Addendum No. 1
to the
Contract Documents
JVWCD Headquarters Upper Campus Site Repairs & Improvements
Project

To All Planholders

March 26, 2021

Gentlemen:

Project No.: 3910

The following changes, additions, and/or deletions are hereby made a part of the Contract Documents for the construction of the "JVWCD Headquarters Upper Campus Site Repairs & Improvements", dated March 3 2021, as fully and completely as if the same were fully set forth therein:

A. Bid Schedule: The attached Bid Schedule replaces the Bid Schedule included in the Bid Documents and is made integral part of the BID DOCUMENTS.

B. Questions and Comments: The attached document titled "TCC Response to Comments and Questions Jordan Valley Water Conservation District Headquarters Upper Campus Improvements Project" answers the questions received after the pre-bid site visit, and it is made integral part of the BID DOCUMENTS.

C. The attached Geotechnical Report titled "Geotechnical Study Proposed JVWCD Headquarters Improvements and Repairs 8215 South 1300 West, West Jordan, Utah, is made integral part of the BID DOCUMENTS.

All bidders shall acknowledge receipt and acceptance of this Addendum No. 1 by signing in the space provided herein and submitting the signed Addendum with the bid. Bids submitted without this Addendum will be considered non-responsive.

Sincerely,

Jordan Valley Water Conservancy District

Marcelo Anglade, P.E.

Receipt acknowledged and conditions agreed to this _____ day of _____, 2021.

_____
Bidder

_____
By

BID

BID SCHEDULES

JVWCD Headquarters Upper Campus Site Repairs and Improvements

BID SCHEDULE A - CULVERT

SCHEDULE A - CULVERT					
Item No.	Description	Quantity Unit	Quantity	Unit Price	Extended Amount
1	Mobilization	Lump Sum	1		
2	Asphalt to be removed and disposed	Square Feet	1,703		
3	Excavation	Cubic Yards	407		
4	Curb and Gutter to be removed and disposed	Linear Feet	130		
5	Storm Drain Pipe to be removed and disposed	Linear Feet	152		
6	Existing Storm Drain Headwall and Valve to be removed and disposed	Each	1		
7	Existing Gate to be removed, stored, and replaced	Each	1		
8	Sawcut - Tie Ins to Existing Asphalt/Concrete	Linear Feet	62		
9	Construction Silt Fencing	Linear Feet	233		
10	Filter Sock Inlet Protection	Each	2		
11	Storm Drain Catch Basin to be removed and disposed	Each	2		
12	Remove and properly dispose of existing fence	Linear Feet	87		
13	Remove and relocate existing Monument and Lighting	Each	1		
14	Tree Protection	Each	3		
15	4" Heavy Asphalt Pavement	Square Feet	1,708		
16	30" Curb and Gutter with Base Course	Linear Feet	130		
17	Aggregate Base Course	Cubic Feet	1,139		
18	Granular Subbase	Cubic Feet	1,424		
19	Precast Concrete Wing Wall for Box Culvert	Each	4		
20	Guardrail along Wing Wall	Linear Feet	73		
21	Fence Replacement	Linear Feet	87		

22	Rip-Rap with Fabric	Cubic Yards	9		
23	Structural Fill Box Culvert	Cubic Feet	2,500		
24	2'x4' Storm Drain Catch Basin	Each	2		
25	8" Water Line 45 Degree Bend	Each	4		
26	15" RCP Storm Drain	Linear Feet	35		
27	5'x3' Concrete Box Culvert	Linear Feet	110		
28	Underground Electrical Conduit Loop	Lump Sum	1		
29	Telecommunication Conduit Loop	Lump Sum	1		
				Total Bid Schedule A	**$**

TOTAL AMOUNT BID SCHEDULE A - CULVERT IN WORDS:

_____ Dollars and ____ cents.

BID SCHEDULE B- BECKSTEAD LANE LINE OF SITE

SCHEDULE B - BECKSTEAD LANE LINE OF SITE					
Item No.	Description	Quantity Unit	Quantity	Unit Price	Extended Amount
1	Mobilization	Lump Sum	1		
2	Asphalt to be removed and disposed	Square Feet	14,472		
3	Excavation	Cubic Yards	1,532		
4	Remove Concrete Waterway	Linear Feet	15		
5	Curb and Gutter to be removed and disposed	Linear Feet	1,060		
6	Gas line to be cut, capped, and abandoned in place	Each	2		
7	Storm Drain Pipe to be removed and disposed	Linear Feet	78		
8	Sawcut - Tie Ins to Existing Asphalt/Concrete	Linear Feet	139		
9	Construction Silt Fencing	Linear Feet	610		
10	Remove and properly dispose of existing water line	Linear Feet	497		
11	Tree Protection	Each	2		
12	4" Heavy Asphalt Pavement	Square Feet	13,167		

13	3.5" Asphalt Pavement	Square Feet	1,186		
14	30" Curb and Gutter with Base Course	Linear Feet	1,060		
15	Aggregate Base Course	Cubic Feet	9,841		
16	Granular Subbase	Cubic Feet	10,973		
17	Concrete Waterway	Linear Feet	60		
18	Utility Structure Adjust to Grade	Each	5		
19	8" CAV	Each	1		
20	8" C900 Water Line	Linear Feet	475		
21	4" Tap into 8" C900 Water Line	Each	1		
22	8x6x8" Tee into 8" C900 Water Line	Each	1		
				Total Bid Schedule B	**$**

TOTAL AMOUNT BID SCHEDULE B - BECKSTEAD LANE LINE OF SITE IN WORDS:

_____ Dollars and ____ cents.

BID SCHEDULE C - UPPER CAMPUS PARKING LOT

Bid Schedule C - UPPER CAMPUS PARKING					
Item No.	Description	Quantity Unit	Quantity	Unit Price	Extended Amount
1	Mobilization	Lump Sum	1		
2	Asphalt to be removed and disposed	Square Feet	76,112		
3	Concrete to be removed and disposed	Square Feet	8,320		
4	Excavation	Cubic Yards	1,409		
5	Remove Concrete Waterway	Linear Feet	125		
6	Curb and Gutter to be removed and disposed	Linear Feet	3,545		
8	Storm Drain Pipe to be removed and disposed	Linear Feet	125		

11	Sawcut - Tie Ins to Existing Asphalt/Concrete	Linear Feet	952		
12	Construction Silt Fencing	Linear Feet	842		
13	Filter Sock Inlet Protection	Each	7		
14	Storm Drain Catch Basin to be removed and disposed	Each	3		
15	Remove and properly dispose of Existing ADA Parking Sign	Each	4		
16	Remove and properly dispose of existing tree	Each	16		
20	Tree Protection	Each	7		
22	3.5" Asphalt Pavement	Square Feet	73,948		
23	5" Concrete Sidewalk	Square Feet	5,077		
24	6.5" Vehicular Concrete Section	Square Feet	3,096		
25	30" Curb and Gutter with Base Course	Linear Feet	3,140		
25A	Type 'P' Curb with Base Course	Linear Feet	85		
26	Aggregate Base Course	Cubic Feet	65,710		
28	Concrete Waterway	Linear Feet	154		
29	Utility Structure Adjust to Grade	Each	2		
30	Detectable Warning Surface (3' Section)	Each	35		
31	Wheel Stops	Each	6		
38	2'x4' Storm Drain Catch Basin	Each	3		
43	12" RCP Storm Drain	Linear Feet	98		
45	18" RCP Storm Drain	Linear Feet	139		

47	Tie-ins to Existing Storm Drain System	Each	2		
54	4" Solid	Linear Feet	2,196		
55	Cross Walk-Paint	Square Feet	2,495		
56	ADA markings and loading zones	Each	5		
				Total Bid Schedule C	**$**

TOTAL AMOUNT BID SCHEDULE C - UPPER CAMPUS PARKING LOT IN WORDS:

_____ Dollars and ____ cents.

BID SCHEDULE D - UPPER CANAL (Ditch) REROUTING

BID SCHEDULE D - CANAL (DITCH) REROUTING					
Item No.	Description	Quantity Unit	Quantity	Unit Price	Extended Amount
1	Mobilization	Lump Sum	1		
4	Excavation	Cubic Yards	166		
8	Storm Drain Pipe to be removed and disposed	Linear Feet	12		
37	5' Diameter Storm Drain Manhole	Each	2		
39	24" Pipe Outfall	Each	1		
46	24" RCP Storm Drain	Linear Feet	250		
47	Tie-ins to Existing Storm Drain System	Each	1		
				Total Bid Schedule D	**$**

TOTAL AMOUNT BID SCHEDULE D CANAL REROUTING IN WORDS:

_____ Dollars and ____ cents.

BID

TOTAL BID SCHDULE A - CULVER REPLACEMENT $_____
TOTAL BID SCHDULE B - BECKSTEAD LANE LINE OF SITE $_____
TOTAL BID SCHDULE C - UPPER CAMPUS PARKING LOT $_____
TOTAL BID SCHDULE D - CANAL (DITCH) REROUTING $_____
TOTAL ALL BID SCHEDULES (A+B+C+D) COMBINED $_____

TOTAL ALL BID SCHEDULES (A+B+C+D) COMBINED IN WORDS:

_____ Dollars and ____ cents.

TALISMAN
CIVIL CONSULTANTS

TCC Response to Comments and Questions
Jordan Valley Water Conservation District Headquarters Upper Campus Improvements Project

Date	3-26-2021
TCC Job No.	18-024
JVWCD Project No.	3910

ANSWERS TO CONTRACTORS QUESTIONS

Question: Is the 5x3 Concrete Box Culvert cast in place or precast?

Talisman Response: The Box Culvert will be precast, Bid Documents have been updated.

Question: It (CD's) say to install P-Curb, but there is not item on the bid schedule for this.

Talisman Response: Bid Documents have been updated to include this. Line item 25A.

Question: The gas line work, items #7 and #51 we don't do this work without Dominion being involved. Were those supposed to be on the bid schedule?

Talisman Response: The bid item was included for continuity with the drawings, but is not expected to be bid upon by the contractor.

Question: What is the size of the existing storm drain pipe that is being removed on Bid Item 8?

Talisman Response: The size is unknown, but it is believed to be 18" RCP.

Question: No Measurement and Payment section in the Bid Documents…will this be available?

Talisman Response: A measurement and payment will not be included. Contractor to make bid for items based off of item call out, and details.

Question: Bid Item #26 Aggregate Base Course, does this item cover the road base for under asphalt and concrete items?

Talisman Response: Line Item #26 Aggregate Base Course refers to line items that require base course but is not specified in line item.

Question: There is quite a scope on removal and replacement of the existing entrance gate…is the scope all covered in Section 32 01 10?

Talisman Response: Specification 32 01 10 'Relocate Fences and Gates' covers the scope of this line item.

Question: Do you happen to have a supplier for the guardrail Bid Item #33?

Talisman Response: Awarded contractor is to obtain own supplier.

Question: Is there a contact name and phone number for Dominion for Bid Item #7 and #51?

Talisman Response: Gas Line repairs for the Lower Campus were performed by Enoch Smith with Diamond S, 801-364-8477.

Question: Bid item #27 uses the term Granular Subbase under the 4" asphalt section…what material in section 31 05 13 does that cover?

Talisman Response: Section 2.3 of Specification 31 05 13.

Question: As well as the term Structural Fill in Bid Item #36…what material in Section 31 05 13 does that cover?

Talisman Response: Refer to Specification 31 23 23 for structural fill requirements.

Question: …It appears there is a loop detection for the gate…I don't believe you want this cut back in to the new asphalt road…what are the plans for this?

District Response: The District will install the loops right before asphalt replacement (in order to avoid showing the cut on the road). Contract shall coordinate with Owner and Engineer the installation of the loop.

Question: Please clarify the traffic restrictions on the building of Beckstead Lane…I heard something about needing to maintain access for the maintenance guys?

Talisman Response: Access to Lower Campus must be maintained at all times. If that access is a dirt road, the dirt road must be compacted in a way to hold large water and delivery trucks.

Does Bid Item #4 cover the removal of the material below the existing asphalt and existing concrete?

Talisman Response: Yes.

Question: What type of waterline material is to be used…PVC, etc. Bid Item #41?

Talisman Response: Existing water pipe material unknown. Replace with 8" C900. Bid documents have been updated.

Question: Please clarify scope…it appears the plans are saying to remove and replace existing monument and light fixture Bid Item #18? It appears to be some sort of surveillance camera?

Talisman Response: Correct. Contractor to coordinate with the District over storage of existing fixtures until reinstalment.

Question: Bid Item #19 the quantity showing 497 lf of water line removal on sheet 4.3, Bid Item #41 only shows 113 lf going back in.

Talisman Response: Agreed, bid documents have been updated.

Question: There is no bid item for waterline loop for sheet 4.4…what item do we price that in?

Talisman Response: Please refer to bid item #42.

GORDON
GEOTECHNICAL
ENGINEERING, INC.

REPORT
GEOTECHNICAL STUDY
PROPOSED JVWCD HEADQUARTERS
IMPROVEMENTS AND REPAIRS
8215 SOUTH 1300 WEST
WEST JORDAN, UTAH

June 4, 2018

Job No. 278-006-18

Prepared for:
Talisman Civil Consultants, LLC
5217 South State Street, Suite 200
Murray, Utah 84107

Prepared by:
Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
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June 4, 2018
Job No. 278-006-18

Talisman Civil Consultants, LLC
5217 South State Street, Suite 200
Murray, Utah 84107

Attention: Ms. Courtney Manfred

Ladies and Gentlemen:

Re: Report
Geotechnical Study
Proposed JVWCD Headquarters Improvements and Repairs
8215 South 1300 West
West Jordan, Utah

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed at the site of the proposed Jordan Valley Water Conservancy District (JVWCD) Headquarters Improvements and Repairs, which are located at 8215 South 1300 West in West Jordan, Utah. The general location of the site with respect to major topographic features and existing facilities, as of 1999, is presented on Figure 1, Vicinity Map. A detailed location of the site showing existing roadways and surrounding facilities, on an air photograph base, is presented on Figure 2, Area Map. The boring locations drilled in conjunction with this study are also presented on Figure 2.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of our study were planned in discussions between Ms. Courtney Manfred of Talisman Civil Consultants, LLC, and Mr. Patrick Emery of Gordon Geotechnical Engineering, Inc. (G^2).

In general, the objectives of this study were to:

1. Accurately 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 development.

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

1. A field program consisting of the drilling, logging, and sampling of 26 borings.

2. A laboratory testing program.

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

1.3 AUTHORIZATION

Authorization was provided on April 17, 2018 for our Professional Services Agreement No. 18-0417 dated April 16, 2018.

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, measured and projected groundwater conditions, and the layout and design data discussed in Section 2., Proposed Construction, of this report. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, G^2 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

An aggregate storage bin is planned for the southeast corner of the JVWCD lower campus. The bin will consist of a one-level steel-frame awning structure established on shallow reinforced concrete footings. The bin will have a concrete floor slab and be surrounded by an apron of concrete pavement. The existing at-grade asphalt concrete pavements throughout the majority of the campus are to be replaced and a new storm drain system will be installed.

Maximum column loads for the aggregate storage bin are projected to be on the order of 15 to 20 kips.

Site development will require a moderate amount of earthwork in the form of site grading. It is estimated that maximum cuts and fills to achieve design grades will be on the order of one to two feet.

Paved surface parking areas will also be a part of the overall development. Traffic over the pavements will consist of a light to moderately light volume of automobiles and light trucks, and some medium-weight trucks. In roadway, the traffic will be somewhat higher. In the aggregate bin storage area, traffic is anticipated to consist primarily of a front-end loader and 10-wheel dump trucks making a dozen passes per day.

3. INVESTIGATIONS

3.1 FIELD PROGRAM

In order to define and evaluate the subsurface soil and groundwater conditions across the site, 26 borings were drilled to depths ranging from 5 to 16 feet below existing grade. The borings were drilled using a rubber tire truck-mounted drill rig equipped with hollow-stem augers. 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, relatively undisturbed and small disturbed 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 have been supplemented by subsequent inspection and testing in our laboratory. Detailed graphical representation of the subsurface conditions encountered is presented on Figures 3A through 3Z, Log of Borings. Soils were classified in accordance with the nomenclature described on Figure 4, Unified Soil Classification System.

A 3.25-inch outside diameter, 2.42-inch inside diameter drive sampler (Dames & Moore) was utilized in the majority of the subsurface sampling at the site. Additionally, a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) was 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 drilling operations, one and one-quarter-inch diameter slotted PVC pipe was installed in Borings B-3, B-6, B-25, and B-26 in order to provide a means of monitoring the groundwater fluctuations.

3.2 LABORATORY TESTING

3.2.1 General

In order to provide data necessary for our engineering analyses, a laboratory testing program was performed. The program included moisture and density, partial gradation, Atterberg limits, and consolidation tests. The following paragraphs describe the tests and summarize the test data.

3.2.2 Moisture and Density Tests

To aid in classifying the soils and to help correlate other test data, moisture and density tests were performed on selected undisturbed samples. The results of these tests are presented on the boring logs, Figures 3A through 3Z.

3.2.3 Partial Gradation Test

To aid in classifying the soils and to provide general index parameters, a partial gradation test was performed upon 14 representative samples of the soils encountered in the exploration borings. The results of the tests are tabulated below:

Boring No.	Depth (feet)	Percent Passing Sieve				Soil Classification
		No. 4	No. 10	No. 40	No. 200	
B-3	0.5	59.0	43.0	31.9	16.0	SM/GM – FILL (BASE)
B-7	2.0	-	-	-	98.3	CL
B-10	2.5	98.1	-	-	77.8	CL
B-11	4.5	97.2	-	-	68.3	CL – FILL
B-12	3.0	100.0	-	-	50.9	SM/ML
B-12	5.0	100.0	-	-	99.2	ML
B-13	2.0	99.5	-	-	91.7	ML
B-17	2.5	-	-	-	72.1	ML
B-18	3.0	-	-	-	51.3	SM/ML
B-18	5.5	98.5	-	-	81.2	ML
B-22	0.5	48.3	35.8	27.1	14.3	GM/SM – FILL (BASE)
B-23	2.5	94.6	-	-	77.2	CL
B-25	10.0	-	-	-	25.8	SM
B-26	10.0	69.9	-	-	8.2	SP/GP

3.2.4 Atterberg Limits Test

To further aid in classifying the site soils, an Atterberg limits tests were performed on three selected samples. Results of the tests are as follows:

Boring No.	Depth (feet)	Liquid Limit (percent)	Plastic Limit (percent)	Plasticity Index (percent)	Soil Classification
B-1	4.0	59	37	22	MH
B-2	4.5	40	23	17	CL
B-5	4.5	64	40	24	MH

3.2.5 Consolidation Tests

To provide data necessary for our settlement analyses, a consolidation test was performed on each of two representative samples of the fine-grained soils encountered in the exploration borings. The data available indicates that the soils in the upper five feet are only slightly over-consolidated. When loaded below the over-consolidated pressure these soils will exhibit moderate to high compressibility characteristics.

The data available indicates that the soils below the upper zone are moderately over-consolidated and when loaded below the over-consolidated pressure the soils will exhibit moderate compressibility characteristics. Detailed results of the tests are maintained within our files and can be transmitted to you, at your request.

4. SITE CONDITIONS

4.1 SURFACE

The site consists of a large irregular-shaped parcel containing the JVWCD headquarters. The site is covered by numerous one to two level existing office and warehouse structures and associated parking lots. The Jordan River bisects the site in a north-south direction. The area on the east side of the river is considered the lower campus and the area on west side is considered the upper campus.

The upper campus contains a terraced at-grade asphalt concrete parking lot. At the time of the field work, this lot appeared to be in generally fair condition with significant areas that would be considered poor condition due to the extensive significant alligator cracking.

The lower campus contains several structures surrounded by at-grade asphalt concrete pavement. Generally, the pavements on the west side of this campus are in good condition. The pavement in the northeast corner is fair to poor condition with numerous linear cracks and areas with alligator cracking.

The primary entrance roadway for the facilities follows the northern boundary of the site. The entrance roadway is generally in fair condition. Numerous linear cracks were observed with extensive alligator cracking in isolated areas.

The aggregate storage bins are planned for the vacant/undeveloped area on the south side of the lower campus.

The site is bordered by 1300 West to the west; and undeveloped and agricultural lands borders the site to the north, east, and south.

The topography of the site is variable. The upper campus parking lot slopes down to the west/southwest with an overall relief on the order of 7 to 10 feet. The low campus overall relief of three to five feet. The upper campus is of an elevation approximately 15 to 20 feet higher than the lower campus. The site grade is at approximately the same elevation as the adjacent street.

Representative photographs of the site area are shown on Figure 5, Photographs.

4.2 SUBSURFACE SOIL

The following charts summarizes the pavement section encountered at each boring location.

LOWER CAMPUS BORINGS

Boring No.	Asphalt Concrete Thickness (inches)	Aggregate Base Thickness (inches)	Subgrade Fill Thickness (inches)
B-1	3.0	12.0	27.0
B-2	3.0	12.0	39.0
B-3	3.0	11.0	0.0
B-4	3.0	14.0	0.0
B-5	3.0	12.0	0.0
B-6	3.0	14.0	0.0
B-7	3.0	12.0	0.0
B-8	3.0	12.0	0.0

UPPER CAMPUS BORINGS

Boring No.	Asphalt Concrete Thickness (inches)	Aggregate Base Thickness (inches)	Subgrade Fill Thickness (inches)
B-12	4.0	8.0	0.0
B-13	2.0	8.0	0.0
B-14	2.0	8.0	0.0
B-15	2.0	8.0	0.0
B-16	2.0	10.0	0.0
B-17	2.0	8.0	0.0
B-18	2.0	10.0	0.0
B-19	2.0	10.0	0.0
B-20	2.0	10.0	0.0
B-21	4.0	6.0	0.0

ENTRANCE ROADWAY BORINGS

Boring No.	Asphalt Concrete Thickness (inches)	Aggregate Base Thickness (inches)	Subgrade Fill Thickness (inches)
B-9	3.0	10.0	0.0
B-10	3.0	11.0	16.0
B-11	3.0	12.0	48.0+
B-22	4.0	6.0	0.0
B-23	4.0	12.0	0.0
B-24	4.0	20.0	0.0

The soil conditions encountered in each of the borings, to the depths penetrated, were relatively similar. As shown on the preceding charts, at Borings B-1 through B-13 and B-15 through B-24, 2 to 4 inches of asphalt concrete underlain by 6 to 24 inches of aggregate base was

encountered. At Borings B-1, B-2, B-10, B-11, and B-23, the pavement section was underlain by non-engineered fill that extended to depths of 2.5 to 6.5 feet below the ground surface. The silty clay/clayey gravel fills contain varying amounts of sand. Non-engineered fill will exhibit variable and, in most cases, poor engineering characteristics.

Underlying the pavement sections and fill in the borings and extending to depths of 5 to 16 feet is primarily natural silty clay/clayey silts with trace sand. The clay/silt is medium stiff to very stiff, brown to gray, moist to saturated, and moderately to highly compressible to depths of five feet. These medium stiff clays/silts within the upper five feet are anticipated to exhibit low strength and high compressibility characteristics under the anticipated loading range. Below these compressible soils, the deeper clay/silt is anticipated to exhibit moderate strength and compressibility characteristics under the anticipated loading range.

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

Immediately following drilling operations, the groundwater was measured in each boring. On June 4, 2018, the groundwater was measured within the piezometers placed in the borings. Groundwater measurements are tabulated on the following page.

Boring No.	Groundwater Depth (feet)		
	May 2, 2018	May 3, 2018	June 4, 2018
B-1	NGWE		No PVC installed.
B-2	NGWE		No PVC installed.
B-3	NGWE		6.0
B-4	NGWE		No PVC installed.
B-5	NGWE		No PVC installed.
B-6	NGWE		5.5
B-7	NGWE		No PVC installed.
B-8	NGWE		No PVC installed.
B-9	NGWE		No PVC installed.
B-10	NGWE		No PVC installed.
B-11	NGWE		No PVC installed.
B-12	NGWE		No PVC installed.
B-13	NGWE		No PVC installed.
B-14	NGWE		No PVC installed.
B-15	NGWE		No PVC installed.
B-16	NGWE		No PVC installed.
B-17	NGWE		No PVC installed.
B-18	NGWE		No PVC installed.
B-19		NGWE	No PVC installed.
B-20		NGWE	No PVC installed.
B-21		NGWE	No PVC installed.
B-22		NGWE	No PVC installed.
B-23		NGWE	No PVC installed.
B-24		NGWE	No PVC installed.
B-25		10.0	7.0
B-26		9.0	7.0

* During drilling; not stabilized

NGWE No groundwater encountered.

Seasonal and longer-term groundwater fluctuations on the order of one and one-half to three feet are projected, with the highest seasonal levels generally occurring during the late spring and early summer months.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

Our review of historic aerial photographs indicate that the pavements in the area of the exploration borings were construction prior to 1997, suggesting these pavements are over 20 years old. Considering the age, these pavements have performed fairly well. We anticipate that the traffic loading has increased over the years. The pavements in the northeast corner of the lower campus appeared to be in the worst condition. It is our understanding that the pavements of concern will be completely replaced. For replacement pavement section recommendations, see Section 5.7, Pavements.

The proposed aggregate storage bin structure may be supported upon conventional spread and continuous wall foundations over suitable natural soils and/or structural fill extending to suitable natural soils.

The most significant geotechnical aspects of the site are:

1. The non-engineered fill encountered in Borings B-1, B-2, B-10, B-11, and B-23 to depths of two and one-half to six and one-half feet below grade. Non-engineered fills must be completely removed from beneath the building footprint and rigid pavement areas.

2. Moderately high compressibility characteristics of the clays encountered in the upper five feet of the soil profile in the area of the aggregate storage bins. Footings will need to be deigned with a relatively low bearing pressure. Additionally, the very moist clay soils are footing depth will be easily disturbed and zones of excessively soft clay may be encountered.

3. The relatively shallow groundwater encountered at depths of five and one-half to seven feet. Design water table recommendations are presented in Section 5.10, Design Water Table. Due to the relatively high groundwater table, earthwork associated with development will be difficult.

Due to the moderately high water table, zones of soft and easily disturbed clay may be encountered at footing depth. A layer of stabilizing fill may be required below footings if these conditions are encountered. Removing the highly compressible clays may require temporary excavations below the water table. Temporary dewatering may likely be required during footing construction.

Due to the variable nature of the non-engineered fills and moderately compressible clays encountered, a qualified geotechnical engineer must aid in verifying that all non-engineered fills have been completely removed and suitable natural soils encountered prior to the placement of structural site grading fills, footings, or foundations.

Detailed discussions pertaining to earthwork, foundations, floor slabs, lateral resistance, pavement, and the geoseismic setting of the site are discussed in the following sections.

5.2 EARTHWORK

5.2.1 Site Preparation

Initial preparation of the site must consist of the removal of the existing pavements, debris, and any associated non-engineered fills. In proposed flexible pavement areas, the existing asphalt concrete and fills may remain provided that they do not interfere with the final grade. The asphalt concrete should be perforated to facilitate drainage and proofrolled.

Further preparation of the site must consist of the removal of all non-engineered fills, loose surficial soils, topsoil, debris, and other deleterious materials from beneath an area extending at least three feet beyond the perimeter of the proposed storage bin, rigid pavement, and exterior flatwork areas.

The non-engineered fills may remain in flexible pavement areas as long as they are properly prepared. Proper preparation will consist of scarifying and moisture conditioning the upper eight inches and recompacting to the requirements of structural fill. However, it should be noted that compaction of fine-grained soils (clays and silts, if utilized) as structural site grading fill will be very difficult, if not impossible, during wet and cold periods of the year. As an option for proper preparation and recompaction, the upper eight inches of the non-engineered fills may be removed and replaced with granular subbase over proofrolled subgrade. Even with proper preparation, flexible pavements established on non-engineered fills may experience some long-term movements. If the possibility of these movements is not acceptable, these non-engineered fills must be completely removed.

Subsequent to the above operations and prior to the placement of footings, structural site grading fill, or floor slabs, the exposed natural subgrade must be proofrolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If any loose, soft, or disturbed zones are encountered, they must be completely removed in footing and floor slab areas and replaced with granular structural fill. If removal depth required is greater than two feet, G^2 must be notified to provide further recommendations. In pavement areas, unsuitable soils encountered during recompaction and proofrolling must be removed to a maximum depth of two feet and replaced with compacted granular structural fill.

5.2.2 Excavations

Groundwater is anticipated to be encountered at depths of approximately five to six feet and possibly shallower. Temporary construction excavations into the natural fine-grained cohesive soils not exceeding four feet in depth and not encountering the groundwater table may be constructed with near-vertical sideslopes. If cohesive soils and groundwater are encountered, near-vertical sideslopes may still be used. If granular soils are encountered below the water table, very flat sideslopes will be required.

Deeper excavations not exceeding 8 to 10 feet in depth nor encountering loose granular soils or groundwater may be constructed with sideslopes no steeper than three-quarters horizontal to one vertical. If granular soils and groundwater are encountered, flatter sideslopes, shoring and bracing, and/or dewatering will be required. Some sloughing of the silty and sandy soils on the sides of the excavations is anticipated. Deep excavations below the water table and through granular soils will be very difficult. If steeper excavations are required adjacent to the existing neighboring structures, shoring will be required.

To minimize disturbance to the underlying soils, it is our recommendation that footings be excavated with a backhoe equipped with a smooth-lip bucket.

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 in some areas, as replacement fill below footings. All structural fill must be free of sod, rubbish, topsoil, frozen soil, and other deleterious materials. Structural site grading fill is defined as fill placed over fairly large open areas to raise the overall site grade. For structural site grading fill, the maximum particle size should generally not exceed four inches; although, occasional larger particles, not exceeding six 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 should generally be restricted to two inches.

The on-site aggregate base, non-engineered fills, and natural soils may potentially be utilized as structural site grading fill. It should be noted that unless moisture control is maintained, utilization of fine-grained soils as structural site grading fill will be very difficult, if not impossible, during wet and cold periods of the year. Only granular soils are recommended as structural fill in confined areas, such as around foundations and within utility trenches.

To stabilize soft subgrade conditions or where structural fill is required to be placed below a level one foot above the water table at the time of construction, a mixture of coarse gravels and cobbles and/or one and one-half- to two-inch gravel (stabilizing fill) should be utilized.

Non-structural site grading fill is defined as all fill material not designated as structural fill and may consist of any cohesive or granular soils not containing excessive amounts of degradable material.

5.2.4 Fill Placement and Compaction

Coarse 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 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 placed so that the "fines" are "worked into" the voids in the underlying coarser gravels and cobbles.

All other structural fill shall be placed in lifts not exceeding eight 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] T-180 (ASTM[2] D-1557) 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 3 feet beyond the perimeter of the structure	0 to 8	95
Outside area defined above	0 to 6	90
Outside area defined above	6 to 8	92
Road base	-	96

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

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

Subsequent to stripping and prior to the placement of structural site grading fill, the subgrade must 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.

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 (flatwork, floor slabs, roads, etc.) should 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 should be proofrolled and/or properly compacted prior to the construction of any exterior flatwork over a backfilled trench. Proofrolling may 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 proofrolling, they should be removed to a maximum depth of two feet below design finish grade and replaced with structural fill.

Most utility companies and City-County governments are now requiring that Type A-1 or A-1-a (AASHTO Designation – basically 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 T-180 (ASTM D-1557) method of compaction. We recommend that as the major utilities continue onto the site that these compaction specifications are followed.

The natural fine-grained cohesive soils are not recommended for use as trench backfill.

5.2.6 Areal Settlements

Areal settlements resulting from site grading fills as much as three to four feet should be less than one-half of an inch. These settlements are in addition to settlements induced by foundation and floor slab loads. To reduce the total settlement that the structure will realize, site grading fill must be placed as far in advance of other construction as possible. The majority of this settlement will occur during placement.

5.3 SPREAD AND CONTINUOUS WALL FOUNDATIONS

5.3.1 Design Data

The proposed structure 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 footings be placed overlying non-engineered fills.

For design, the following parameters are provided with respect to the projected loading discussed in Section 2., Proposed Construction, of this report:

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 Pressure for Real Load Conditions	
For footings on suitable natural soils and/or structural fill extending to suitable natural soils	- 1,500 pounds per square foot
Bearing Pressure Increase for Seismic Loading	- 50 percent*

* Not applicable for edge bearing pressure when the footings are established upon granular soil. Use 25 percent for overturning or other inclined loading.

The term “net bearing pressure” refers to the pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to the 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.

Because of the high groundwater table in the area, it is recommended that all footings be immediately underlain by a minimum of four inches of “free-draining” granular material, such as

three-quarters- to one-inch minus clean gap-graded crushed gravel. This will act as a "working mat." The gravels may be placed upon granular structural site grading fill extending to suitable natural soils and/or properly prepared suitable natural soil. This footing base will provide a "working mat."

5.3.2 Installation

Under no circumstances shall the footings be established upon non-engineered fills, highly compressible clays, loose or disturbed soils, rubbish, construction debris, plowed disturbed soils, other deleterious materials, frozen soils, or within ponded water. If unsuitable soils are encountered, they must be completely removed and replaced with compacted structural fill.

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.

5.3.3 Settlements

Settlements of foundations designed and installed in accordance with above recommendations and supporting maximum projected structural loads are anticipated to be on the order of one to one and one-half inches. Settlements are expected to occur rapidly with approximately 60 to 70 percent of the settlements occurring during construction.

5.4 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 on fine-grained soils, a coefficient of 0.40 should be utilized. In determining frictional resistance on granular replacement fills, a coefficient of 0.45 should be utilized. 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.

5.5 LATERAL PRESSURES

The lateral pressure parameters, as presented within this section, assume that the backfill extending at least five feet from the back of the wall be properly placed and compacted granular soil. The lateral pressures imposed upon subgrade facilities will, therefore, be basically dependent upon the relative rigidity and movement of the backfilled structures. 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 35 pounds per cubic foot in computing lateral pressures. For more rigid basement walls, granular backfill may be considered equivalent to a fluid with a density of 45 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 55 pounds per cubic foot. The above values assume that the surface of the soils slope behind the wall is horizontal, that the granular fill has been placed and lightly compacted, not as structural fill. If the fill is placed as a structural fill the values should be increased to 45 pounds per cubic foot, 60 pounds per cubic foot, and 120 pounds per cubic foot, respectively.

Recommended average lateral uniform pressure for various height walls are tabulated below and assume a granular wall backfill with a horizontal grade above the wall. It should be noted that the lateral pressures as quoted assume that the backfill materials will not become saturated. If the backfill becomes saturated, the above values may be decreased by one-half; however, full hydrostatic water pressures will have to be included.

Wall Height (feet)	Uniform Seismic Lateral Pressure*, ** (psf)
4	42

* Maximum short-term pressures, they are not sustained loads.
** For intermediate height wall, the lateral pressure will be developed based upon a straightline interpolated between the pressures at the specific height.

Note that the pressures presented in this section do not include surcharge loadings such as floor slabs, adjacent footings, etc.

5.6 FLOOR SLABS

Floor slabs may be established upon suitable undisturbed natural soils, and/or upon structural fill extending to suitable natural soils or properly prepared existing surface soils. Non-engineered fills and topsoil are not considered suitable. To provide a capillary break, it is recommended that floor slabs be directly underlain by at least four inches of “free-draining” fill, such as “pea” gravel or three-quarters- to one-inch minus clean gap-graded gravel. Settlements of lightly to moderately loaded floor slabs are anticipated to be minor.

Design water table recommendations are presented in Section 5.10, Design Water Table.

5.7 PAVEMENTS

The properly prepared non-engineered fills and surficial natural soils will exhibit poor engineering characteristics when saturated or nearly saturated. Non-engineered fills may

remain in flexible pavement areas if properly prepared, as stated previously in this report. Rigid pavements shall not be placed overlying non-engineered fills, even if properly prepared.

Due to the surficial compressible clays and non-engineered fills, significant stabilization may be required depending on the proposed pavement elevations and the weather during construction. Surficial soils will be highly susceptible to rutting and disturbance under construction traffic.

Considering the fine-grained soils as the subgrade soils and the projected traffic, 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 equivalent 18-kip axle load per day]

Flexible:

2.5 inches	Asphalt concrete
8.0 inches	Aggregate base
Over	Properly prepared natural soils, properly prepared existing non-engineered fill, and/or structural site grading fill extending to suitable stabilized natural soils.

Rigid:

5.0 inches	Portland cement concrete (non-reinforced)
4.0 inches	Aggregate base
Over	Properly prepared natural soils, and/or structural site grading fill extending to suitable stabilized natural soils.*

* Rigid pavements shall not be placed over non-engineered fills, even if properly prepared.

Secondary Roadway Areas

(Moderate Volume of Automobiles and Light Trucks,
Light Volume of Medium-Weight Trucks,
and Occasional Heavy-Weight Trucks)
[5 equivalent 18-kip axle loads per day]

Flexible:

3.5 inches	Asphalt concrete
10.0 inches	Aggregate base
Over	Properly prepared natural soils, properly prepared existing non-engineered fill, and/or structural site grading fill extending to suitable stabilized natural soils.

Rigid:

5.5 inches	Portland cement concrete (non-reinforced)
5.0 inches	Aggregate base
Over	Properly prepared natural soils, and/or structural site grading fill extending to suitable stabilized natural soils.*

* Rigid pavements shall not be placed over non-engineered fills, even if properly prepared.

Primary Driveways, Loading/Unloading Areas

(Moderate Volume of Automobiles and Light Trucks;
Light Volume of Medium- and Heavy-Weight Trucks)
[20 equivalent 18-kip axle loads per day]

Flexible Pavement:

4.0 inches	Asphalt concrete
8.0 inches	Aggregate base course
10.0 inches	Granular Subbase
Over	Properly prepared natural soils, properly prepared non-engineered fills, and/or structural site grading fill extending to suitable natural soils

Rigid Pavement:

6.5 inches	Portland cement concrete (non-reinforced)
4.0 inches	Aggregate base course
10.0 inches	Granular subbase
Over	Properly prepared natural soils and/or structural site grading fill extending to suitable natural soils*

* Rigid pavements shall not be placed over non-engineered fills, even if properly prepared.

Storage Bin Concrete Apron

(Light to Moderate Volume of Medium-Weight Trucks)
[15 to 20 equivalent 18-kip axle loads per day]

Rigid:

6.0 inches	Portland cement concrete (non-reinforced)
6.0 inches	Aggregate base
Over	Properly prepared natural soils, and/or structural site grading fill extending to suitable stabilized natural soils.*

* Rigid pavements shall not be placed over non-engineered fills, even if properly prepared.

For dumpster pads, we recommend a pavement section consisting of six and one-half inches of Portland cement concrete, four inches of aggregate base, over properly prepared natural stabilized subgrade or site grading structural fills.

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.

5.8 GEOSEISMIC SETTING

5.8.1 General

As of July 2016, the State of Utah has adopted the International Building Code (IBC) 2015. The IBC 2015 code determines the seismic hazard for a site based upon 2008 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).

The structure must be designed in accordance with the procedure presented in Section 1613, Earthquake Loads, of the IBC 2015 edition.

5.8.2 Faulting

Based on our review of available literature, no active faults pass through or immediately adjacent to the site.

5.8.3 Soil Class

For dynamic structural analysis, the Site Class D - Stiff Soil Profile as defined in Table 20.3-1, Site Classification, of ASCE 7-10 April 6, 2011 can be utilized.

5.8.4 Ground Motions

The IBC 2015 code is based on 2008 USGS mapping, which provides peak values of short and long period accelerations (S_S, S_1) for the Site Class B-C boundary for the Maximum Considered Earthquake (MCE). This Site Class B-C boundary represents a hypothetical bedrock surface and must be corrected for local soil conditions. The following table summarizes the peak ground and short and long period accelerations for this site for a MCE event and incorporates a soil amplification factor for a Site Class D soil profile in the second column. Based on the site latitude and longitude (40.5997 degrees north and -111.9227 degrees west, respectively), the values for this site are tabulated below:

Spectral Acceleration Value, T Seconds	Site Class B-C Boundary [mapped values] (% g)	Site Class D [adjusted for site class effects] (% g)
Peak Ground Acceleration	53.2	53.2
0.2 Seconds, (Short Period Acceleration)	S_S = 133.0	S_{MS} = 133.0
1.0 Seconds (Long Period Acceleration)	S_1 = 43.5	S_{M1} = 68.0

The IBC 2015 code design accelerations (S_{DS} and S_{D1}) are based on multiplying the above accelerations (S_{MS} and S_{M1}) for the MCE event by two-thirds (⅔).

5.8.5 Liquefaction

The site is located in an area that has been identified by the Utah Geological Survey as having “moderate to high” liquefaction potential. Liquefaction is defined as the condition when saturated, loose, finer-grained sand-type soils lose their support capabilities because of excessive pore water

Due to fine-grained nature of the saturated soils encountered, our analysis indicates liquefaction is not anticipated during the design seismic event.

Calculations were performed using the procedures described in the 2008 Soil Liquefaction During Earthquakes Monograph by Idriss and Boulanger[3].

5.9 SITE OBSERVATIONS

As stated previously, due to the variable nature of the non-engineered fills and compressible clay soils encountered, a qualified geotechnical engineer must aid in verifying that all non-engineered fills have been completely removed and suitable natural soils encountered prior to the placement of structural site grading fills, footings, or foundations.

5.10 DESIGN WATER TABLE

As stated previously, the water table was measured at a depth of five and one-half to seven feet below existing grade. Considering seasonal and long-term groundwater fluctuations, we recommend that the design groundwater table of three and one-half to five feet below existing grade be utilized in the design of the structure. We recommend that all habitable floor slabs be established a minimum of two feet above the design water table.

We appreciate the opportunity of providing this service for you. If you have any questions or require additional information, please do not hesitate to contact us.

Respectfully submitted,

Gordon Geotechnical Engineering, Inc.

Reviewed by:

Joshua M. Whitney, State of Utah No. 6252902
Senior Engineer

Patrick R. Emery, State of Utah No. 7941710
Senior Engineer

JMW/PRE:sn

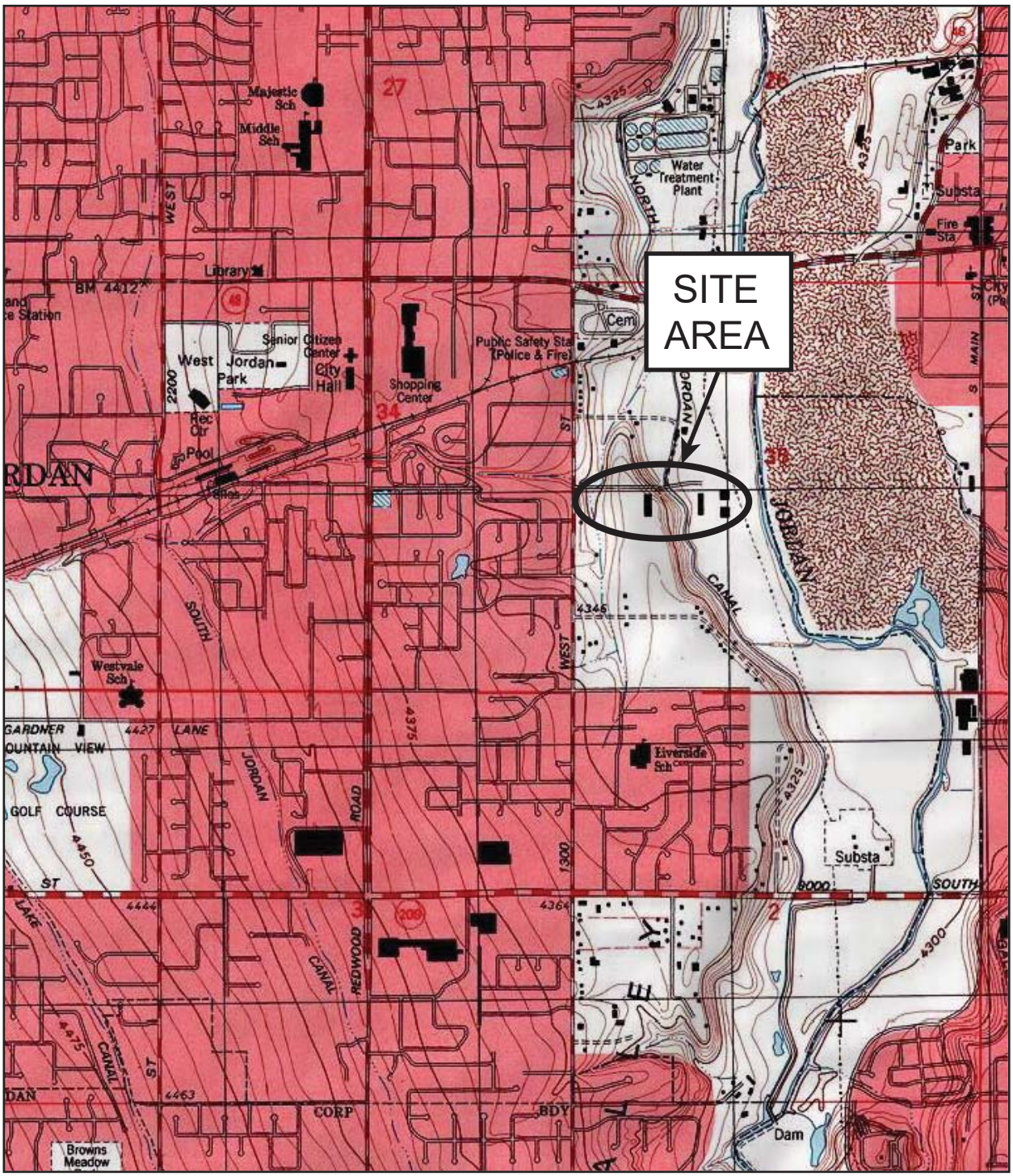
Encl. Figure 1, Vicinity Map
Figure 2, Area Map
Figures 3A through 3Z, Log of Borings
Figure 4, Unified Soil Classification System
Figure 5, Photographs

Addressee (3 + 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.

TALISMAN CIVIL CONSULTANTS, LLC
JOB NO. 278-006-18

GORDON GEOTECHNICAL ENGINEERING, INC.



SCALE IN FEET
1000 0 1000 2000

REFERENCE:
USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP
TITLED "MIDVALE, UTAH", DATED 1999

FIGURE 1
VICINITY MAP

TALISMAN CIVIL CONSULTANTS, LLC
JOB NO. 278-006-18

GORDON GEOTECHNICAL ENGINEERING, INC.

8200 SOUTH STREET

B-23 B-22 B-21 B-12 B-17 B-13 B-18 B-14 B-19 B-16 B-20 B-15 B-24 B-10 B-11 B-9 B-8 B-5 B-4 B-3 B-6 B-2 B-1 B-7 B-26 B-25

#1 #2 #3 #4

SITE AREA

PROPOSED LOCATION OF AGGREGATE STORAGE BIN

see Figure 5, Photographs

REFERENCE:
ADAPTED FROM AERIAL PHOTOGRAPH
DOWNLOADED FROM 2018 GOOGLE EARTH
IMAGERY DATED JUNE 15, 2017

500 ft
SCALE:

Google Earth
© 2018 Google

FIGURE 2
AREA MAP

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-1

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
12.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM) observed wood debris in auger cuttings					D	27	42.7	69				moist very stiff
SILTY CLAY, FILL with trace fine sand; dark gray (CL-FILL)					D	8	33.1			59	37	moist medium stiff
CLAYEY SILT with trace fine sand; light gray (MH)			5									
Stopped drilling at 3.5'. Stopped sampling at 5.0'. No groundwater encountered at time of drilling.			10 15 20 25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3A

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-2

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
12.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM) observed clayey gravel fill in auger cuttings					D	32						moist very stiff
SILTY CLAY, FILL with trace fine sand; dark brown (CL-FILL)												
SILTY CLAY with trace fine sand; gray (CL)			5		D	14	32.8			40	23	moist stiff
Stopped drilling at 4.0'. Stopped sampling at 5.5'. No groundwater encountered at time of drilling.			10 15 20 25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3B

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-3

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered. (05-02-18), 6.0' (06-04-18)
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
11.0" BASE: SILTY FINE TO COARSE SANDY FINE AND COARSE GRAVEL brown (SM/GM)					B		6.8		16.0			moist stiff
SILTY CLAY with trace fine sand and occasional fine to coarse sand layers 1/4" thick; grayish-brown (CL)					D	11	35.5	87				
grades dark gray			5		D	4						
Stopped drilling at 5.0'.												
Stopped sampling at 6.5'.												
No groundwater encountered at time of drilling.												
Installed slotted PVC pipe to 6.5'.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3C

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-4

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
14.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												
SILTY CLAY with trace fine sand; dark gray (CL)					D	27						moist very stiff
grades with fine sand layers 1/2" thick			5		D	9						medium stiff
Stopped drilling at 3.5'.												
Stopped sampling at 5.0'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3D

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-5

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
12.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist stiff
SILTY CLAY with trace fine sand and fine to coarse sand layers 1/2" thick; dark gray (CL)					D	16						
CLAYEY SILT with trace fine sand; light gray (MH)			5		D	8				64	40	moist medium stiff
Stopped drilling at 4.0'.												
Stopped sampling at 5.5'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3E

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Salt Lake City, Utah 84123

BOREHOLE B-6

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered. (05-02-18), 5.5' (06-04-18)
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
14.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist stiff
SILTY CLAY with trace fine sand; gray (CL)					D	15						
grades gray to dark gray			5		D	7						very moist medium stiff
Stopped drilling at 5.0'.												
Stopped sampling at 6.5'.												
No groundwater encountered at time of drilling.												
Installed slotted PVC to 6.5'.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3F

Gordon Geotechnical Engineering, Inc.
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Salt Lake City, Utah 84123

BOREHOLE B-7

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
12.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist
SILTY CLAY with trace fine sand; dark gray (CL)					D	21						stiff
grades gray			5		D	7						medium stiff
Stopped drilling at 3.5'.												
Stopped sampling at 5.0'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3G

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-8

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
12.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist
SILTY CLAY with trace fine sand and occasional fine to coarse sand layer; dark gray (CL)					D	22						very stiff
grades tan			5		D	10						medium stiff
Stopped drilling at 4.0'.												
Stopped sampling at 5.5'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3H

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-9

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
10.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist
SILTY CLAY with trace fine sand; brown (CL)					D	12						stiff
grades dark gray			5		D	13						
Stopped drilling at 5.0'.												
Stopped sampling at 6.5'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3I

Gordon Geotechnical Engineering, Inc.
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Salt Lake City, Utah 84123

BOREHOLE B-10

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
11.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												very moist very stiff
CLAYEY FINE AND COARSE GRAVEL, FILL with trace fine to coarse sand; tan (GC-FILL)					D	30	18.8	108	77.8			moist very stiff
FINE SANDY CLAY with trace fine and coarse gravel; gray (CL) grades with occasional fine sandy layers 1/2" thick			5		D	43						
Stopped drilling at 3.5'. Stopped sampling at 5.0'. No groundwater encountered at time of drilling.			10 15 20 25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3J

Gordon Geotechnical Engineering, Inc.
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Salt Lake City, Utah 84123

BOREHOLE B-11

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
3.0" ASPHALT CONCRETE												
12.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												sligtly moist
SANDY AND SILTY CLAY, FILL with fine and coarse gravel; dark gray (CL-FILL)					D	45						very stiff
			5		D	40	21.0	105	68.3			moist
Stopped drilling at 4.0'.												
Stopped sampling at 5.5'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3K

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-12

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
4.0" ASPHALT CONCRETE												
8.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist loose
SILTY FINE TO COARSE SAND/FINE TO COARSE SANDY SILT tan (SM/ML)					D	23	10.6	92	50.9			
CLAYEY SILT with trace fine sand; tan and gray (ML)			5		D	16						moist loose
Stopped drilling at 5.0'. Stopped sampling at 6.5'. No groundwater encountered at time of drilling.			10 15 20 25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3L

Gordon Geotechnical Engineering, Inc.
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Salt Lake City, Utah 84123

BOREHOLE B-13

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
2.0" ASPHALT CONCRETE												
8.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist loose
CLAYEY SILT with some fine sand; tan and gray (ML)					D	14	26.4		91.7			
SILTY CLAY with trace fine sand and occasional fine to coarse sand layers 2" thick; tan and gray (CL)			5		D	13						moist loose
Stopped drilling at 3.5'.												
Stopped sampling at 5.0'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3M

Gordon Geotechnical Engineering, Inc.
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Salt Lake City, Utah 84123

BOREHOLE B-14

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
2.0" ASPHALT CONCRETE **8.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL** brown (SM/GM)												moist medium stiff
SILTY CLAY with trace fine sand and occasional fine sand layers 2" thick; tan and gray (CL)					D	8						
			5		D	7						
Stopped drilling at 4.0'. Stopped sampling at 5.5'. No groundwater encountered at time of drilling.			10 15 20 25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3N

Gordon Geotechnical Engineering, Inc.
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Salt Lake City, Utah 84123

BOREHOLE B-15

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
2.0" ASPHALT CONCRETE												
8.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist stiff
SILTY CLAY with trace fine sand and occasional fine sand layers 1" thick; tan and gray (CL)					D	13	31.6	88				
			5		D	10						medium stiff
Stopped drilling at 5.0'.												
Stopped sampling at 6.5'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3O

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Salt Lake City, Utah 84123

BOREHOLE B-16

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
2.0" ASPHALT CONCRETE												
10.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist
SILTY CLAY with trace fine sand and occasional fine to coarse sand seams; tan and gray (CL)					D	17						stiff
					D	12						
Stopped drilling at 3.5'.			5									
Stopped sampling at 5.0'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3P

Gordon Geotechnical Engineering, Inc.
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Salt Lake City, Utah 84123

BOREHOLE B-17

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
2.0" ASPHALT CONCRETE												
8.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist loose
FINE SANDY SILT tan (ML)					D	15	17.0		72.1			
SILTY CLAY with trace fine sand and fine sand layers 1" thick; tan and gray (CL)			5		D	19						moist stiff
Stopped drilling at 4.0'. Stopped sampling at 5.5'. No groundwater encountered at time of drilling.			10 15 20 25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3Q

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-18

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-02-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
2.0" ASPHALT CONCRETE												
10.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist loose
SILTY FINE TO COARSE SAND/FINE TO COARSE SANDY SILT tan (SM/ML)					D	10	12.5		51.3			
FINE TO COARSE SANDY SILT with occasional fine sand seams; tan (ML)			5		D	21	21.2		81.2			moist stiff
Stopped drilling at 5.0'.												
Stopped sampling at 6.5'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3R

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-19

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-03-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
2.0" ASPHALT CONCRETE												
10.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist
SILTY CLAY with trace fine sand and occasional fine sand seams; tan and gray (CL)					D	20	31.3	90				stiff
					D	13						
			5									
Stopped drilling at 3.5'.												
Stopped sampling at 5.0'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3S

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-20

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-03-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
2.0" ASPHALT CONCRETE												
10.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist stiff
SILTY CLAY with trace fine sand and occasional fine sand seams; tan and gray (CL)					D	17						
			5		D	20						
Stopped drilling at 4.0'.												
Stopped sampling at 5.5'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3T

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-21

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-03-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
4.0" ASPHALT CONCRETE												
6.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist dense
SILTY FINE SAND tan and gray (SM)					D	44	1.6	115				
SITLY CLAY with trace fine sand and occasional fine sand seams and silty fine sand layers; tan and gray (CL)			5		D	26						moist very stiff
Stopped drilling at 5.0'. Stopped sampling at 6.5'. No groundwater encountered at time of drilling.			10 15 20 25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3U

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-22

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-03-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
4.0" ASPHALT CONCRETE												
6.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)					B		8.3		14.6			
												moist
SITLY CLAY with trace fine sand; tan (CL)					D	20						stiff
					D	15						
			5									
Stopped drilling at 3.5'.												
Stopped sampling at 5.0'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3V

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-23

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-03-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
4.0" ASPHALT CONCRETE												
12.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												moist
FINE SANDY CLAY, FILL with trace fine and coarse gravel; dark and light gray (CL-FILL)					D	36	24.2	97	77.2			very stiff
			5		D	30						stiff
Stopped drilling at 4.0'.												
Stopped sampling at 5.5'.												
No groundwater encountered at time of drilling.			10									
			15									
			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3W

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-24

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-03-18
Elevation: ---
Water Level: No groundwater encountered.
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
4.0" ASPHALT CONCRETE												
20.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												
SILTY CLAY with trace fine sand and fine sand seams; grayish-tan (CL)					D	14						moist stiff
			5		D	16						
Stopped drilling at 5.0'. Stopped sampling at 6.5'. No groundwater encountered at time of drilling.			10 15 20 25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3X

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-25

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-03-18
Elevation: ---
Water Level: 10.0' (05-03-18), 7.0' (06-04-18)
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
24.0" BASE: SILTY FINE TO COARSE SAND AND FINE AND COARSE GRAVEL brown (SM/GM)												
SILTY CLAY with trace fine sand and occasional silty fine sand layers 4" thick and organic; dark brown (CL)					D	9	29.5	87				moist medium stiff
			5		D	7						
SILTY FINE TO COARSE SAND gray (SM)			10		D	32	33.7		25.8			saturated medium dense
FINE TO COARSE SAND AND FINE AND COARSE GRAVEL with trace silt; gray (SP/GP)			15		SPT	30						saturated dense
Stopped drilling at 14.5'. Stopped sampling at 16.0'. Installed slotted PVC pipe to 16.0'.			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3Y

Gordon Geotechnical Engineering, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

BOREHOLE B-26

Project Name: Prop. JVWCD Headquarters Improvements & Repairs
Project No.: 278-006-18
Location: 8215 South 1300 West, West Jordan, Utah
Client: Talisman Civil Consultants, LLC
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 05-03-18
Elevation: ---
Water Level: 9.0' (05-03-18), 7.0' (06-04-18)
Remarks:

DESCRIPTION	GRAPHIC LOG	WATER LEVEL	DEPTH (FT.)	SAMPLE SYMBOL	SAMPLE TYPE	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
GRAVELLY CLAY AND SILTY CLAY with trace fine sand; major roots (topsoil) to 2"; dark gray (CL)					D	14						moist stiff
			5		D	12	32.8	81				
FINE TO COARSE SAND AND FINE AND COARSE GRAVEL with some silt; gray (SP/GP)			10		SPT	21	16.9		8.2			saturated loose
			15		SPT	20						
Stopped drilling at 14.5'. Stopped sampling at 16.0'. Installed slotted PVC pipe to 16.0'.			20									
			25									

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3Z

GORDON GEOTECHNICAL ENGINEERING, INC.

UNIFIED SOIL CLASSIFICATION SYSTEM

FIELD IDENTIFICATION PROCEDURES				GRAPH SYMBOL	LETTER SYMBOL [1]	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than half of material is larger than No. 200 sieve size. [2] (The No. 200 sieve size is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size. (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.		GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			Predominantly one size or a range of sizes with some intermediate sizes missing.		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
			Plastic fines (for identification procedures see CL below).		GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.
	SANDS More than half of coarse fraction is smaller than No. 4 sieve size. (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.		SW	Well graded sands, gravelly sands, little or no fines.
			Predominantly one size or a range of sizes with some intermediate sizes missing.		SP	Poorly graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		SM	Silty sands, poorly graded sand-silt mixtures.
			Plastic fines (for identification procedures see CL below).		SC	Clayey sands, poorly graded sand-clay mixtures.
	IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE					
			DRY STRENGTH (CRUSHING CHARACTERISTICS) / DILATANCY (REACTION TO SHAKING) / TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT)			
FINE GRAINED SOILS More than half of material is smaller than No. 200 sieve size. (The No. 200 sieve size is about the smallest particle visible to the naked eye)	SILTS AND CLAYS Liquid limit less than 50		None to slight / Quick to slow / None		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sand with slight plasticity.
			Medium to high / None to very slow / Medium		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			Slight to medium / Slow / Slight		OL	Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS Liquid limit greater than 50		Slight to medium / Slow to none / Slight to medium		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			High to very high / None / High		CH	Inorganic clays of high plasticity, fat clays.
			Medium to high / None to very slow / Slight to medium		OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS			Readily identified by color, odor, spongy feel and frequently by fibrous texture.		Pt	Peat and other highly organic soils.

[1] Boundary classifications: —Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW—GC, well graded gravel—sand mixture with clay binder.
[2] All sieve sizes on this chart are U.S. standard.

GENERAL NOTES

1. In general, Unified Soil Classification Designations presented on the logs were evaluated by visual methods only. There rore, actual designations (based on laboratory testing) may differ.
2. Lines seperating strata on the logs represent approximate boundaries only Actual transitions may be gradual.
3. Logs represent general soil conditions observed at teh point of exploration onthe date indicated.
4. No warranty is provided as to the continuity of soil conditions between individual sample locations.

FINE - GRAINED SOIL

CONSISTENCY	SPT (blows/ft)	TORVANE UNDRAINED SHEAR STRENGTH (tsf)	POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)	FIELD TEST
Very Soft	<2	<0.125	<0.25	Easily penetrated several inches by Thumb. Squeezes through fingers.
Soft	2 - 4	0.125 - 0.25	0.25 - 0.5	Easily penetrated 1 " by Thumb . Molded by light finger pressure.
Medium Stiff	4 - 8	0.25 - 0.5	0.5 - 1.0	Penetrated over 1/2 " by Thumb with moerate effort. Molded by strong finger pressure.
Stiff	8 - 15	0.5 - 1.0	1.0 - 2.0	Indented about 1/2 " by Thumb but penetrated only with great effort
Very Stiff	15 - 30	1.0 - 2.0	2.0 - 4.0	Readily indented by Thumbnail
Hard	>30	>2.0	>4.0	Indented with difficulty by Thumbnail

LOG KEY SYMBOLS

- Bulk / Bag Sample
- Standard Penetration Split Spoon Sampler
- Rock Core
- Water Level
- Thin Wall
- No Recovery
- 3-3/4" ID D&M Sampler
- 3" ID D&M Sampler
- California Sampler

COARSE -GRAINDE SOIL

APPERENT DENSITY	SPT (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
Very Loose	<4	0 - 15	Easily penetrated with 1/2 " reinforcing rod pushed by hand
Loose	4 - 10	15 - 35	Difficult to penetrated with 1/2 " reinforcing rod pushed by hand
Medium Dense	10 - 30	35 - 65	Easily penetrated a foot with 1/2 " reinforcing rod driven with 5-lb hammer
Dense	30 - 50	65 - 85	Difficult to penetrated a foot with 1/2 " reinforcing rod driven with 5-lb hammer
Very Dense	>50	85 - 100	Penetrated only a few inches with 1/2 " reinforcing rod driven with 5-lb hammer

STRATIFICATION

DESCRIPTION	THICKNESS
SEAM	1/16 - 1/2 "
LAYER	1/2 - 12 "

DESCRIPTION	THICKNESS
Occasional	One or less per foot of thickness
Frequent	More than on per foot of thichness

CEMENTATION

DESCRIPTION	DESCRIPTION
Weakely	Crumbles or breaks with handling of slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumbles or breaks with finger pressure

MODIFIERS

DESCRIPTION	%
Trace	<5
Some	5 - 12
With	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible water, usually soil below Water Table

FIGURE 4

TALISMAN CIVIL CONSULTANTS, LLC
JOB NO. 278-006-18

GORDON GEOTECHNICAL ENGINEERING, INC.

#1 Looking north along eastern property line.

#2 Looking east across lower campus.

#3 Looking south across upper campus.

#4 Looking east from southwest corner of lower campus.

FIGURE 5
PHOTOGRAPHS

Locations and direction, see Figure 2, Area Map