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**PROJECT MEMORANDUM**

Date: May 29, 2015 SA Project No: 15-142

From: David B. Simon

To: Alan Taylor

Subject: Report - Geotechnical Study, Lot 15 Ski Lake Estates No.3, 6640 East 1100 South,

Huntsville, Utah, prepared by Earthtec Engineering Inc. (project no. 145150G), dated June 23, 2014, prepared for Mr. Martin Nabs, 50 River Bluff Road, Elgin, IL 60120.

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As requested I reviewed the above referenced report to evaluate whether or not the site is located in a geologically sensitive area. It is my opinion the site is located in a geologically sensitive area. As shown on the attached geologic map:

1. The site is underlain by geologic unit Tn, Norwood Formation, an extremely landslide-prone geologic unit. Personally, I believe any site underlain by Tn should have a qualified engineering geologist, at a minimum, review, if not log, subsurface explorations.

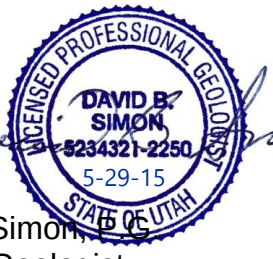
2. There are several landslides in the immediate vicinity of the site (geologic unit Qms), all within unit Tn. Please note that I only included the geologic description of the units in the immediate vicinity of the site on the attached geologic map.

The test pit logs in the EEI report (attached) are also informative. TP-1 denotes clay to 8 feet, silty sand from 8 to 12 feet, and no “bedrock” (e.g., Norwood Formation sediments). TP-2 indicates clay to 4 feet and sandstone (presumably bedrock) from 4 to 7.5 feet, followed by silty sand to 12 feet; bedrock “sandwiched” between soil units. The test pit logs are suggestive that a landslide may be present on the property.

It is possible that the field engineer did not have sufficient geologic experience to recognize Norwood Formation material, or for that matter a landslide. Based on the geologic map, Norwood Formation bedrock should have been documented within a few feet of the ground surface. Alternatively, the site may be underlain by a landslide, not recognized by the field engineer or delineated on the geologic map due to the scale of the geologic map.

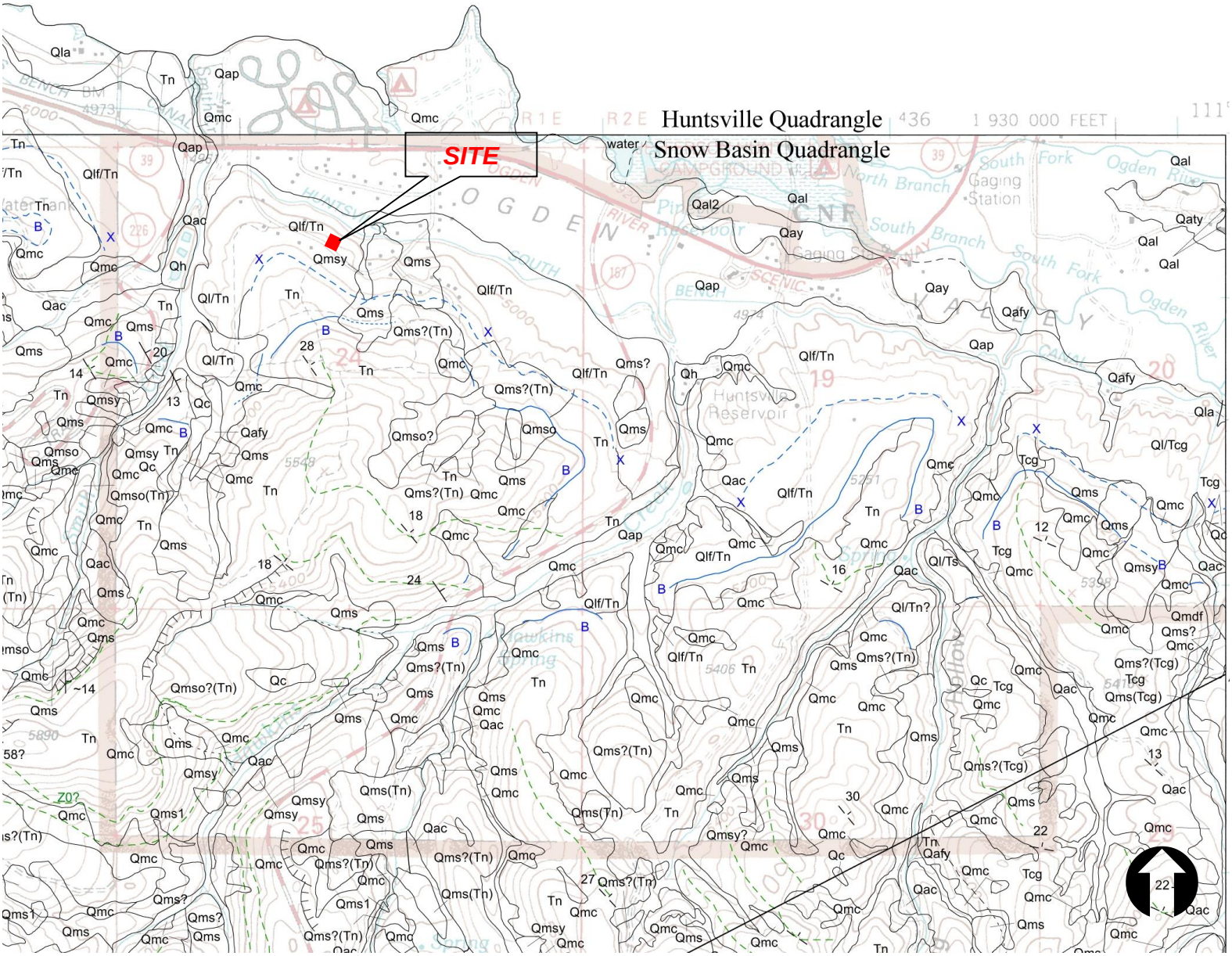
Based on the documents reviewed and my experience in the area, specifically with the Norwood Formation, I recommend the site be treated as a geologically sensitive (e.g., hazardous) site and also be evaluated by a qualified engineering geologist. Should you have any questions, please feel free to contact me.

SA




David B. Simon, P.G.
Principal Geologist

Dist: 1/Addressee
Encl: Geologic Map
EEI test pit logs




King, J.K., Yonkee, W.A., and Coogan, J.C., 2008, Interim geologic map of the Snow Basin and part of the Huntsville quadrangle, Davis, Morgan, and Weber Counties, Utah: Utah Geological Survey Open-File Report 536, scale 1:24,000.

Qap, Alluvium, undivided (Holocene and Pleistocene)

Qms, Landslide and slump deposits (Holocene and Pleistocene) - age uncertain (though likely Holocene and/or upper Pleistocene), where portions of slide/slump complexes have different ages but cannot be shown separately at map scale, or where boundaries between slides/slumps of different ages are not distinct.

Qlf Lake Bonneville fine-grained deposits (upper Pleistocene) - Mostly silt, clay, and fine sand (typically eroded from shallow Norwood Formation) in Ogden and Morgan Valleys.

Tn Norwood Formation (lower Oligocene and upper Eocene) - Typically light-gray to light brown, altered tuff (claystone), tuffaceous siltstone, sandstone, and conglomerate; includes landslides and slumps that are too small to show at map scale.

# TEST PIT LOG
## NO.: TP-1

**PROJECT:** Lot 15 Ski Lake Estates No. 3 **PROJECT NO.:** 145150G
**CLIENT:** Martin Nobs **DATE:** 05/30/14
**LOCATION:** See Figure 2 **ELEVATION:** Not Measured
**OPERATOR:** C.E. Butters **LOGGED BY:** S. Stuart
**EQUIPMENT:** Trackhoe
**DEPTH TO WATER; INITIAL ▽ :** **AT COMPLETION ▼ :**

| Depth (Ft.) | Graphic Log | USCS | Description | Samples | TEST RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Water Cont. (%) | Dry Dens. (pcf) | LL | PI | Gravel (%) | Sand (%) | Fines (%) | Other Tests |
| 0 | | | TOPSOIL, clay, slightly moist, black, organic rich | | | | | | | | | |
| 1 | | | | | | | | | | | | |
| 2 | | | Fat CLAY with sand, stiff (estimated), moist, olive, minor sandstone content up to 1 inch in diameter, moderate thin root material, minor pinhole texture | | | | | | | | | |
| 3 | | CH | | | | | | | | | | |
| 4 | | | | ■ | 26 | 84 | 79 | 49 | 0 | 29 | 71 | C, DS |
| 5 | | | Sandy Lean CLAY, stiff (estimated), moist, olive, heavy salt staining from 4 to 7 feet, moderate sandstone content up to 1 inch in diameter | | | | | | | | | |
| 6 | | CL | | ☒ | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |
| 9 | | | Silty SAND, dense (estimated), moist, olive, moderate sandstone content up to 6 inches in diameter | ☒ | | | | | | | | |
| 10 | | SM | | | | | | | | | | |
| 11 | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | |
| 13 | | | MAXIMUM DEPTH EXPLORED APPROXIMATELY 12 FEET | | | | | | | | | |
| 14 | | | | | | | | | | | | |

**Notes:** No groundwater encountered.

**Tests Key**
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

**PROJECT NO.:** 145150G

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**FIGURE NO.:** 3

LOG OF TESTPIT 145150G.GPJ EARTHTEC.GDT 6/19/14

# TEST PIT LOG
## NO.: TP-2

| | | | |
|---|---|---|---|
| **PROJECT:** | Lot 15 Ski Lake Estates No. 3 | **PROJECT NO.:** | 145150G |
| **CLIENT:** | Martin Nobs | **DATE:** | 05/30/14 |
| **LOCATION:** | See Figure 2 | **ELEVATION:** | Not Measured |
| **OPERATOR:** | C.E. Butters | **LOGGED BY:** | S. Stuart |
| **EQUIPMENT:** | Trackhoe | | |

**DEPTH TO WATER; INITIAL ▽ :** **AT COMPLETION ▼ :**

| Depth (Ft.) | Graphic Log | USCS | Description | Samples | TEST RESULTS: Water Cont. (%) | Dry Dens. (pcf) | LL | PI | Gravel (%) | Sand (%) | Fines (%) | Other Tests |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | TOPSOIL, clay, slightly moist, black, organic rich | | | | | | | | | |
| 4 | | CL | Lean CLAY with sand, stiff (estimated), moist, olive, moderate thin root material | ■ | 23 | 90 | 49 | 22 | 0 | 21 | 79 | C |
| 8 | | SANDSTONE | SANDSTONE, olive, slightly weathered, moderate soft | | | | | | | | | |
| 8 | | SM | Silty SAND, dense (estimated), slightly moist, olive, moderate sandstone content up to 1 inch in diameter | X | | | | | | | | |
| 11 | | SM | | X | | | | | | | | |
| 12 | | | MAXIMUM DEPTH EXPLORED APPROXIMATELY 12 FEET | | | | | | | | | |

**Notes:** No groundwater encountered.

**Tests Key**
- CBR = California Bearing Ratio
- C = Consolidation
- R = Resistivity
- DS = Direct Shear
- SS = Soluble Sulfates
- UC = Unconfined Compressive Strength

**PROJECT NO.:** 145150G

Earthtec Engineering

**FIGURE NO.:** 4

LOG OF TESTPIT 145150G.GPJ EARTHTEC.GDT 6/19/14