State of Utah

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Department of Administrative Services
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Division of Facilities Construction and Management
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Interim Director

Addendum No. 1

Date: January 22, 2015

To: A/E Firms

From: Dave McKay – Project Manager, DFCM

Reference: Farmington Health Center
University of Utah – Design/Build
DFCM Project No. 14345750

Subject: **Addendum No. 1**

Pages	Addendum Cover Sheet	2	pages
	Site Survey	1	page
	Geotechnical Report	30	pages
	Design Supply Install Responsibly Matrix	1	page
	Total	34	pages

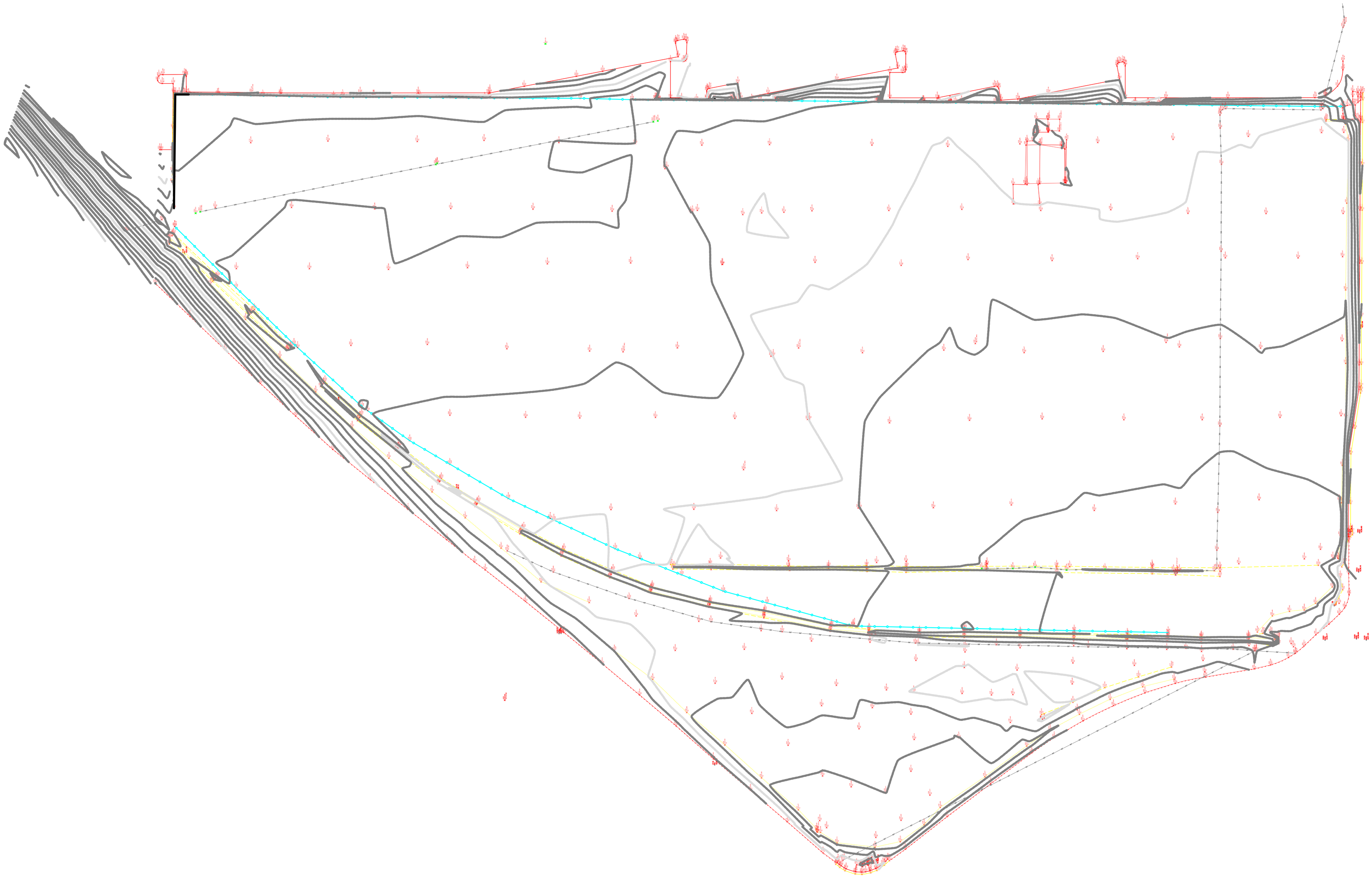
Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

1.1 SCHEDULE CHANGE: there are no project schedule changes.

1.2 GENERAL ITEMS: 13 items listed including three attachments.

1. Lifecycle Cost General Criteria - University assumes seven year cost of capital for payback calculations.
2. Design/Build Team is to include an allowance of $100,000 for Exterior Building Signage, site, and monument signage. A final design will be developed as part of the project.
3. Finished Ceiling – 9'-0" Minimum.
4. Drive up Pharmacy is no longer a program requirement.
5. Site of Service 22 is assumed on the entire project

6. Removal of existing structures from site to be by design/build contractor. See Guideline Spec 311000.
7. Printing costs and rendering prints shall be included in design/build proposal.
8. Owner will pay fees for the following, but Design Build Team must schedule and coordinate timely approvals for:
    a. FAA for Heliport
    b. Easements
    c. Conditional use, Jurisdictional impact and connection fees
    d. DFCM
    e. State Fire Marshal
    f. Health Department
    g. Medicare
    h. Medicaid
    i. Physics for radiology will be by owner
9. Certifications for equipment shall be coordinated by design/build team.
10. Close out documents shall include BIM models.
11. **See attached** updated Site Survey from Psomas. (1page)
12. **See attached** Geotechnical Report from Gordon Geotechnical. (30 pages)
13. **See attached** *Design, Supply, Install Responsibility Matrix* for additional clarifications. (1 page)



GORDON
GEOTECHNICAL
ENGINEERING, INC.

REPORT
SUPPLEMENTAL GEOTECHNICAL STUDY
RELOCATED SITE OF THE
PROPOSED THREE-LEVEL MEDICAL BUILDING
JUST EAST OF THE INTERSECTION OF
1100 WEST AND PARK AVENUE
FARMINGTON, UTAH

January 15, 2015

Job No. 003-016-14

Prepared for:
State of Utah - DFCM
P.O. Box 14116052
Salt Lake City, Utah 84111

Prepared by:
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January 15, 2014
Job No. 003-016-14

State of Utah - DFCM
P.O. Box 141160
Salt Lake City, Utah 84114

Attention: Mr. Dave McKay

Ladies and Gentlemen:

Re: Report
Supplemental Geotechnical Study
Relocated Site of the Proposed Three-Level Medical Building
Just East of the Intersection of 1100 West and Park Avenue
Farmington, Utah

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our supplemental geotechnical study performed at the relocated site of the proposed three-level medical building to be constructed just east of the intersection of 1100 West and Park Avenue in Farmington, Utah. The general location of the relocated site with respect to existing roadways and major topographic features and existing facilities, as of 1997 and 1998, is presented on Figure 1, Vicinity Map. A more detailed layout of the site showing the approximate relocated site of the building, on an air photograph base, is presented on Figure 2, Area Map. A detailed layout of the relocated site with respect to existing and proposed property lines, adjoining facilities, and roadway is presented on Figure 3, Site Plan. The locations of the borings drilled in conjunction with our March 1, 2013[1] report of the originally proposed site and the location of the three borings drilled in conjunction with the relocated site are also presented on Figure 3.

Shortly after completion of our field program, Gordon Geotechnical Engineering, Inc. (G^2) called representatives of the design team and stated that the general discussions and recommendations presented in our March 1, 2013 report of the original study would prevail for this new relocated site.

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[1] "Report, Geotechnical Study, Proposed U of U Three-Level Medical Building, Northeast of 1100 West and 100 North, Farmington, Utah," G^2 Job No. 098-006-13, Dated March 1, 2013.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of our study were planned in discussions between Mr. Dave McKay of State of Utah – DFCM; Mr. Dave Dixon of Dixon & Associates; and Mr. Bill Gordon of G^2.

In general, the objectives of this study were to:

1. Accurately define and evaluate the subsurface soil and groundwater conditions to determine whether they are essentially the same as the soil and groundwater conditions at the original site.

2. Provide appropriate foundation, earthwork, subdrain, geoseismic, and pavement 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 3 exploration boring to depths of 18 to 41 feet.

2. A laboratory testing program to determine if the soils at the relocated site were essentially the same as those encountered at the original site.

3. An office program consisting of the correlation of available data and engineering analyses so that this supplemental report could be developed.

1.3 AUTHORIZATION

Authorization was provided by verbally accepting our Professional Services Agreement No. 14-1033 dated November 5, 2014.

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

A three-level, slab-on-grade, steel-frame building as proposed for the original site will be constructed at the relocated site. Specifics regarding the building are as follows:

> Foundation loads are anticipated to not exceed 6 kips per lineal foot for bearing walls and 330 to 400 kips for column loads. Maximum anticipated average uniform floor loads will be 150 to 200 pounds per square foot.

Site development will require a moderate amount of earthwork in the form of site grading. We estimate that maximum cuts to achieve design grades will be on the order of one foot. Fills up to four to five feet above existing grade are anticipated.

Extensive at-grade parking with accompanying access driveways on the north side of the building will also be a part of the overall development. Traffic over the driveways will consist of a light to moderate volume of automobiles and light trucks, and a light volume of medium- and heavy-weight trucks. Traffic over the parking surface is anticipated to consist of a moderate volume of automobiles and light trucks, and an occasional medium-weight truck.

3. INVESTIGATIONS

3.1 FIELD PROGRAM

In order to define and evaluate the subsurface soil and groundwater conditions and compare these conditions to those encountered at the original site, 3 exploration borings were drilled to depths of 18 to 41 feet below existing grade. The borings were drilled using a rubber tire all-terrain drill rig equipped with hollow-stem augers. Locations of the borings are presented on Figure 3. The locations of the borings from the original site are also presented on Figure 3.

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 4A through 4C, Log of Borings. Soils were classified in accordance with the nomenclature described on Figure 5, 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 the borings 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 and determination if the subsurface conditions at the original and proposed relocated site are in fact very similar to identical, a laboratory testing program was performed. The program included moisture and density, consolidation, and partial gradation tests. Laboratory data from our March 1, 2013 report has also been used. 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 and to provide data for liquefaction analysis, moisture and density tests were performed on selected samples. The results of these tests are presented on the boring logs, Figures 4A through 4C.

3.2.3 Consolidation Test

A consolidation test was performed on a representative sample of the soil obtained from Boring B-2A in order to assess the moisture sensitivity and load deformation characteristics of typical silty clay soils. The results of the test show that the sample at 10.5 feet is moderately over-consolidated and will exhibit relatively low compressibility characteristics beneath the preconsolidation pressure. When loaded above the preconsolidation pressure, the soil becomes highly compressible. The test results are tabulated below:

Boring No.	Depth (feet)	Soil Classification	In-Situ Dry Density (pcf)	In-Situ Moisture Content (percent)	Axial Load When Saturated (psf)	Collapse (-) or Swell (+) (percent)
B-2A	10.5	CL	To follow			

Detailed results of the tests are maintained within our files and can be transmitted to you, at your request.

3.2.4 Partial Gradation Tests

To aid in classifying the soils, to provide general index parameters, and data necessary for our liquefaction analysis, partial gradation tests were performed upon representative samples of the soils encountered in the supplemental exploration borings. The results of the tests are tabulated below:

Sieve Size	Percent Passing B-2A @ 15.0'
No. 200	To follow
Soils Classification	

4. SITE CONDITIONS

4.1 SURFACE

The site is a relatively flat, low grass and high weed covered parcel which slopes downward a total of approximately 5 to 10 feet to the southwest. In addition to an irrigation ditch, at site boundaries there are a few deciduous trees. The site is very similar to surface appearance to the original site to the immediate north. The site is unoccupied except for an old barn structure in the southeast portion.

Previously, the western portion of the site was occupied by Park Avenue. In the past few months, the previous alignment of Park Avenue/1100 West Street has been realigned so it is no longer under the western portion of the proposed new multi-level building footprint. These roadway conditions, existing and previous, are depicted on Figures 2 and 3.

Representative photographs of the site area are shown on Figure 6, Photographs.

4.2 SUBSURFACE SOIL AND GROUNDWATER

Subsurface conditions encountered in the three borings drilled in conjunction with this study were similar to those encountered at the original site to the northeast. The predominant soils in the upper 20 feet consist of layers of silty clays in the upper 20 foot segment range from medium stiff to hard, will exhibit low to moderate strengths, relatively low to high compressibility characteristics, and exhibit variable preconsolidation pressures. In Boring B-2A a seven- to eight-foot thick layer of surface silty fine to medium sands was encountered.

With depth, the soils consist predominantly of medium dense silty fine sands which exhibit moderate strength and relatively low compressibility but in some zones appear to be liquefiable and silty clays.

The water table in conjunction with this study was encountered and ranged from six to nine feet which is a number of feet lower than the water table further to the north and east. It is our opinion that these water table variations are seasonal with the lower levels being encountered in the late fall to winter months.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

1. It is our opinion that a groundwater table at the time of construction which we anticipate will occur this spring or summer will range from approximately three to five feet below existing grade with the highest levels occurring during this projected construction period, late spring to summer months. Seasonal and longer-term groundwater fluctuations easily on the order of three to four feet have been encountered.

2. The soils in the upper 10 to 20 feet consist predominantly of silty clays and silty fine sands/fine sandy silts, silty fine sands, and silts. The clays vary laterally and vertically across the site exhibiting compressibility characteristics ranging from relatively high to moderately low. More importantly the preconsolidation pressure are extremely variable.

   The silty sands and pure silt soils are in zones susceptible to liquefaction.

3. The soils below a depth of approximately 20 feet consist of silty fine to medium sands, silts, and in a couple of the borings, layers of medium stiff silty clay and clayey silt. The silty clay/clayey silts are moderately compressible, have low preconsolidation pressures while the sands and silts in some zones again will be potentially liquefiable.

4. Although conventional spread and continuous wall foundations can be utilized to support the structure, the soils underlying these footings need to be improved in order to control total and differential settlements and liquefaction potential. Considering the depth of the potentially poor soils and the desire to control potential total and differential settlements to a commonly accepted degree, we recommend that the soils underlying the footings to a depth of 20 feet be improved utilizing rammed aggregate piers/Geopiers®.

5. If at all possible, we recommend that an area subdrain system be utilized in order to lower and control the groundwater table. This should be installed as early as

possible in the construction sequence before the upcoming spring and summer months and will greatly improve the constructability especially the initial earthwork portion of development.

Detailed discussions pertaining to earthwork, foundations, lateral resistance and pressure, floor slabs, pavements, and the geoseismic setting of the site affecting the conclusions and suggestions as stated above are presented in the following sections. These sections are essentially the same as presented in our March 1, 2013 report but have been slightly edited in consideration of very minor geotechnical variations between the two sites.

Based upon the results of our investigation the most significant geotechnical aspects of this site are as follows:

1. The site soils include significant layers of fine-grained cohesive soils which exhibit low preconsolidation pressures. (Highly compressible under moderate loads in the range anticipated.)

2. The soils are susceptible to significant total and differential settlements resulting from the static loads associated with site grading fill and the proposed facilities.

3. Settlements of the foundations can be controlled to within tolerable limits if they are underlain by moderately thick amounts of replacement granular fill.

4. Saturated subsurface soils will exhibit moderate to moderately high total and differential settlements due to liquefaction.

5. Replacement granular fill underneath the footings would not be practically thick enough to reduce the liquefaction settlement potential.

6. Therefore, it is our opinion that using conventional spread and continuous wall foundations underlain by even reasonably thick deposits of replacement granular fill would not be a viable solution. This is based upon the projected amount of settlements that could occur and the type of facility proposed.

7. Groundwater table in conjunction with this study was measured as high as approximately two feet below the existing ground surface. This level will most likely rise during the late spring and early summer months.

8. If there is a point of suitable gravity discharge nearby, an area subdrain should be installed in order to lower and control the groundwater table. Based upon the information available to us to date, it does not appear that an area subdrain is workable.

9. The site will have to be raised with granular structural fill to ultimately minimize the effect of the groundwater and stabilize the subgrade.

Considering all of these factors, it is our recommendation that the following design and construction sequence be followed:

1. Area subdrains should be installed if possible. The possibility will be dependent upon a nearby source of gravity discharge. The subsurface drains should extend at least three to four feet below existing grade.

2. After the subdrains are installed initially if possible, the building pad and all other areas to ultimately be structurally loaded should be stripped of surface vegetation.

3. Topsoil may remain in proposed pavements and non-sensitive outside flatwork areas. The root mat will act somewhat as a geotextile fabric and will facilitate the installation and long-term performance of the pavements.

4. Structural site grading fill should be placed to grade and to provide a “working mat” for subsequent construction.

5. Rammed aggregate piers/Geopiers® should be installed beneath the footings of the building in order to:

   a. Control total and differential static settlements.

   b. To minimize total and differential settlements associated with potential liquefaction.

   c. Allow for the utilization of higher bearing pressures that would be unreasonable for replacement fill only.

6. Initial earthwork operations would best be initiated in the summer, late summer or fall months when the groundwater table will be at its lowest and the surface soils the driest.

Detailed discussions pertaining to earthwork, foundations, lateral resistance and pressure, floor slabs, pavements, and the geoseismic setting of the site affecting the conclusions and suggestions as stated above are presented in the following sections.

5.2 EARTHWORK

5.2.1 Site Preparation

Initial site grading must include the removal of all surface vegetation, topsoil, root bulbs, sod, rubbish, construction debris, non-engineered fill, and any other deleterious materials from beneath the footprint of the proposed building and immediately adjacent flatwork areas which will ultimately be structurally loaded. We estimate that approximately four to five inches of stripping will be necessary to remove major roots, vegetation, and organics. Beneath pavements and non-critical flatwork, the root mat need not be removed. Vegetation and other deleterious materials should be removed from the site. Stripped topsoil will be unsuitable for structural fill but may be stockpiled for subsequent landscaping purposes.

Subsequent to stripping and prior to the placement of floor slabs, structural site grading fill and pavements, the exposed subgrade, consisting of undisturbed natural soils, must be proofrolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If excessively soft or loose soils are encountered, they must be removed to a maximum depth of two feet, and replaced with structural fill.

Following the above operations, pavements or structural site grading fill may be placed. All topsoil, vegetation, non-engineered fill, and agriculturally-disturbed or weathered surficial soils must be completely removed from beneath the proposed structure. Site grading fill should be placed as far in advance of other construction as possible to minimize settlement.

5.2.2 Excavations

Temporary construction excavations 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, much flatter 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. <u>Deep excavations below the water table and through granular soils will be very difficult.</u>

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, 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. 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.

For general structural site grading fill, the maximum particle size should generally not exceed four inches; although, occasional larger particles, not exceeding eight 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.

Except for the upper 18 inches fine-grained soils may be utilized as structural site grading fill. It should be noted that unless moisture control is maintained, utilization of these natural soils as structural site grading fill <u>will be very difficult, if not impossible</u>, 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 and as the upper 18 inches of the structural site grading fill sequence in pavement and outside flatwork areas.

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, should 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 at least twice. Subsequent fill material placed over the coarse gravels and cobbles should be adequately compacted so that the “fines” are “worked into” the voids in the underlying coarser gravels and cobbles.

All other structural fill should be placed in lifts not exceeding eight inches in loose thickness. Fills beneath an area extending out 5 feet from all footings and floor slabs, as well as all other fills 5 to 10 feet thick, must be compacted to at least 95 percent of the maximum dry density as

determined by the AASHTO[2] T-180 (ASTM[3] D-1557) compaction criteria. Structural fills greater than 5 feet thick are not anticipated. Fills less than 5 feet thick, which are not beneath an area extending out at least 5 feet from the perimeter of the structure, should be compacted to at least 90 percent of the above-defined criteria.

Subsequent to stripping and prior to the placement of structural site grading fill, the subgrade should 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 five feet will be less than one inch. This settlement is in addition to settlements induced by foundation and floor slab loads and liquefaction. 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.

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[2] American Association of State Highway and Transportation Officials

[3] American Society for Testing and Materials

5.3 SPREAD AND CONTINUOUS WALL FOUNDATIONS

5.3.1 Design Data

To limit potential settlements due to compressible and potential liquefiable natural fine-grained soils, it is recommended that rammed aggregate piers/Geopiers® be installed beneath moderately to heavily loaded footings. The piers/columns will be installed from the top of the building pad grade. Footings in this zone are part of the design-build process developed by the selected subcontractor. To aid in the initial design, the following parameters are provided:

Minimum Recommended Depth of Embedment for Frost Protection	- 30 inches
Minimum Recommended Depth of Embedment for Non-frost Conditions	- 15 inches
Recommended Minimum Width for Continuous Wall Footings	- 18 inches
Minimum Recommended Width for Isolated Spread Footings	- 24 inches
Recommended Net Bearing Pressure for Real Load Conditions	
Footings established on the rammed aggregate piers/Geopiers®	- Estimated 4,000 to 5,000 pounds per square foot
Lightly loaded footings over at least one foot of granular fill	- 1,500 pounds per square foot
Bearing Pressure Increase for Seismic Loading	- 50 percent

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 lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.3.2 Installation

Under no circumstances should the footings be installed directly on the natural near-surface soils, or upon soft or disturbed soils, construction debris, frozen soil, or within ponded water.

We anticipate that footings will be installed over the ground improvement elements. Very lightly loaded footings can be placed upon the site grading fill placed to create a “working mat” for the ground improvement contractor.

The width of the “working mat” fill should be extended laterally at least five feet beyond the edges of the building in all directions.

5.3.3 Settlements

Maximum settlements of foundations due to consolidation of the undisturbed near-surface natural soils under the projected foundation loads were estimated to be on the order of one to one and one-quarter inches. If at least two feet of granular structural fill was placed below footings, settlements were calculated to be about three-quarters to one inch.

Additional total and differential settlements of one and one-half to four inches were estimated to occur as a result of liquefaction. As discussed earlier, it is our opinion that these settlements are unacceptable. Therefore soil improvement must be part of foundation system beneath the major foundations. Specifically it is our recommendation that immediately following initial site work including site grading the rammed aggregate piers/Geopiers® be installed.

If:

1. Rammed aggregate piers/Geopiers® are installed prior to other major construction to reduce areal settlement across the site.

2. Rammed aggregate piers/Geopiers® are initiated to 20 feet beneath the building foundation to reduce potential liquefaction related settlement and control and reduce static footing settlements.

The static-induced settlement of the foundations should be on the order of one-half to five-eighths of an inch while the liquefaction-related settlement would be controlled to one-half to seven-eighths of an inch. A properly designed structure can tolerate these settlements and remain structurally viable.

Approximately 60 percent of the quoted static settlement should occur 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, a coefficient of 0.45 should be used for the pier elements and granular structural fill. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

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

5.5 LATERAL PRESSURES

The lateral pressure parameters as presented within this section, assume that the backfill will consist of a drained granular soil placed and compacted in accordance with the recommendations presented herein. The lateral pressures imposed upon subgrade facilities will, therefore, be basically dependent upon the relative rigidity and movement of the backfilled structure. For more rigid walls that are not more than six feet in height, such as loading dock bulkhead, elevator pits, etc., three-quarter- to one-inch minus clean gap-graded gravel should be used as backfill extending out at least 18 inches back of the wall. The gravel should be procedurally compacted and may be considered equivalent to a lateral pressure with an equivalent fluid density of 45 pounds per cubic foot.

For seismic loading, a uniform pressure of 100 pounds per square foot should be added.

5.6 FLOOR SLABS

Floor slabs should be established above the existing ground surface and supported on a minimum of 12 inches of granular structural fill placed over the ground improvement elements, rammed aggregate piers/Geopiers®. Topsoil is 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. Static settlements of lightly to moderately loaded floor slabs are anticipated to be minor. Settlements due to liquefaction if the underlying soils are not improved could be on the order of one-half to one and one-quarter inch.

5.7 PAVEMENTS

The natural fine-grained soils will exhibit poor pavement support characteristics when saturated or nearly saturated. Due to the shallow groundwater, the natural soils should be considered nearly saturated. Considering these conditions, and the projected traffic conditions, the pavement sections on the following pages are recommended.

Flexible Pavements:
(Asphalt Concrete)

Driveway Areas

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

3.5 inches	Asphalt concrete
6.0 inches	Aggregate base course
8.0 inches	Granular subbase*
Over	Properly prepared disturbed and/or natural subgrade soils, and/or structural site grading fill extending to properly prepared disturbed and/or natural subgrade soils

* Suitable granular site grading fills can be utilized as granular subbase.

Parking Areas

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

3.0 inches	Asphalt concrete
6.0 inches	Aggregate base course
6.0 inches	Granular subbase*
Over	Properly prepared disturbed and/or natural subgrade soils, and/or structural site grading fill extending to properly prepared disturbed and/or natural subgrade soils

* Suitable granular site grading fills can be utilized as granular subbase.

Rigid Pavements:
(Non-reinforced Concrete)

Driveway Areas

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

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

* Suitable granular site grading fills can be utilized as granular subbase.

Parking Areas

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

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

* Suitable granular site grading fills can be utilized as granular subbase.

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

Utilization of a filter fabric, such as Mirafi 500X or equivalent, over soft subgrade may also be advantageous.

Suitable granular structural site grading fill will satisfy the requirements for granular subbase.

Asphalt concrete and base course components should meet the requirements and be placed in accordance with the Farmington City specifications.

The above rigid pavement sections are for non-reinforced Portland cement concrete. Construction of the rigid pavement should be in sections 10 to 12 feet in width with construction or expansion joints or one-quarter depth saw-cuts on no more than 12-foot centers. Saw-cuts must be completed within 24 hours of the “initial set” of the concrete and should be performed under the direction of the concrete paving contractor. 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 2013, the State of Utah has adopted the International Building Code (IBC) 2012. The IBC 2012 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 2012 edition.

5.8.2 Faulting

Based on our review of available literature, no active faults pass through or immediately adjacent to the site. The nearest mapped fault trace, approximately one and one-quarter miles northeast of the site, is part of the Weber section of the Wasatch Fault

5.8.3 Soil Class

Static groundwater measured about 14 days after drilling was encountered at depths of about 2 feet below the surface. Many of the subsurface and near-surface natural soil layers are silts and relatively clean which exhibit low plasticity to non-plastic characteristics.

Our analysis shows that these soils could liquefy during the design seismic event (see Section 5.9.5, Liquefaction). Because of the shallow groundwater, these potentially liquefiable soils extend near the surface which could also result in ground rupture and lateral spread. According to the Table 20.3-1, Site Classification, of ASCE 7-10 April 6, 2011, "Soils vulnerable to potential failure or collapse under seismic loading such as liquefiable soils..." are designated under site Class F. However, following the ground improvements recommended in this report, ground rupture should not occur and the site may be classified as Site Class D.

5.8.4 Ground Motions

The IBC 2012 code is based on 2008 USGS mapping, which provides peak values of short and long period accelerations (SS, S1) 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 (40.9838 degrees north and 111.9096 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	59.8	59.8
0.2 Seconds, (Short Period Acceleration)	S_S = 139.1	S_{MS} = 139.1
1.0 Seconds (Long Period Acceleration)	S_1 = 58.1	S_{M1} = 87.2

The IBC 2012 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 "high" liquefaction potential. Liquefaction is defined as the condition when saturated, loose,

finer-grained sand non-cohesive-type soils lose their support capabilities because of excessive pore water pressure which develops during a seismic event.

Shallow groundwater was encountered in each of the borings and thus all but the upper couple of feet of the soil profile encountered is saturated. Gradation test results indicate that the subsurface soils are predominately fine grained with as much as 69 to 84 percent passing the No. 200 sieve; however, these soils have low plasticity or are non-plastic. These soils have a potential to liquefy during the design seismic event represented by a horizontal acceleration of 0.4 g which is two-thirds of the ground motion with a 2 percent probability of being exceeded in 50 years. We estimate that liquefaction could result in settlements of one and one-half to four inches. Calculations were performed with the computer program NovoLiq using procedures described in the NCEER Workshop Report (1997) and 2004 Liquefaction Resistance Report by Idriss and Boulanger[4].

Ground improvement with rammed aggregate piers/Geopiers® is recommended to reduce the liquefaction potential and control these settlements. This is a design-build system. Contractors in the area that provide this service are:

Geopiers®	Geopiers® Foundation Company David Plehn @ 801-269-8012
Rammed Aggregate Piers/ Stone Columns	Nicholson Construction Company Ryan Hill @ 801-296-5899
Rammed Aggregate Piers/ Stone Columns	Jones Drilling & Shoring Matt Madsen @ 801-280-2908
Rammed Aggregate Piers/ Stone Columns	Hayward Baker Inc. Todd E. Ross @ 801-363-0546

5.9 CEMENT TYPES

The laboratory tests indicate that the site soils contain negligible amounts of water soluble sulfates. Therefore, all concrete which will be in contact with the site soils may be prepared using Type I cement.

[4] State Normalization of Penetration Resistance and the Effect of Overburden Stress on Liquefaction Resistance, R. W. Boulanger, I. M. Idriss, 2004

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.

William J. Gordon, State of Utah No. 146417
Principal Engineer

WJG:sn

Encl. Figure 1, Vicinity Map
Figure 2, Area Map
Figure 3, Site Plan
Figures 4A through 4C, Log of Borings
Figure 5, Unified Soil Classification System
Figure 6, Photographs

LICENSED PROFESSIONAL ENGINEER #146417 WILLIAM JAMES GORDON STATE OF UTAH

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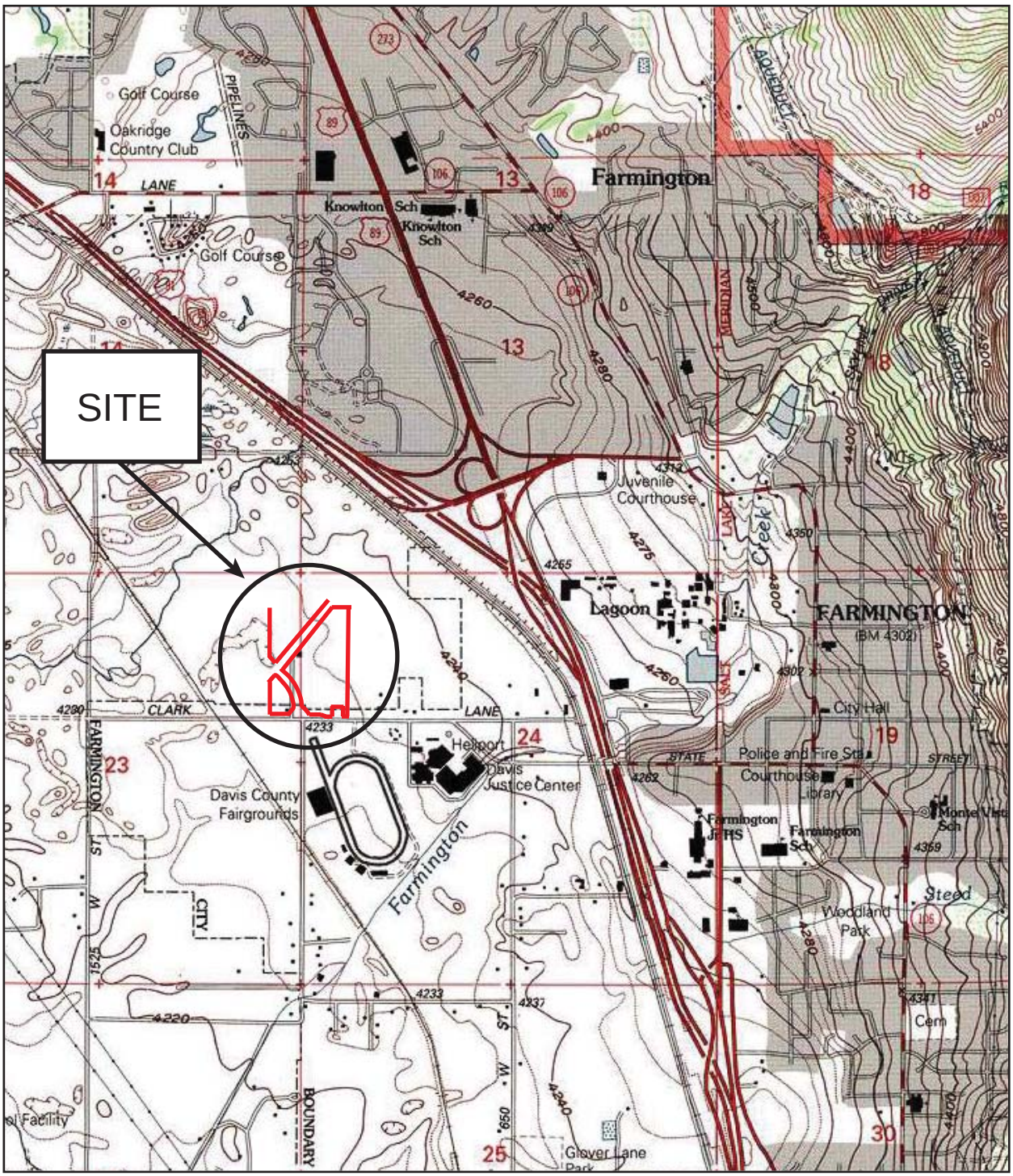
Salt Lake City, Utah 84132

STATE OF UTAH - DFCM
JOB NO. 003-016-14

GORDON GEOTECHNICAL ENGINEERING, INC.



SCALE IN FEET

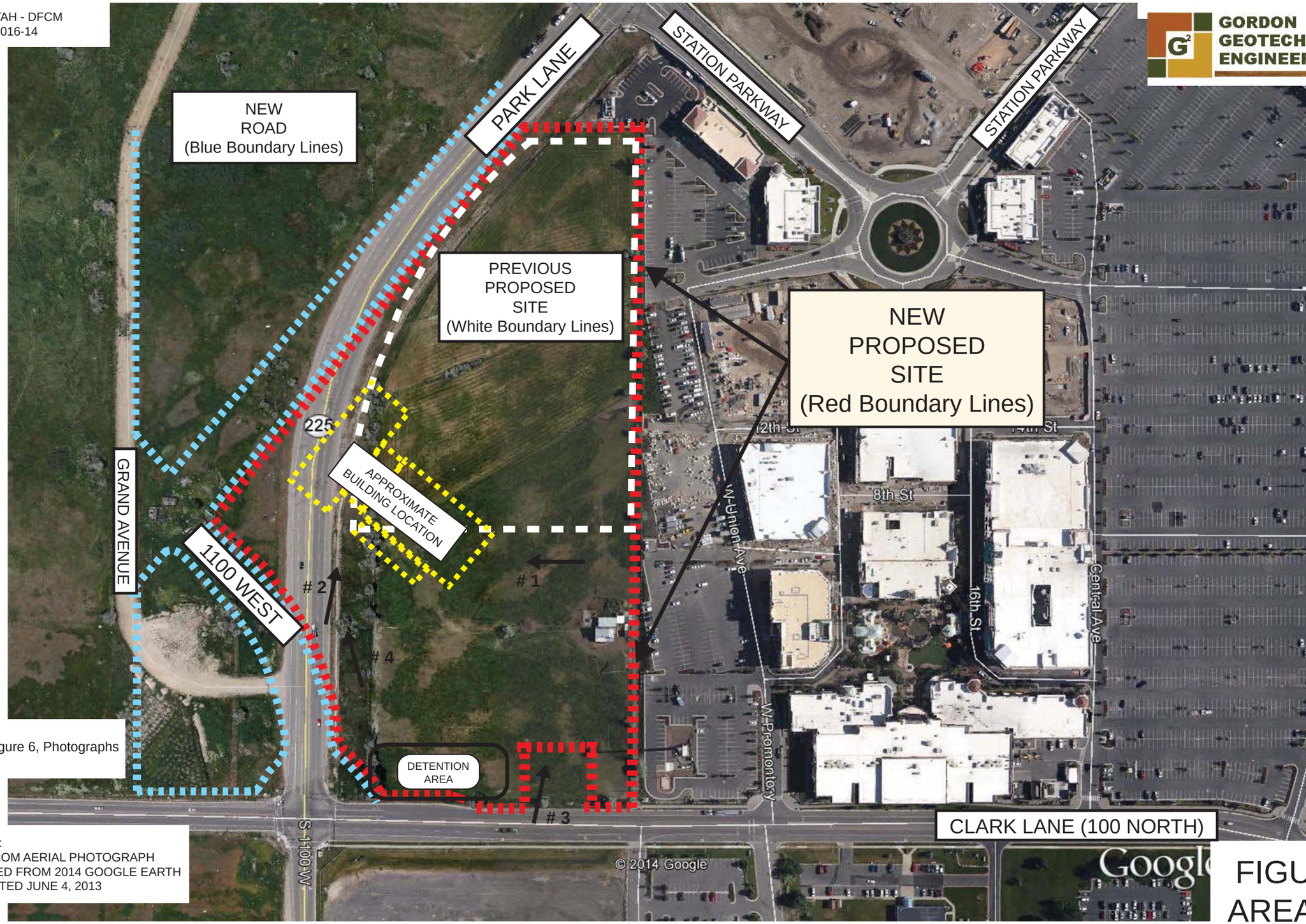
1000 0 1000 2000

REFERENCE:
USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAPS TITLED "FARMINGTON, UTAH", DATED 1997 AND "KAYSVILLE, UTAH" DATED 1998

FIGURE 1
VICINITY MAP

STATE OF UTAH - DFCM
JOB NO. 003-016-14

GORDON GEOTECHNICAL ENGINEERING, INC.



see Figure 6, Photographs

REFERENCE:
ADAPTED FROM AERIAL PHOTOGRAPH
DOWNLOADED FROM 2014 GOOGLE EARTH
IMAGERY DATED JUNE 4, 2013

SCALE: feet 2000
meters 700

FIGURE 2
AREA MAP

STATE OF UTAH - DFCM
JOB NO. 003-016-14

GORDON GEOTECHNICAL ENGINEERING, INC.

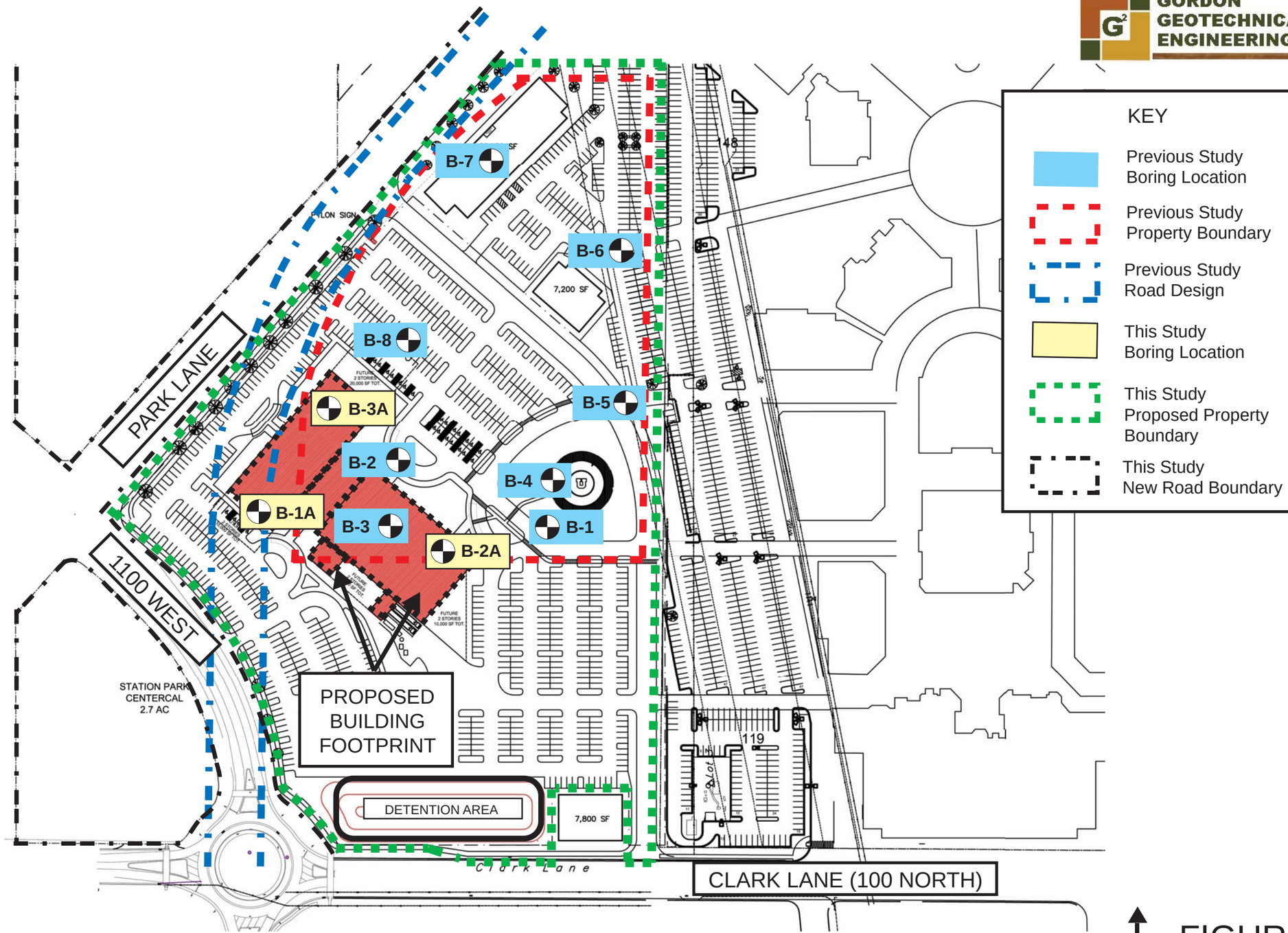


FIGURE 3
SITE PLAN

REFERENCE:
ADAPTED FROM DRAWING PROVIDED BY CLIENT, NO DATE

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

BOREHOLE B-1A

Project Name: Relocation of Presently Prop. Farmington Health Ctr
Project No.: 003-016-14
Location: NE of 1100 West and 100 North, Farmington, Utah
Client: State of Utah - DFCM
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 11-13-14
Elevation: ---
Water Level: 8.0' (11-13-14)
Remarks:

DESCRIPTION	GRAPHIC LOG	Water Level	DEPTH FT.	SAMPLE TYPE	SAMPLE SYMBOL	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
Ground Surface			0									
SILTY FINE TO COARSE SAND/GRAVEL, ROAD BASE FILL brown (SM/GM-FILL)												
SILTY CLAY with some fine sand; brown (CL)				D		77						slightly moist hard
			5	D		25	29.6	92				very stiff
		▼										saturated
			10	D		9	29.8	93				medium stiff
grades with occasional layers up to 2" thick of silty fine sand; gray			15	D		24						very stiff
SILTY FINE SAND with occasional layers up to 2" thick of silty clay; gray (SM)												saturated medium dense
			20	SPT		11						
			25			12						

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 4A

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

BOREHOLE B-1A

Project Name: Relocation of Presently Prop. Farmington Health Ctr
Project No.: 003-016-14
Location: NE of 1100 West and 100 North, Farmington, Utah
Client: State of Utah - DFCM
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 11-13-14
Elevation: ---
Water Level: 8.0' (11-13-14)
Remarks:

DESCRIPTION	GRAPHIC LOG	Water Level	DEPTH FT.	SAMPLE TYPE	SAMPLE SYMBOL	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
				SPT		12						
			30	SPT		14						
			35	SPT		12						
			40	SPT		11						
Stopped drilling at 39.5'. Stopped sampling at 41.0' Installed slotted PVC pipe to 41.0'.			45 50									

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 4A
(con't)

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

BOREHOLE B-2A

Project Name: Relocation of Presently Prop. Farmington Health Ctr
Project No.: 003-016-14
Location: NE of 1100 West and 100 North, Farmington, Utah
Client: State of Utah - DFCM
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 11-13-14
Elevation: ---
Water Level: 8.0' (11-13-14)
Remarks:

DESCRIPTION	GRAPHIC LOG	Water Level	DEPTH FT.	SAMPLE TYPE	SAMPLE SYMBOL	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
Ground Surface			0									
FINE TO MEDIUM SAND with some silt and clay; loose/disturbed to 6"; brown (SM-FILL)												loose to 6" moist medium dense
				D		29						
			5	D		28						
grades with oxidation mottling												
SILTY CLAY with some fine sand; brown (CL)												saturated medium stiff
			10	D		11						
SILTY FINE SAND with numerous layer to 1"-2" thick of silty clay; brown (SM)												saturated loose
			15	D		18						
no recovery; pushed Dames & Moore												
			20	D		16						
Stopped drilling at 19.5'.												
Stopped sampling at 21.0'												
Installed slotted PVC pipe to 21.0'.			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 4B

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

BOREHOLE B-3A

Project Name: Relocation of Presently Prop. Farmington Health Ctr
Project No.: 003-016-14
Location: NE of 1100 West and 100 North, Farmington, Utah
Client: State of Utah - DFCM
Drilling Method: 3.75" ID Hollow-Stem Augers
Date Drilled: 11-13-14
Elevation: ---
Water Level: 12.0' (11-13-14)
Remarks:

DESCRIPTION	GRAPHIC LOG	Water Level	DEPTH FT.	SAMPLE TYPE	SAMPLE SYMBOL	BLOWS/FT.	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	REMARKS
Ground Surface			0									loose to 6"-8" moist very stiff
SILTY CLAY with some fine sand; loose/disturbed to 6"-8"; light brown (CL)				D		31						
			5	D		36	25.7	95				
				D		38						
grades with numerous layers up to 1" to 2" thick silty fine to medium sand; oxidation mottling			10	D		22	24.8	97				saturated
SILTY FINE SAND with occasional layer to 1"-2" thick of silty clay; gray (SM)			15	SPT		15						saturated medium dense
Stopped drilling at 16.5'. Stopped sampling at 18.0' Installed slotted PVC pipe to 18.0'.			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 4C

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.
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)	IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE		DRY STRENGTH (CRUSHING CHARACTERISTICS)	DILATANCY (REACTION TO SHAKING)	TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT)			
	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 5

STATE OF UTAH - DFCM
JOB NO. 003-016-14

GORDON GEOTECHNICAL ENGINEERING, INC.

#1 Facing north-northwest toward the proposed building footprint.

#2 Facing northeast toward the western portion of the building footprint.

#3 Facing northeast toward the southeast corner of the site.

#4 Facing north-northwest along the western site boundary.

Locations and direction, see Figure 2, Area Map

FIGURE 6
PHOTOGRAPHS

Farmington Health Care Center

Design, Supply, Install, responsibility matrix

DBT = Design Build Team *C = Design Build Contractor* *U = User*

			Designed By	Supplied By	Installed By	
Audio/Visual						
	Equipment		DBT	U	C	
	Supports		DBT	U	C	
	Wall boxes (backboxes)		DBT	C	C	
	Wire terminations		DBT	C	C	
	Wire		DBT	C	C	
	Conduit/Raceways		DBT	C	C	
Security *(an approved University Contractor)*						
	Equipment/Card Readers		DBT	C	C	
	Card Access software		DBT	C	C	
	Wall boxes/Supports		DBT	C	C	
	Wire terminations		DBT	C	C	
	Wire		DBT	C	C	
	Conduit/Raceways		DBT	C	C	
IT/Data						
	Equipment		DBT	U	U	
	Supports		DBT	C	C	
	Wall boxes (backboxes)		DBT	C	C	
	Wire terminations		DBT	C	C	
	Equipment Connection		DBT	C	U	
	Wire		DBT	U	C	
	Conduit/Raceways		DBT	C	C	

			Designed By	Supplied By	Installed By	
Time System *(an approved Univeristy System)*						
	Equipment		DBT	C	C	
	Supports		DBT	C	C	
	Wall boxes (backboxes)		DBT	C	C	
	Wire terminations		DBT	C	C	
	Wire		DBT	C	C	
	Conduit/Raceways		DBT	C	C	
Paging *(an approved Univeristy System)*						
	Equipment		DBT	C	C	
	Supports		DBT	C	C	
	Wall boxes (backboxes)		DBT	C	C	
	Wire terminations		DBT	C	C	
	Wire		DBT	C	C	
	Conduit/Raceways		DBT	C	C	
DAS						
	Equipment		U	U	U	
	Supports		U	U	U	
	Wall boxes (backboxes)		U	U	U	
	Wire terminations		U	U	U	
	Wire		U	U	U	
	Conduit/Raceways		U	U	U	

			Designed By	Supplied By	Installed By
Nurse Call *(an approved Univeristy System)*					
	Equipment		DBT	C	C
	Supports		DBT	C	C
	Wall boxes (backboxes)		DBT	C	C
	Wire terminations		DBT	C	C
	Wire		DBT	C	C
	Conduit/Raceways		DBT	C	C
Wireless Network					
	Equipment		DBT	U	U
	Supports		DBT	C	C
	Wall boxes (backboxes)		DBT	C	C
	Wire terminations		DBT	C	C
	Wire		DBT	C	C
	Conduit/Raceways		DBT	C	C
Furniture & General Equipment					
	Furniture		DBT	U	U
	Equipment		DBT	U	U