



IGES[®]

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July 3, 2018

Summit Mountain Holding Group, LLC
3632 North Wolf Creek Drive
Eden, Utah 84310
Attn: Mr. Rick Everson

IGES Project No. 01628-028

**RE: Preliminary Findings – Geotechnical and Geologic Hazards Investigation (Rev.1)
Bobcat Ridge Subdivision
Summit Powder Mountain Resort
Weber County, Utah**

Mr. Everson,

As requested, this letter serves to address the preliminary findings of the ongoing geotechnical and geologic hazards investigation that IGES is conducting for the proposed Bobcat Ridge Subdivision of the Summit Powder Mountain Resort in Weber County, Utah. Site reconnaissance and site-specific geologic mapping preceded subsurface investigation, in which a total of 55 test pits were excavated across the property between June 6 and June 26, 2018 (see Figure 1, attached). Soil samples collected from the test pits have been transported to our laboratory and are currently undergoing geotechnical testing; slope stability modeling will also be performed once the results of the soil strength testing are received. It is our understanding that Summit Mountain Holding Group (Summit) intends to obtain a preliminary subdivision approval at an upcoming meeting with Weber County, and in lieu of the completed geotechnical and geologic hazards report, a letter summarizing the preliminary findings of the geotechnical and geologic hazards investigation in advance of the completed report may provide useful data for the upcoming meeting with the County. To this end, the following is a summary of the key preliminary findings that are to be further elaborated in the completed report:

- Though geologic and geotechnical conditions are variable across the property, adverse geologic or geotechnical conditions that would constitute a fatal flaw for the development were not observed. Some modifications to the current roadway and lot layout may be necessary, based upon surficial and subsurface groundwater encountered. Additionally, some lots may require standard engineering practices to mitigate landslide and slope instability hazards. However, these groundwater and slope stability concerns are restricted to localized areas of the property and do not apply to the property as a whole.
- Shallow groundwater conditions are prevalent across the property, most notably on the northern half and especially in the northeastern portion of the property, which includes an area of standing water characterized by abundant hydrophilic plants through which a road is shown on current plans (this area is approximately delineated on Figure 1). We understand that this road will be moved outside of this area, and the area is to be further assessed and delineated by a ‘wetlands’ expert. Groundwater seepage was observed in 27 of the 55 test pits excavated, with seepage typically emanating from the sandy Wasatch Formation at

depths as shallow as 3 feet below existing grade. Continuous, persistent seepage in some test pits caused the pits to be filled with as much as 3 feet of water during the test pit logging. Further delineation of the wet, swampy area and avoidance of all proposed development within this area is recommended. Additionally, because the shallow groundwater conditions extant in other parts of the property are likely to be perennial, *it is anticipated that some of the lots are better suited for on-grade structures (no basements).*

- Topsoil across the property was typically between 6 and 18 inches thick, observed to be thinner in the northern part of the property in association with the steeper slopes and thicker (up to 3.5 feet thick) on the gentler slopes found in the southern part of the property.
- A persistent colluvium unit was found to underlie the topsoil across the property. This unit was typically 1 to 2 feet thick and had a topsoil matrix, and commonly exhibited cobbles and boulders up to several feet in diameter. As encountered in other places on Powder Mountain, due to the topsoil matrix this unit is unacceptable to build on.
- Wasatch Formation bedrock, largely weathered and typically disaggregated to a medium dense to dense, moist to wet, clayey sand with gravel, was the most common subsurface material observed at the maximum depth of exploration for the test pits. This material was observed to be gradational to clayey gravel with sand (GC) grading to sandy lean to fat clay with gravel (CL or CH) in places, with the gravel portion comprising an estimated 20 to 50% of the unit and the sand fraction being typically fine- to medium-grained. Shallow groundwater was commonly observed to be seeping from this unit. This unit represents competent native materials that are acceptable to build on.
- Weathered bedrock of the Calls Fort Shale Member of the Bloomington Formation was only encountered in one test pit (TP-1), the furthest northwest and downslope test pit excavated. An older, shallow landslide slide plane was also observed in this test pit, located at the contact between the Calls Fort Shale Member and the overlying Wasatch Formation.
- A light gray to dark yellowish orange fat clay seam up to several feet thick was commonly observed in the test pits. This seam was most commonly encountered immediately above the Wasatch Formation, but several times was encountered immediately below the Wasatch Formation (but was never observed both above and below the Wasatch Formation in a single test pit). Where observed above the Wasatch Formation, the clay seam was commonly slickensided and was interpreted to represent the slide plane for shallow older landslide deposits, extending to a depth of less than 10 feet below existing grade. This was most commonly observed in the southern part of the property on gentle modern topography.

Though similar in appearance and character as a fat clay, the seam did not exhibit slickensides when it was observed below the Wasatch Formation (which was only observed in the northwestern portion of the property). In this case, it was interpreted to represent the highly weathered uppermost portion of the Calls Fort Shale Member.

Where present, the seams act as aquitards and are the likely reason for the persistent groundwater conditions observed across the property, e.g. a localized perched groundwater condition.

- Given the presence of shallow groundwater and fat clays in the subsurface, some localized parts of the property may exhibit marginal slope stability barring remedial grading. Strength testing of the clay seams will provide quantitative data upon which slope stability modeling will be performed. Should the slope stability modeling result in inadequate factors of safety in particular areas, recommendations for mitigation will be provided such that the factors of safety can be brought to an acceptable level.

Preliminary Recommendations

We understand that the footings for the proposed skier bridge will be placed upwards of 20 feet below existing grade. At that location, bedrock (Wasatch Formation) is expected to be relatively shallow (less than 5 feet below existing grade). Accordingly, we anticipate those footings will bear directly on Wasatch Formation. We anticipate the bridge abutments may be supported on conventional spread footings – for planning purposes, the footings can be designed with a net allowable bearing capacity of 5,500 psf. The preceding value is for dead plus live loads; a 1/3 increase may be taken for transient loading conditions such as wind or seismic.

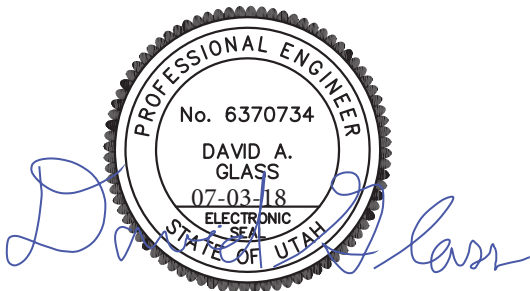
Limitations

This is a *preliminary* letter, and the observations and interpretations noted in this letter are based on a preliminary assessment of the field data and do not represent substantive and definitive conclusions. These may be subject to change, based upon the laboratory testing and slope stability modeling results. Upon completion of our analyses, the forthcoming geotechnical and geologic hazards report may differ in part or substantially from the statements made in this letter, but in our professional opinion the statements made in this letter represent the anticipated results at this time based upon the available data.

Closure

We appreciate the opportunity to be of service on this project – if you have any questions, please contact the undersigned at 801-748-4044.

Respectfully submitted,
IGES, Inc.



David A. Glass, P.E.
 Senior Geotechnical Engineer

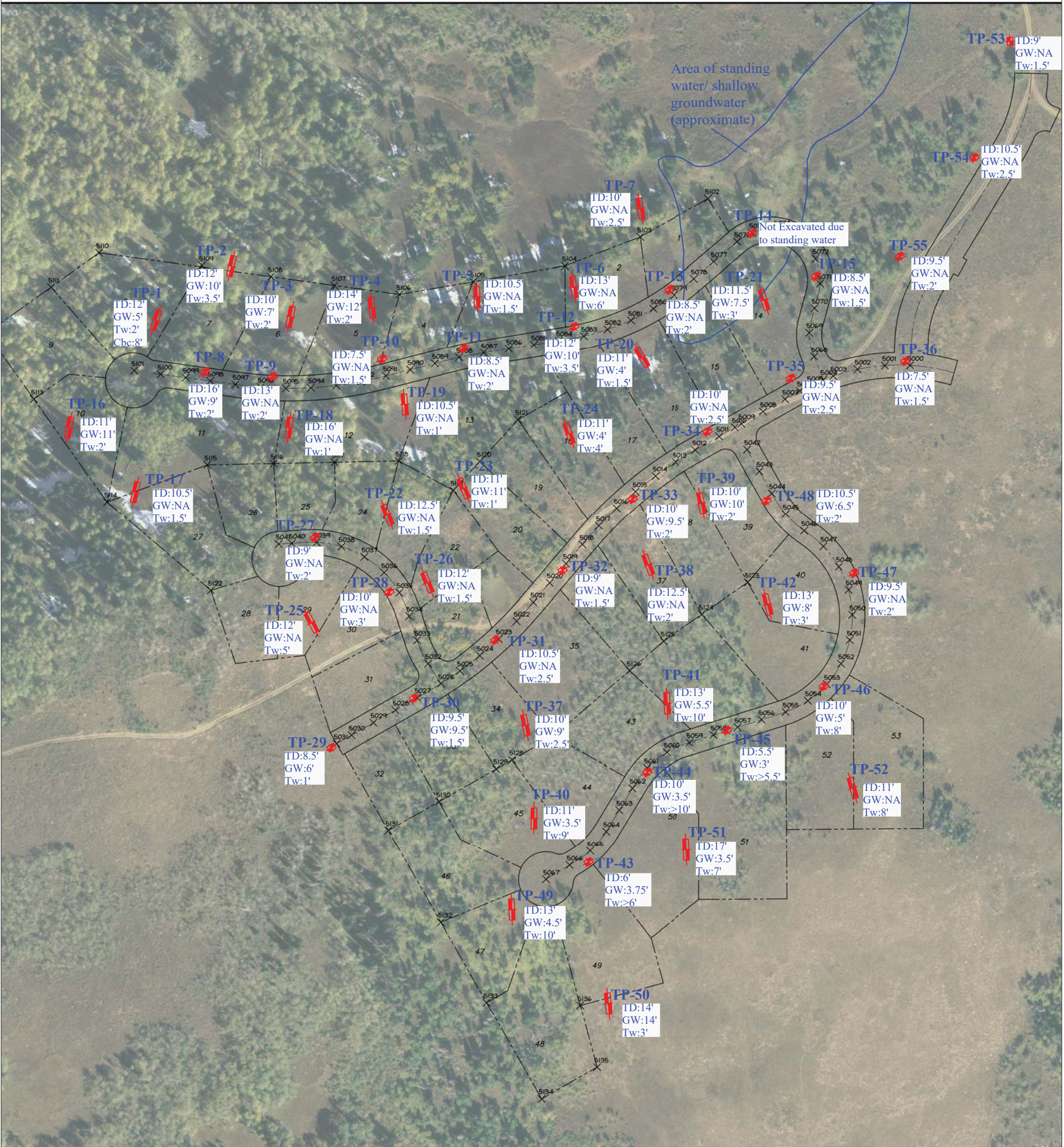


Peter E. Doumit, P.G.
 Senior Geologist

Attachments:

-Figure 1 – Test Pit Location and Groundwater Map

TP-53B TD:10'
GW:NA
Tw:2.5'



LEGEND

Map Data From:

-Bobcat Ridge Point Plot provided by NV5 (2018)



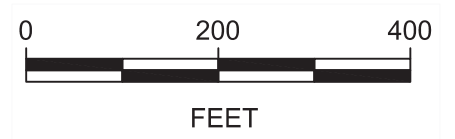
Test Pit

Tw: Wasatch Formation

TD: Total Depth

Cbc: Calls Fort Shale Member of the Bloomington Formation

GW: Ground Water



1" = 200'

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Bobcat Ridge
Summit Powder Mountain Resort
Weber County, Utah

Test Pit Location and Groundwater Map

Figure

1