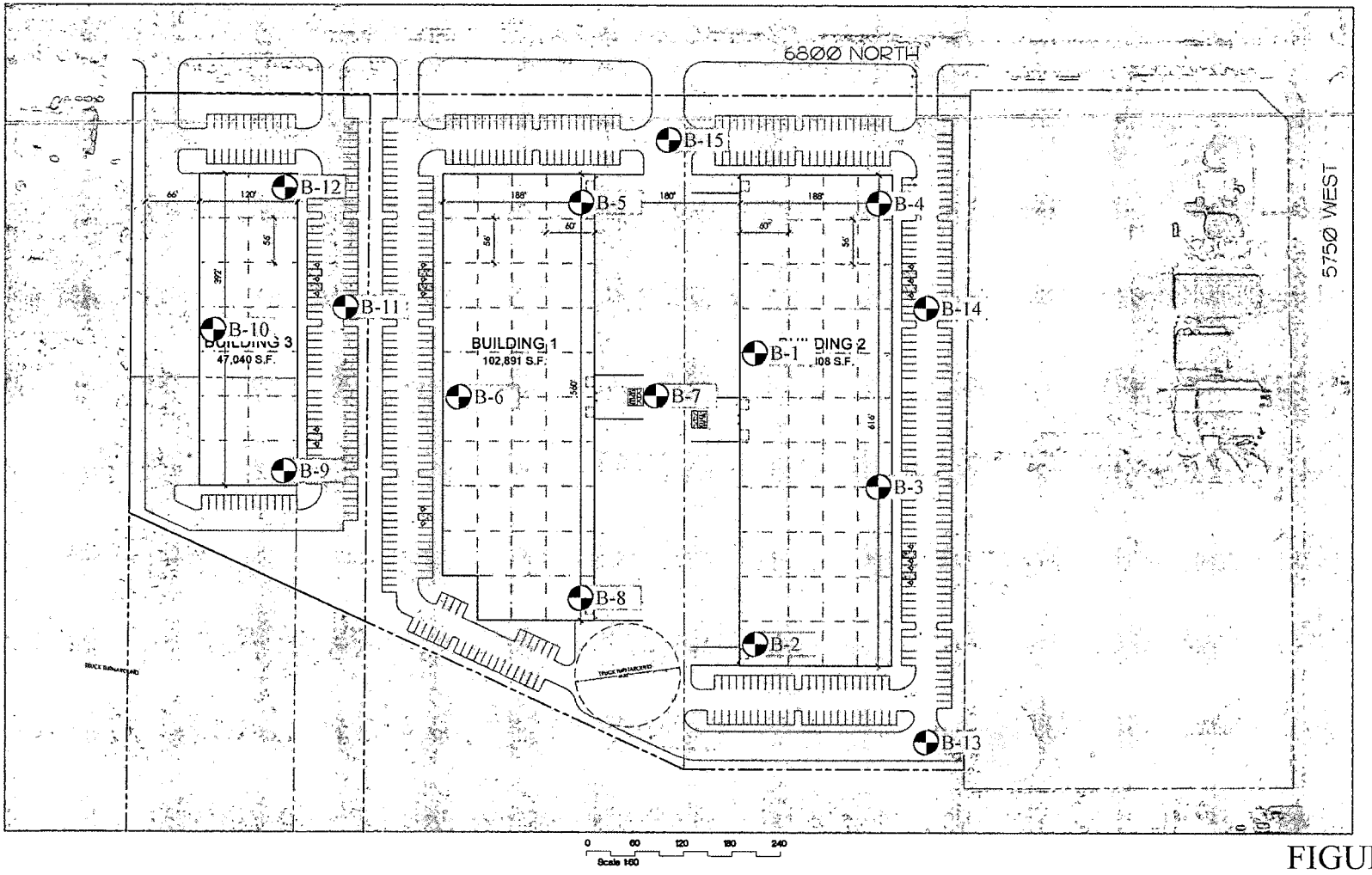


FIGURE 2
SITE PLAN

REFERENCE:
ADAPTED FROM DRAWING ENTITLED
"MIKE HORAN - 6800 NORTH INDUSTRIAL AF"
BY AEURBIA, DATED 8 APR 2021

GSH

GSH	BORING LOG Page: 1 of 2	BORING: B-1

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/22/21 — DATE FINISHED: 4/22/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: JH

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 4.8' (5/13/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand and occasional layers of silty fine sand up to 3" major roots (topsoil) to 6"; brown									slightly moist soft
				2							
▼		grades with trace fine sand	5	3							saturated
		grades with occasional layers of fine to coarse sandy fine gravel up to 6" thick	10	26							
		grades with some fine sand with layers of silty fine sand up to 3" thick	15	2							very soft
		grades fine sandy clay; tan									
			20	2							
		grades silty clay with some fine sand; gray	25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3A

GSH	BORING LOG Page: 2 of 2	BORING: B-1

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/22/21 — DATE FINISHED: 4/22/21

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		grades silty clay with some fine sand; gray	25	0							
	SP	FINE TO MEDIUM SAND with occasional layers of silty clay up to 3" thick; brown	30	3							saturated very loose
	CL	SILTY CLAY with some fine sand; brown	35	7							saturated medium stiff
		grades with trace fine sand; gray	40	4							soft
			45	4							
		grades brown	50	3							
		End of Exploration at 51.5'. Installed 1.25" diameter slotted PVC pipe to 51.5'.									

See Subsurface Conditions section in the report for additional information.

FIGURE 3A
(continued)

GSH BORING LOG

Page: 1 of 1

BORING: B-2

CLIENT: Red Pine Construction | PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial | DATE STARTED: 4/22/21 | DATE FINISHED: 4/22/21

LOCATION: 5900 West 6800 North, American Fork, Utah | GSH FIELD REP.: JH

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger | HAMMER: Automatic | WEIGHT: 140 lbs | DROP: 30"

GROUNDWATER DEPTH: 6.0' (4/22/21) | ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand; major roots (topsoil) to 5"; brown									slightly moist medium stiff
				8							
			5	3							moist soft
▼											saturated
	SM	SILTY FINE SAND with numerous layers of clay up to 2" thick; gray									saturated very loose
			10	3							
	CL	SILTY CLAY with some fine sand; brown									saturated soft
			15	4							
		End of Exploration at 16.0'. Installed 1.25" diameter slotted PVC pipe to 16.0'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3B

GSH	BORING LOG Page: 1 of 1	BORING: B-3

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/22/21 — DATE FINISHED: 4/22/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: JH

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 7.8' (5/13/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand; major roots (topsoil) to 6"; brown		8							slightly moist medium stiff
			5								
▼		grades fine sandy clay with some fine and coarse gravel		6							saturated
		grades with occasional layers of silty fine sand up to 2" thick	10	2							soft
		grades silty clay with some fine sand	15	3							
		End of Exploration at 16.0'. Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3C

GSH BORING LOG

Page: 1 of 1

BORING: B-4

CLIENT: Red Pine Construction | PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial | DATE STARTED: 4/23/21 | DATE FINISHED: 4/23/21

LOCATION: 5900 West 6800 North, American Fork, Utah | GSH FIELD REP.: GL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger | HAMMER: Automatic | WEIGHT: 140 lbs | DROP: 30"

GROUNDWATER DEPTH: 2.8' (5/13/21) | ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY major roots (topsoil) to 5"; brown									slightly moist medium stiff
▼				5							saturated
	SP/SM	FINE TO COARSE SAND with fine gravel and silt; brown	5								saturated dense
				15							
	CL	SILTY CLAY brown									saturated medium stiff
			10	14							saturated
	SM	FINE TO COARSE SAND with silt; brown	15	2							saturated very loose
	CL	SILTY CLAY brown									saturated very soft
		End of Exploration at 16.0'. Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3D

GSH	BORING LOG Page: 1 of 1	BORING: B-5

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/23/21 — DATE FINISHED: 4/23/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: GL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 5.0' (5/13/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine gravel; major roots (topsoil) to 6"; brown									moist soft
				4							
▼		fine gravel grades out	5								saturated very soft
				2							
		grades fine to coarse sandy clay with some fine gravel	10	4							soft
		grades fine to medium sandy clay with silt	15	7							medium stiff
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3E

GSH	BORING LOG Page: 1 of 1	BORING: B-6

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 6.1' (5/13/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	FINE TO MEDIUM SANDY CLAY major roots (topsoil) to 6"; dark brown		17							slightly moist stiff
▼		grades brown	5	4							medium stiff saturated
	SM	SILTY FINE SAND with occasional layers of silty clay up to 6" thick; gray	10	5							saturated medium dense
	CL	FINE TO MEDIUM SANDY CLAY brown	15	4							saturated medium stiff
		End of Exploration at 16.5'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 16.5'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3F

GSH	BORING LOG Page: 1 of 1	BORING: B-7

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: Not Encountered (4/26/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with fine to medium sand; major roots (topsoil) to 6"; brown									slightly moist medium stiff
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3G

GSH

BORING LOG

Page: 1 of 1

BORING: B-8

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 7.8' (5/13/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/ ML	SILTY FINE SAND/FINE SANDY SILT major roots (topsoil) to 6"; brown									slightly moist dense
				13							
			5								
	CL	FINE TO MEDIUM SANDY CLAY brown									slightly moist medium stiff
▼				4							saturated
			10								
				4							
		grades silty clay with some fine sand	15								
				6							
		End of Exploration at 16.5'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 16.5'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3H

GSH BORING LOG

Page: 1 of 1

BORING: B-9

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 14.5' (4/26/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine to medium sand and trace fine gravel; major roots to 5"; brown									slightly moist stiff
				17							
		grades with occasional layers of silty fine sand up to 6" thick	5								
				41							
	GP	FINE TO COARSE SANDY FINE GRAVEL with some clay; brown									moist medium dense
			10	38							
▼	CL	FINE TO MEDIUM SANDY CLAY brown	15								saturated medium stiff
				5							
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.									
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3I

GSH	BORING LOG Page: 1 of 1	BORING: B-10

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 7.1' (5/13/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/SC	SILTY/CLAYEY FINE TO MEDIUM SAND with some fine gravel; major roots (topsoil) to 6"; brown									dry loose
				16							
			5								
▼	CL	SILTY CLAY with fine to medium sand and trace fine gravel; gray									saturated soft
				2							
		grades fine to medium sandy clay with some fine gravel	10	5							medium stiff
		grades silty clay with some fine to medium sand and trace fine gravel; gray to brown	15	9							
		End of Exploration at 16.5'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 16.5'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3J

GSH	BORING LOG Page: 1 of 1	BORING: B-11

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: Not Encountered (4/26/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	FINE TO MEDIUM SANDY CLAY with some fine gravel; major roots (topsoil) to 5"; brown									dry medium stiff
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3K

GSH	BORING LOG Page: 1 of 1	BORING: B-12

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 4.6' (5/13/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/SC	SILTY/CLAYEY FINE TO MEDIUM SAND major roots (topsoil) to 6"; brown									dry loose
				8							
▼			5								saturated
	SP	FINE GRAVELLY FINE TO COARSE SAND with some clay; gray									saturated medium dense
				47							
		grades fine to coarse sand; brown	10	16							loose
		grades fine gravelly fine to coarse sand with trace clay and occasional layers of silty clay up to 6" thick	15	2							very loose
		End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16.5'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3L

GSH	BORING LOG Page: 1 of 1	BORING: B-13

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: Not Encountered (4/26/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand and trace fine gravel; major roots (topsoil) to 6"; brown									slightly moist medium stiff
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3M

GSH	BORING LOG Page: 1 of 1	BORING: B-14

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: Not Encountered (4/26/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand; major roots (topsoil) to 5"; brown									slightly moist medium stiff
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3N

GSH	BORING LOG Page: 1 of 1	BORING: B-15

CLIENT: Red Pine Construction — PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial — DATE STARTED: 4/26/21 — DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah — GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 3.6' (5/13/21) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	GC	FINE SANDY FINE AND COARSE GRAVEL with clay; major roots (topsoil) to 6"; brown									slightly moist medium dense
▼											saturated
		End of Exploration at 5.0'. Installed 1.25" diameter slotted PVC pipe to 5.0'.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3O

CLIENT: Red Pine Construction
PROJECT: Proposed 6800 North Industrial
PROJECT NUMBER: 2354-003-21

KEY TO BORING LOG

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫

COLUMN DESCRIPTIONS

① **Water Level:** Depth to measured groundwater table. See symbol below.

② **USCS:** (Unified Soil Classification System) Description of soils encountered; typical symbols are explained below.

③ **Description:** Description of material encountered; may include color, moisture, grain size, density/consistency,

④ **Depth (ft.):** Depth in feet below the ground surface.

⑤ **Blow Count:** Number of blows to advance sampler 12" beyond first 6", using a 140-lb hammer with 30" drop.

⑥ **Sample Symbol:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

⑦ **Moisture (%):** Water content of soil sample measured in laboratory; expressed as percentage of dryweight of

⑧ **Dry Density (pcf):** The density of a soil measured in laboratory; expressed in pounds per cubic foot.

⑨ **% Passing 200:** Fines content of soils sample passing a No. 200 sieve; expressed as a percentage.

⑩ **Liquid Limit (%):** Water content at which a soil changes from plastic to liquid behavior.

⑪ **Plasticity Index (%):** Range of water content at which a soil exhibits plastic properties.

⑫ **Remarks:** Comments and observations regarding drilling or sampling made by driller or field personnel. May include other field and laboratory test results using the following abbreviations:

CEMENTATION:	MODIFIERS:	MOISTURE CONTENT (FIELD TEST):
Weakly: Crumbles or breaks with handling or slight finger pressure.	**Trace** <5%	**Dry:** Absence of moisture, dusty, dry to the touch.
Moderately: Crumbles or breaks with considerable finger pressure.	**Some** 5-12%	**Moist:** Damp but no visible water.
Strongly: Will not crumble or break with finger pressure.	**With** > 12%	**Saturated:** Visible water, usually soil below water table.

Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on the logs apply only at the specific boring locations and at the time the borings were advanced; they are not warranted to be representative of subsurface conditions at other locations or times.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS SYMBOLS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than 50% of material is larger than No. 200 sieve size.	GRAVELS More than 50% of coarse fraction retained on No. 4 sieve.	CLEAN GRAVELS (little or no fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GP	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		GRAVELS WITH FINES (appreciable amount of fines)	GM	Silty Gravels, Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SANDS More than 50% of coarse fraction passing through No. 4 sieve.	CLEAN SANDS (little or no fines)	SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
			SP	Poorly-Graded Sands, Gravelly Sands, Little or No Fines
		SANDS WITH FINES (appreciable amount of fines)	SM	Silty Sands, Sand-Silt Mixtures
			SC	Clayey Sands, Sand-Clay Mixtures
FINE-GRAINED SOILS More than 50% of material is smaller than No. 200 sieve size.	SILTS AND CLAYS Liquid Limit less than 50%		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Silts and Organic Silty Clays o f Low Plasticity
	SILTS AND CLAYS Liquid Limit greater than 50%		MH	Inorganic Silts, Micacious or Diatomacious Fine Sand or Silty Soils
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Silts and Organic Clays of Medium to High Plasticity
HIGHLY ORGANIC SOILS			PT	Peat, Humus, Swamp Soils with High Organic Contents

Note: Dual Symbols are used to indicate borderline soil classifications.

STRATIFICATION:

DESCRIPTION	THICKNESS
Seam	up to 1/8"
Layer	1/8" to 12"
Occasional:	One or less per 6" of thickness
Numerous;	More than one per 6" of thickness

TYPICAL SAMPLER GRAPHIC SYMBOLS

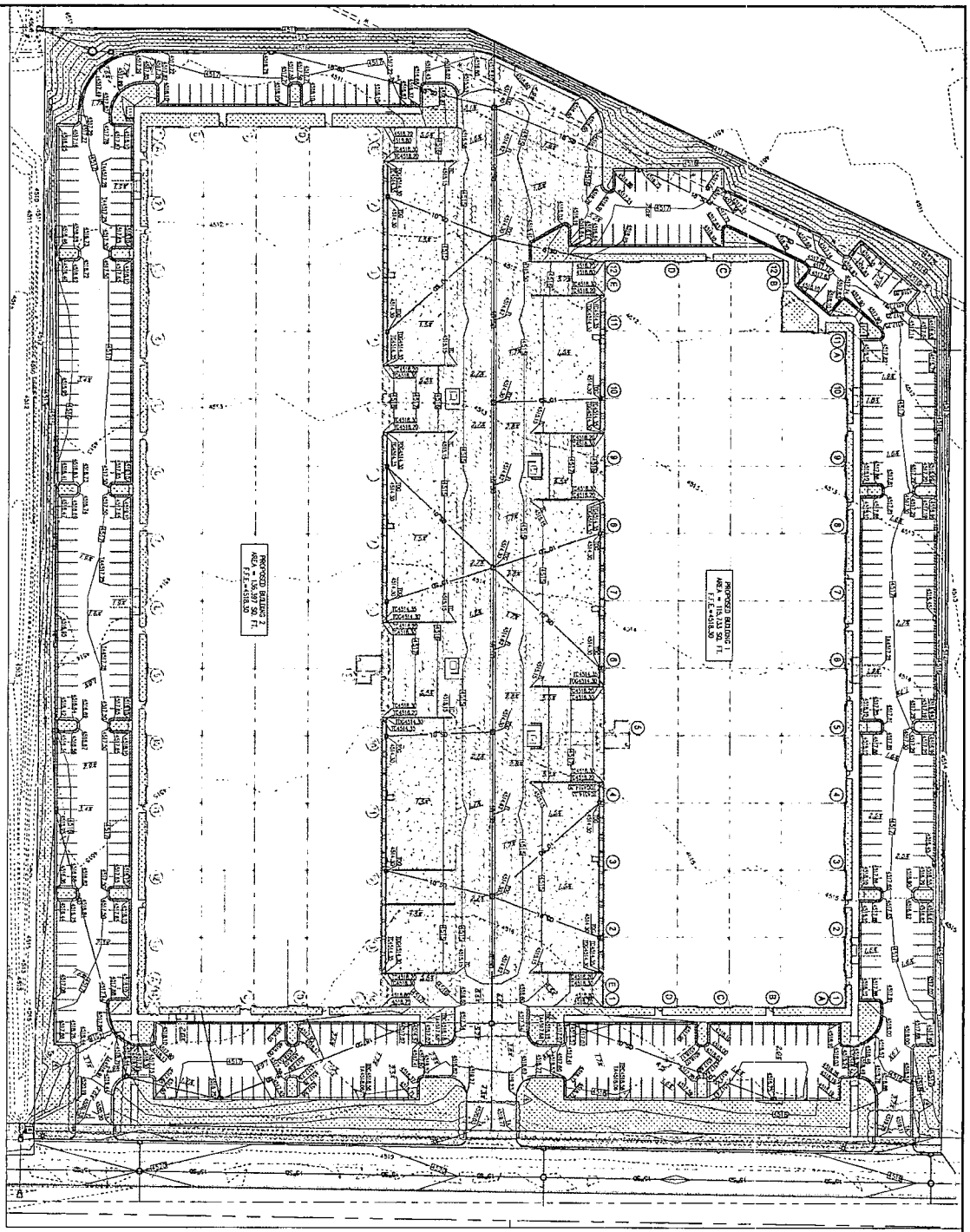
- Bulk/Bag Sample
- Standard Penetration Split Spoon Sampler
- Rock Core
- No Recovery
- 3.25" OD, 2.42" ID D&M Sampler
- 3.0" OD, 2.42" ID D&M Sampler
- California Sampler
- Thin Wall

WATER SYMBOL

- Water Level

FIGURE 4

GSH



Benchmark Info

The Benchmark for this property is the South Quarter Corner of Section 26, T 5 S, R 1 E, SLB&M. Elevation = 4503.89' Datum = NAVD 88 Vertical Datum UTAH TURNOPS System

SHEET LEGEND

- PROPOSED LIGHT ASPHALT 128,431 SF
- PROPOSED HEAVY ASPHALT 72,157 SF
- PROPOSED CONCRETE

SEE COVER SHEET FOR PROJECT LEGEND

Scale in Feet: 0, 40, 80

N

LIGHT ASPHALT PAVEMENT
N.T.S.

PAVEMENT SECTIONS ARE PER THE MAY 14, 2021 GEOTECHNICAL STUDY BY CGN (JOB NO 2021-001-21). CONTRACTOR TO INSTALL ALL PAVEMENT PER THE GEOTECH REPORT.

OVER SUITABLE NATURAL SOILS, PROPERLY PREPARED EXISTING FILLS AND/OR ENGINEERED FILLS EXTENDING TO SUITABLE NATURAL SOILS

4.5" ASPHALT
6.0" AGGREGATE BASE COURSE

HEAVY ASPHALT PAVEMENT
N.T.S.

PAVEMENT SECTIONS ARE PER THE MAY 14, 2021 GEOTECHNICAL STUDY BY CGN (JOB NO 2021-001-21). CONTRACTOR TO INSTALL ALL PAVEMENT PER THE GEOTECH REPORT.

OVER PROPERLY PLACED NON-ENGINEERED FILLS, SUITABLE NATURAL SOILS, OR STRUCTURAL FILL/ENGINEERED FILL AS NOTED TO SUITABLE NATURAL SOILS.

12.0" GRANULAR SUBBASE
6.0" AGGREGATE BASE COURSE
4.5" ASPHALT

HEAVY CONCRETE PAVEMENT
N.T.S.

PAVEMENT SECTIONS ARE PER THE MAY 14, 2021 GEOTECHNICAL STUDY BY CGN (JOB NO 2021-001-21). INSTALL ALL PAVEMENT PER THE GEOTECH REPORT.

OVER SUITABLE NATURAL SOILS, PROPERLY PREPARED EXISTING FILLS AND/OR ENGINEERED FILLS EXTENDING TO SUITABLE NATURAL SOILS. MOISTURE CONDITION AND COMPACT ALL PAVEMENT SUBGRADE PRIOR TO PLACEMENT OF NON-ENGINEERED FILLS.

7.0" PORTLAND CEMENT CONCRETE
6.0" AGGREGATE BASE COURSE

CALL BEFORE YOU DIG 811 BLUE STAKES OF UTAH

SHEET NO.	C2.0	
PROJECT ID	A1140-01	DATE: 10/28/21
DRAWN BY:	PRJ-AFH	CHECKED BY: SDT
SCALE:	1"=40'	

LICENSED PROFESSIONAL ENGINEER STATE OF UTAH TYLER D. THOMPSON No. 354391

DEER PARK

9 WEST & 42 EAST 1100 SOUTH, AMERICAN FORK, UTAH

GRADING PLAN

C1R CIVIL ENGINEERING +SURVEYING
3032 SOUTH 1030 WEST, SUITE 202
SLC, Utah 84119 – 801-949-6296

NO	REVISIONS	BY	DATE
1	CITY COMMENTS	RGW	10/18/21
2	ARCHITECTURAL COORDINATION	RGW	12/02/21
3	WATERLINE UDPATE	RGW	12/13/21
4	ROAD CROSS SECTION UPDATE	RGW	01/04/22

DESIGNER: RGW PROJECT ENGINEER: SDT