

Hidden Acres Addendum

January 22, 2013
Job No. 129-001-13

Stonebrook Real Estate
6375 South Highland Drive (2000 East)
Salt Lake City, Utah 84121

Attention: Mr. Tom Hoovey, Associate Broker

Ladies and Gentlemen:

Re: Report
Geotechnical Considerations
Proposed Residential Subdivision
Approximately 13200 South 3300 West
Riverton, Utah

1. GENERAL

At the request of Tom Hoovey of Stonebrook Real Estate, acting as an agent for three owners, this study was performed. This report presents geotechnical consultation review of a previously performed geotechnical study at the site. The previous study was summarized in a report dated December 11, 2012¹.

2. DECEMBER 11, 2012 REPORT

2.1 PROPOSED CONSTRUCTION

The proposed development will consist of 30 lots for single-family residential development. The lots will range from approximately one-third to just over one-half of an acre. The homes will be one to two levels above grade and all contain a full subgrade level. The subgrade of the structure will be of reinforced concrete construction. Above grade, the structure will be of wood-frame construction. Loads imposed upon the continuous wall foundations and interior spread footings will be typical for this type of residential structure. In addition to the homes, there will be interior roadways and outside flatwork around the perimeter of each of the homes.

¹ "Geotechnical Investigation, Proposed Residential Subdivision, Approximately 13200 South 3300 West, Riverton, Utah," AGEC Project No. 1120908.

2.2 SITE CONDITIONS

2.2.1 Surface

The site is relatively flat; therefore, overall general site grading cuts and fills are not anticipated to exceed a couple of feet.

2.2.2 Subsurface Soil And Groundwater

As part of the December 11, 2012 report, 4 test pits were excavated to depths of approximately 12 to 15 feet. The subsurface soils encountered consist of 6 inches of topsoil which is, in turn, underlain by 6.5 to 10.0 feet of clay which has been projected as being slightly to moderately moisture sensitive (collapsible). Below the projected collapsible soils, silty gravels, silty sands, silts, and some silty clays were found to be non-moisture sensitive.

2.3 DISCUSSIONS AND RECOMMENDATIONS (December 11, 2012)

Based upon the data from the initial report, it was recommended that:

1. The residential homes are not established upon the moisture sensitive soils which extended to 6.5 to 10.0 feet.
2. Alternate foundation systems like helical piers, replacement fill, micropiles, and other deep foundations including soil improvement through Geopiers[®], be considered.
3. Floor slabs in the house not properly established could experience settlements up to two inches and that precautions be taken under outside at-grade slabs, roadways, etc.

3. DISCUSSIONS AND RECOMMENDATIONS (This Review)

Based upon our review, it is our opinion that:

1. The site is blanketed by moisture sensitive (collapsible) soils extending to depths of approximately 6.5 to 10.0 feet.
2. Below the moisture sensitive soils, natural non-moisture sensitive soils are present.
3. This condition is typical of the area; meaning that most studies that we have performed in the general area have similar conditions.
4. Groundwater is not of concern.

5. Soils were identified by four test pit excavations. "Undisturbed" samples of the soils were obtained by hand-driving a sampler into the soils and/or by excavating a block of the typical soils and then trimming the block of soils for testing. It has been our experience that both techniques can generally end up resulting in samples that will show higher than real moisture sensitivity. It would be our preference that the subsequent explorations be extended utilizing a drill rig were the samples are either pushed or driven with a sampler which contains rings that are directly tested without trimming. This can make a difference of 0.5 to 1.0 percent of measured moisture sensitivity which is critical to the project.
6. The homes will include full-depth basements extending five and one-half to six and one-half feet below grade. Based upon available data this means the basement and the supporting foundations would essentially pass through the majority, if not all, of the moisture sensitive soils. With regard to the foundations, possible means of support would be to extend the footings down to the non-collapsible soils and/or excavate and replace the remaining portion of the potentially collapsible soils with structural fill and then establish the footings at a normal depth. This is very efficient and economical.
7. The consolidation test data is somewhat difficult to interpret. Only one of the four consolidation tests show the pressure at which the soils are saturated and at what pressure does the collapse and higher compressibility occur. At the other three samples, the graphs are identified as "no movement upon wetting" but it does not tell where the wetting occurs and what happened at that particular loading. In taking a look at all the consolidation data and the depths at which consolidation tests were performed, it appears that the footings established immediately below the basements at six and one-half to seven feet would be on low moisture sensitive soils only one or two feet thick beneath the footings. Therefore, excavations for the footings and an additional foot or so below the footings would eliminate the moisture sensitive problem. The footings could also be proportioned utilizing a lower than standard bearing pressure. Making the footings somewhat larger.
8. With proper interpretation of consolidation data, the need for over-excavating "projected" moisture sensitive soils beneath the basement level may not be required.
9. Trying to scarify, moisture prepare, and recompact the clayey soils, moisture sensitive or not, would be very difficult. It is, in many cases, easier to just excavate these soils and replace them with somewhat more compactible soils.

4. SUMMARY

In summary, I believe that the general subsurface conditions defined in the December 11, 2012 report are reasonable. However, the results of the consolidation tests leave a lot of questions. If the tests show that minimal or no collapse occurs below a pressure of 1,000 or 1,200 pounds per square foot, no significant remedial action for the development of the footings, flatwork, basement, slabs, etc. will be required. The key here is better samples and more accurate and additional consolidation testing.

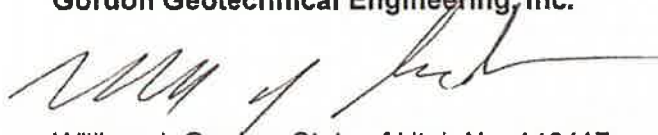
The conditions that have been encountered and determined by testing to date need to be re-evaluated.

The moisture sensitive fine-grained soils to the depths as projected are typical of the area.

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.



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Professional Engineer

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Addressee (3 + email)

