



August 4, 2015

Ms. Dana Shuler, P.E.  
Weber County Engineering Department  
2380 Washington Boulevard, Suite 240  
Ogden, Utah 84401

Subject: Third Geologic Review  
Matthew Rasmussen Hillside Review  
6472 South Bybee Drive  
Ogden, Utah 84403  
SA Project No: 15-140

Report: GeoStrata Memorandum: "Review Response for Geological Review - 6472 and 6498 South Bybee Drive, Weber County Parcel Numbers: 07-753-0001 and 07-753-0002 Uintah, Weber County, Utah, SA Project Number 15-140," dated July 9, 2015; prepared for Matt Rasmussen.

Geologic Submittal Status: **INCOMPLETE SUBMITTAL**

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Dear Ms. Shuler,

At your request, Simon Associates, LLC (SA) reviewed the above referenced July 9, 2015, GeoStrata letter. The July 9, 2015, GeoStrata letter was submitted in response to the following SA review letter:

Second Geologic Review, 6472 and 6498 South Bybee Drive, Weber County Parcel Numbers: 07-753-0001 and 07-753-0002, Uintah, Weber County, Utah (SA Project No: 15-140), dated May 27, 2015.

The May 27, 2015, SA review letter was written in response to the following April 24, 2015, GeoStrata memorandum:

Memorandum - Review Response for Geological Review - 6472 and 6498 South Bybee Drive, Weber County Parcel Numbers: 07-753-0001 and 07-753-0002 Uintah, Utah, SBI Project Number 2-14-522," dated April 24, 2015, prepared by GeoStrata, 14425 South Center Point Way, Bluffdale, Utah 84065, prepared for Matt Rasmussen.

The April 24, 2015, GeoStrata memorandum was written in response to the following November 29, 2014, SBI<sup>1</sup> review letter:

Geologic Review, 6472 and 6498 South Bybee Drive, Weber County Parcel Numbers: 07-753-0001 and 07-753-0002, Uintah, Utah (SBI Project No: 2-14-522), dated November 29, 2014.

The November 29, 2014, SBI geologic review letter was written in response to the following December 10, 2013, GeoStrata report:

Geologic Hazards Assessment, Dauphine-Savory Piedmont Subdivision Lots 1R and 2R and adjacent 2-acre property, Weber County, Utah (GeoStrata Job No. 910-001), dated December 10, 2013: Prepared for: Matt Rasmussen, 2927 Melanie Lane, Ogden, UT 84403.

The purpose of SA's review is to evaluate whether or not the GeoStrata documents adequately address geologic conditions at the site, consistent with concerns for public health, safety, and welfare; reasonable professional standards-of-care, and; the Weber County Hillside Development Review Procedures and Standards.

### **SA Recommendations**

The May 27, 2015, SA review letter contained ten items for which SA recommended Weber County request additional data and/or clarification. It is our opinion that the July 9, 2015, GeoStrata memorandum adequately responds to eight of the items in the May 27, 2015 SA geologic review letter. SA recommends Weber County not consider the geologic submittals complete from a geologic perspective until GeoStrata adequately addresses the following items:

1. Item 5 from May 27, 2015, SA Geologic Review Letter:
  - a. In their July 9, 2015 memorandum, GeoStrata states (first paragraph on page 5): "As stated in GeoStrata's Response to SA Recommendation 2 above, the

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<sup>1</sup> As of January 1, 2015, SBI has been operating as Simon Associates, LLC.

updated log of Trench 2 has been included in this response to extend our trench coverage on the east side of Lot 1R the requested 25 feet setback distance.”

GeoStrata trench T-2 is located about 275 feet to the south of Lot 1R. It is SA’s opinion T-2 is located too far to the south to be representative of geologic conditions at Lot 1R, particularly in regards to evaluating surface-fault-rupture potential.

Geologic mapping and paleoseismic trenching have shown that patterns of ground deformation resulting from past surface faulting on normal faults in Utah are highly variable, and may change significantly over short distances along the strike (trend) of the fault.

While a single trench provides data at a specific fault location, multiple trenches are often required to characterize variability of the fault, to provide a more comprehensive understanding of faulting at a particular site, and/or to adequately document the absence of faulting.

For that reason, it is standard practice that subsurface data generally not be extrapolated more than about 300 feet (100± meters) without additional subsurface information. Accordingly, SA recommends:

- i. Excavation of a trench near Lot 1R, of adequate length to explore the proposed building site(s) plus any potential setback to the east of the building envelope (Salt Lake County 2002; Christenson and others, 2003; Morgan County, 2010; Draper City, 2010).
- ii. At least 25 feet be utilized as the potential setback distance.
- iii. A scoping meeting prior to commencement of any field work to allow Weber County to evaluate the geologist’s investigative approach. At the scoping meeting, the consultant should present the purpose of the field work and the location of the proposed trench(es), which meet the minimum standard of practice. To expedite the process

and due to Weber County's familiarity with the proposed development, the site plan could be emailed to Weber County and the scoping meeting completed via telephone.

- iv. A field review by Weber County of the trench(es) to allow Weber County the opportunity to evaluate subsurface data (i.e., age and type of sediments; presence/absence of faulting, etc.) with the consultant, and verify that the investigation is adequate
- b. The descriptions of Unit 4, Trench T-2 (page 6) and Unit 5 (page 7), in the July 9, 2015, GeoStrata memorandum appear to reference incorrect geologic units. SA recommends Weber County request GeoStrata clarify the apparent discrepancies.

2. Item 6b from May 27, 2015, SA Geologic Review Letter:

Response "b" on page 11 of the July 9, 2015, GeoStrata memorandum states: "GeoStrata has attached the Site Geologic Map (Plate A-5) and the Site Geologic Setback Map (Plate A-6) to the end of this letter. The Site Geologic Map (Plate A-5) is intended to delineate the alluvial fan sediments on the site and the Site Geologic Setback Map (Plate A-6) is intended to show the active channel setback based on the hydrology report prepared by HydroPlot titled 'Drainage Evaluation for Dauphine'-Savoy-Piedmont Subdivision, Lot #2, Ogden, UT' and dated September 4, 2014 and shown on the Grading/Drainage Plan prepared by Silverpeak Engineering<sup>2</sup> and stamped by Joshua R. Jensen P.E. This report and Grading/Drainage Plan are included in Appendix D of this letter."

There appears to be an inconsistency between the calculated drainage setback as shown on GeoStrata Plate A-6, Site Geologic Setback Map (attached), and site geologic conditions as shown on GeoStrata Plate A-5, Site Geologic Map (attached). Plate A-6 depicts the drainage setback coinciding with the south building envelope line. Plate A-5 depicts debris flow deposits within the proposed

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<sup>2</sup> Silverpeak Engineering (Heber, Utah), 10-17-2014, Rasmussen Residence Weber Canyon Uinta County, Utah, Wash Grading Plan, Grading/Drainage Plan, p C1.0-C2.0., unpublished plan set.

building foot print, northwest of the drainage setback line. SA recommends Weber County request GeoStrata clarify the apparent discrepancy.

3. Item 6d from May 27, 2015, SA Geologic Review Letter:

Response "d" on page 12 of the July 9, 2015, GeoStrata memorandum states: "The drainage easement is labeled on the Grading/Drainage Plan as an existing 50' [wide] drainage easement but actually measures 75 feet according to the reported scale. The Modified Channel Cross Section detail on the Grading/Drainage Plan shows a minimum channel width of 20 feet and a minimum depth of 3 feet."

SA recommends Weber County request GeoStrata clarify whether the existing drainage easement is 50 feet or 75 feet wide.

4. Item 6e(ii) from May 27, 2015, SA Geologic Review Letter:

On page 13 of the July 9, 2015, GeoStrata Memorandum, GeoStrata states:

"Fire related debris flow volumes for the subject property were predicted using the Western USA regression model (Gartner and others, 2008<sup>3</sup>; Giraud and Castleton, 2009<sup>4</sup>; Cannon and others 2010<sup>5</sup>). The model estimates debris flow volumes as:"

$$\ln V = 0.59(\ln S) + 0.65(B)^{1/2} + 0.18(R)^{1/2} + 7.21"$$

Giraud and Castleton, 2009, utilizes the empirical Western U.S. regression model of Gartner and others (2008) for fire related debris flows:

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<sup>3</sup> Gartner, J.E., Cannon, S.H., Santi, P.M. and DeWolfe, V.G., 2008, Empirical models to predict the volumes of debris flows generated by recent burned basins in the Western U.S., *Geomorphology* 96 (2008), pp. 339-354.

<sup>4</sup> Giraud, R. E. and Castleton, J.J., 2009, Estimation of potential debris-flow volumes for Centerville canyon, Davis county, Utah: Utah Geological Survey Report of Investigation 267.

<sup>5</sup> Cannon, S.H., Gartner, J.E., Rupert M.G., Michael, J.A., Alan H. Rea, A.H., and Charles Parrett, C., 2010, Predicting the probability and volume of post wildfire debris, flows in the intermountain western United States: *GSA Bulletin*; January/February 2010; v. 122; no. 1/2; p. 127–144; 9 figures; 5 tables.

$$\ln V = 0.59(\ln S) + 0.65(B)^{1/2} + 0.18(R)^{1/2} + 7.21$$

It is noteworthy that the regression model in Gartner and others (2008) and Giraud and Castleton (2009) is not the same as the regression equation in Cannon and others (2010) for fire related debris flows:

$$\ln V = 7.2 + 0.6(\ln A) + 0.7(B)^{1/2} + 0.2(T)^{1/2} + 0.3$$

SA recommends Weber County request GeoStrata evaluate the fire related debris volume using the regression models from Giraud and Castleton (2009) and Cannon and others (2010); the most conservative results should be used at the subject site. (hand calculations should be provided).

5. The July 9, 2015, GeoStrata memorandum provides debris flow analysis only for fire-related debris flows. SA recommends Weber County request GeoStrata provide an analysis of debris flows that could result from rapid snowmelt/rainfall. The analysis should:
  - a. Include hand calculations;
  - b. Include derivation of all variables, including sediment bulking, and;
  - c. Account for all processes that trigger snowmelt/rainfall debris flows.
6. Item 6e(ii) from May 27, 2015, SA Geologic Review Letter: On page 13 of the July 9, 2015, GeoStrata Memorandum, GeoStrata states:

"Total basin area and the percent of the basin with slopes greater than 30% were given in the 2014 HydroPlot hydrology report (Appendix D)."

The water shed area is shown on Figure 1 of the September 4, 2014, HydroPlot report<sup>6</sup>. SA recommends Weber County request GeoStrata submit HydroPlot Figure 1 ("Broad Hollow Drainage Location & Topography") with a bar scale.

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<sup>6</sup> HydroPlot, September 4, 2014, Drainage Evaluation for the Dauphine'-Savoy-Piedmont Subdivision, Lot #2, Ogden, UT, p 3., unpublished consultant report.

## Closure

Comments and recommendations in this review are based on data presented in the referenced Consultant's report. SA accordingly provides no warranty that the data in the Consultant's report or any other referenced reports are correct or accurate. SA has not performed an independent site evaluation. Comments and recommendations presented herein are provided to aid Weber County in reducing risks from geologic hazards and to protect public health, safety, and welfare. There is no other warranty, either express or implied.

All services performed by SA for this review were provided for the exclusive use and benefit of Weber County; no other person or entity may or is entitled to use or rely upon any of the information or reports generated by SA as a result of this review.

SA would be pleased to meet with Weber County and/or the Consultant, at a mutually convenient time, to discuss any of the issues presented herein. In the meantime, if you have any questions, please feel free to contact the undersigned. The opportunity to be of service to Weber County is appreciated.

Very truly yours,

**SA**



David B. Simon, P.G.  
Principal Geologist

DBS/AOT

Dist.: 1/addressee

Encl.: GeoStrata Plate A-5, Site Geologic Map  
GeoStrata Plate A-6, Site Geologic Setback Map