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January 12, 2016

39 Summit LLC
c/o Ms. Andrea Milner
cc: Mrs. Cassandra Beresini
314 Lytton Avenue, Suite 100
Palo Alto, California 94301

IGES Project No. 02132-002

Subject: Response to Review Comments - Engineering
Geotechnical Investigation Report and Soil Nail Wall
Lot 39R of Powder Mountain Resort
8365 East Summit Pass
Weber County, Utah

Ms. Milner:

As requested, IGES has prepared the following response to review comments regarding the referenced geotechnical report and soil nail wall design package for Lot 39, part of the larger Powder Mountain Resort expansion project in Weber County, Utah. The review comments to be addressed were prepared by Taylor Geotechnical (TG); the comments were posted on Miradi (Weber County Website) on October 15, 2015, and were provided to IGES on November 30, 2015 via email. For convenience, the review comments will be presented first, followed by our response.

Comment No. 1

"Prior to the completion of review of the subject documents, TG recommends IGES Respond to geological comments in the Simon Associates, LLC (SA) "Geologic Review No. 2, Lot 39R Summit at Powder Mountain Phase I Subdivision" (SA Project No 15-161), dated October 13, 2015."

Response to Comment No. 1

IGES has submitted this response in a separate submittal.

Comment No. 2

"*In Table 2, On page 8 of the June 3, 2015 IGES document, IGES provided equivalent fluid densities for the design of basement foundation walls and retaining walls. The values presented in the table are less than those determined from their calculations for active and passive pressures. TG request IGES clarifies the discrepancies."*

Response to Comment No. 2

The values in Table 2.0 were calculated with an assumed moist unit weight of 120 pcf. However, the calculations presented in Appendix D assumed a moist unit weight of 125 pcf. Considering the prevailing granular soils will be somewhat gravelly (classifying as clayey gravel (GC)), an assumed moist unit weight of 125 is considered more appropriate. Therefore,

the values presented in the calculations in Appendix D should be followed. A revised Table 2.0 is presented herein; this response should be considered an addendum to the geotechnical report in this regard.

Table 2.0 (Revised)
Lateral Earth Pressure Coefficients

Condition	Level Backfill		2H:1V Backfill	
	Lateral Pressure Coefficient	Equivalent Fluid Density (pcf)	Lateral Pressure Coefficient	Equivalent Fluid Density (pcf)
Active (Ka)	0.33	42	0.53	67
At-rest (Ko)	0.50	60	0.80	100
Passive (Kp)	3.0	375	—	—

Comment No. 3

"*TG request IGES provide calculations that substantiate the At-rest (Ko) equivalent fluid density provided in Table 2 of the June 3, 2015 IGES document.*"

Response to Comment No. 3

IGES is not aware of a published simplified calculation for at-rest pressures in the case of a slope. To address this issue, IGES has estimated the at-rest pressure by taking the ratio of the at-rest coefficient (Ko) and the active coefficient (Ka) for a *flat backfill* and multiply the result by the active coefficient for a 2H:1V slope:

$Ko_{flat}/Ka_{flat} = 0.50/0.33 = 1.515$

For 2H:1V Slope, $Ko_{2H:1V} = Ka_{2H:1V} \times Ko_{flat}/Ka_{flat} = 0.53 \times 1.515 = 0.80$

Comment No. 4

"*Provide slope stability analyses for all slopes below the building envelope that have a gradient ≥ 20 percent in accordance with the recommendations presented on page 12 of the August 28, 2012, Western Geologic report. IGES states the following on page 1 (under Response to Comment No. 1) of the September 23, 2015, IGES letter*:

"Slope stability was addressed in a separate submittal for the design of a permanent soil nail wall for the new home (IGES, 2015b). The design of the wall included global stability of the shoring system, which included much of the slope above and below the proposed improvements, taking into account proposed grades and improvements. This document is on file with the County; however, IGES can provide an electronic copy of this submittal to the reviewer upon request via email."

The slope stability analyses provided in the September 17, 2015, IGES document was performed for soil nail walls to be constructed as permanent shoring. The slope stability analyses were

bound to the confines of the proposed construction area of the shoring and did not address slopes below the building envelope."

Response to Comment No. 4

As a part of our response to geology review comments for Lot 39, IGES performed a slope stability analysis to provide a quantitative assessment of a reasonable setback from the landslide located south of the lot. The intent of the analysis was to model a hypothetical post-failure scenario, e.g., if the mapped landslide is reactivated, what is the potential impact up-slope of the landslide? This analysis provides a reasonable assessment of the stability of the slope below the proposed building envelope, and is therefore reproduced herein.

The stability of the slope was modeled using gSTABLE7 slope stability software. Bishop's Simplified Method was used to model the slope. Calculations for stability were developed by searching for the minimum factor-of-safety for a circular-type failure. A minimum static factor-of-safety of 1.5 and seismic factor-of-safety of 1.0 was considered acceptable for this project considering the available information. Homogeneous earth materials (existing site soils, colluvium) and arcuate failure surfaces were assumed. The section analyzed is Section A-A', illustrated on Plate 1 (attached). Geologic Cross Section A-A' is presented as Figure 1, attached.

For our assessment of native site soils, IGES has reviewed soil data presented in our geotechnical report for Lot 39R (2015a). The report indicates that the subsurface in the vicinity of the property consists mostly dense, coarse gravel and cobbles in a clay matrix in the upper 10 to 15 feet, which is underlain by hard sandy lean clay. Considering the available geotechnical data and our experience in the area, appropriate engineering parameters have been selected for our model; these parameters are summarized in Table 1.

Table 1
Engineering Parameters for Subsurface Model

Soil Type	Elevation (ft. below existing grade)	Unit Weight (pcf)	Friction Angle (Degrees)	Cohesion (psf)
Clayey Gravel	0-15	130	39	100
Sandy Lean Clay	~15-20	120	26	250

Groundwater (e.g., a piezometric surface) was not identified during our geotechnical investigation; furthermore, shallow groundwater is not known to occur in this area. However, in one of the two test pits excavated during the geotechnical investigation water was observed seeping at a depth of 7 feet; this water is presumed to be a localized perched water condition, likely associated with spring run-off and therefore transient. Nonetheless, to assess the potential impact to the slope a surface saturated condition was also modeled by way of increasing the unit weight of the soil to that of the saturated condition (e.g., the clayey gravel was modeled with a unit weight of 136 pcf). A surface saturated condition is more appropriately modeled in an infinite slope stability analysis, discussed in the following section.

For the seismic (pseudo-static) assessment of slope, the seismic coefficient k_h is modeled as equal to 50% of the peak ground acceleration (PGA) resulting from a MCE seismic event (2PE50). From our referenced geotechnical report, the PGA resulting from a 2PE50 seismic event is taken as 0.326g. Therefore, we have adopted a seismic coefficient of 0.17g.

Based on our analysis, in a hypothetical post-failure condition, minimum factors-of-safety of 1.5 and 1.0 for static and seismic conditions, respectively, are maintained with respect to the proposed building envelope. Therefore, the distance between the proposed building envelope and the mapped landside is considered acceptable from a slope stability and geologic hazard standpoint. The results of the global stability analyses are attached.

Stability of Saturated Slopes

IGES assessed the potential for surficial soils becoming mobilized under saturated parallel seepage conditions. Our assessment assumes coarse colluvium, fully saturated, and a 3.7H:1V slope, which is representative for the area below the building envelope, within the property boundary. Our model assumes an effective friction angle of 39 degrees with zero cohesion, and a saturated unit weight of 136 pcf. Based on this model, a factor-of-safety of 1.64 results. It is informative to apply this analysis further down-slope, in the vicinity of the mapped landslide, south of the Lot 39R property boundary, where the prevailing natural gradient is somewhat steeper, on the order of 2.5H:1V. Using the same model except with a gradient of 2.5H:1V, a factor-of-safety of 1.10 results, suggesting marginal surficial stability. Sample calculations are attached as Figures 3 and 4.

Comment No. 5

"*Provide supporting data for the following statement in Section 2.1 of the September 17, 2015, IGES document*:

"Considering the available geotechnical data and our experience in the area, appropriate engineering parameters have been selected for our model; these parameters are summarized in Table 1."

Specifically, TG requests clarification for the following:

A. *What constitutes* "… available geotechnical data."

B. *What is IGES' specific experience in the area allowing* "appropriate engineering parameters" *to be selected.*

C. *Locations and subsurface conditions, relative to the subject site, of prior IGES projects from which "appropriate engineering parameters" were selected.*

D. *Laboratory data that substantiates the soil parameters used in the analyses presented in the May 8, 2013, and September 17, 2015, IGES documents for the shoring and rock retaining wall designs.*

Response to Comment No. 5A

Available geotechnical data includes the preliminary geotechnical report and follow-up final geotechnical report for the greater Powder Mountain 200-acre expansion (IGES, 2012a, 2012b).

The referenced reports include several test pits, and one soil boring. Although the soil boring was drilled at a different location, the soils sampled consisted of coarse colluvium similar to what is observed throughout the Powder Mountain project site, including Lot 39. IGES also conducted two direct shear tests on remolded samples of coarse granular soils generally consisting of clayey gravel (results attached). Because of the extremely coarse nature of the prevailing colluvium, the samples tested necessarily consisted of remolded samples of the clayey/silty matrix material, with the coarse fraction sieved out. As such, IGES has weighed the SPT blowcounts more heavily when qualitatively assessing the insitu strength of the coarse colluvial soils. Conversely, the strength of the stiff clay soil encountered on Lot 39 may be better represented by the direct shear results.

IGES has also observed the subsurface across the Powder Mountain project site during investigations for various smaller projects, such as the new Sundown Lift towers, a pedestrian bridge across Summit Pass, and numerous single-lot investigations, the closest to the subject lot being Lot 37. In addition, observation of road cuts, particularly along Summit Pass, also provides useful geotechnical data with respect to the characteristics of the prevailing colluvial cover.

Additional available geotechnical data includes the original geotechnical/geologic study by AMEC (2001). This report included several test pits, plus laboratory testing consisting largely of index testing (Atterberg Limits, sieve analysis) and swell/consolidation testing. Laboratory strength testing was not performed. In addition to the AMEC report, a 60-foot soil boring was completed by Raba Kistner (2013) for an alternate buried water tank site; it is interesting to note that the earth materials described in the Raba Kistner boring log were very similar to the soils observed in the IGES boring log (IGES, 2012c). Both boring locations were located at a topographic high, effectively at the top of the main east-west trending ridge forming the northern boundary of the Powder Mountain expansion area, and both borings indicated at least 60 feet of coarse colluvium mantling the top of the broad, flat ridge. It should also be noted that the borings are located almost 1 mile from each other. The Raba Kistner boring is attached.

A complete electronic copy of any of these referenced sources can be provided to the Reviewer upon request.

Response to Comment No. 5B

Our primary experience include the logging of dozens of test pits throughout the Powder Mountain expansion project site, and the logging of a deep boring. Direct observation of test pit excavations provides valuable insight – primarily, a direct observation of the coarseness of the soil, and the difficulty of the excavator to excavate due to the presence of coarse materials and/or the presence of well-cemented soils.

Specific experience is presented in the references section, which details most of the projects IGES has conducted in the project area. Electronic copies of any of these referenced reports can be provided upon request.

Response to Comment No. 5C

A map illustrating our subsurface explorations relative to Lot 39, with corresponding logs, is attached (Plate 1).

Response to Comment No. 5D

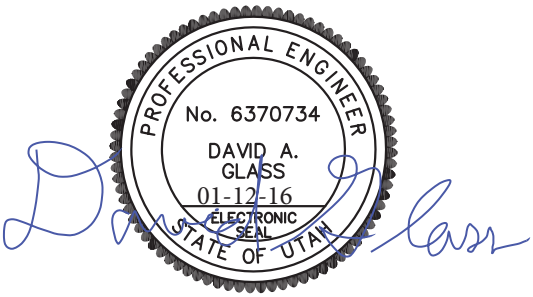
Available laboratory data is attached. As previously discussed, the prevailing coarse colluvium is considered to be too coarse to reasonably estimate strength values based on conventional laboratory testing (e.g., direct shear test). The direct shear tests attached to this response may be more representative of the stiff clay soils encountered on Lot 39.

Due to the coarse nature of the prevailing colluvial cover encountered across the Powder Mountain site, assessing the strength of the colluvium does provide a challenge. To that end, IGES has recently acquired a large-diameter shear box, which will allow testing of remolded soil samples with material up to 1 inch diameter. IGES anticipates testing representative samples of the prevailing coarse colluvium at selected locations in the spring, as the need arises. Since a permanent soil nail wall is planned on Lot 39, IGES anticipates obtaining a sample from this location to further evaluate our estimated strength parameters. As this data is developed, at the Reviewer's request IGES will share this information with the Reviewer and discuss the implications for future slope stability analysis for upcoming Powder Mountain projects, or past projects if re-assessment is warranted based on this new data.

Closure

We appreciate the opportunity to provide you with our services. If you have any questions please contact the undersigned at your convenience (801) 748-4044.

Respectfully Submitted,
IGES, Inc.



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

Davey L. Breinholt, P.E.
Senior Geotechnical Engineer

Attachments:

References

Appendix A	Plate 1 – Geologic Map
	Figure 2 – Cross Section A-A'
	Slope Stability Analysis
Appendix B	Referenced Test Pit and Boring Logs
Appendix C	Laboratory Test Data

References

AMEC, 2001, Report Engineering Geologic Reconnaissance/Geotechnical Study Powder Mountain Resort.

IGES, Inc., 2015a, Design Package, Permanent Shoring System, Howery Residence, 8365 East Summit Pass (Lot 39R), Summit Eden Development, Weber County, Utah, Project No. 02132-001, dated July 6, 2015, latest revision August 27, 2015.

IGES, Inc., 2015b, Geotechnical Investigation Report, Lot 39R of Powder Mountain Resort, 8365 East Summit Pass, Weber County, Utah Project No. 02052-001, dated June 3, 2015.

IGES, Inc., 2012c, Design Geotechnical Investigation, Powder Mountain Resort, Weber County, Utah, Project No. 01628-003, dated November 9, 2012.

IGES, Inc., 2012d, Preliminary Geotechnical Investigation, Powder Mountain Resort, Weber County, Utah, Project No. 01628-001, dated July 26, 2012.

Raba Kistner, 2013, Geotechnical Engineering Study, Powder Mountain Resort, Earl's Peak Water Tank, Weber County, Utah, Project No. AUA 13-046-00, dated June 26, 2013.

Western Geologic, 2012, Report: Geologic Hazards Reconnaissance, Proposed Area 1 Mixed-Use Development, Powder Mountain Resort, Weber County, Utah, dated August 28, 2012.

Additional References – IGES Experience in Powder Mountain

The following references include services provided by IGES that involved subsurface exploration within the Powder Mountain expansion area.

IGES, 2015e, Geotechnical Investigation, Summit Eden Phases 1E, 1F, and 1G, Summit at Powder Mountain Resort, Weber County, Utah, Project No. 01628-011, dated September 30, 2015.

IGES, 2015f, Geotechnical Investigation Report, Lot 81, Summit Eden Phase 1C, 8409 East Spring Park, Weber County, Utah, Project No. 02137-001, dated July 27, 2015.

IGES, 2015g, Assessment of Borrow Sites, Meridian and Daybreak Areas, Powder Mountain Resort, Weber County, Utah, Project No. 01628-005, dated July 25, 2015.

IGES, 2015h, Geotechnical Investigation Report, Lot 78, Summit Eden Phase 1C, 8457 East Spring Park, Weber County, Utah, Project No. 02136-001, dated July 21, 2015.

IGES, 2014i, Geotechnical Investigation, Copper Crest - East, Powder Mountain Resort, Weber County, Utah, Project No. 01628-010, dated November 12, 2014.

Additional References (cont.)

IGES, 2014j, Geotechnical Investigation Report, Pedestrian Bridge over Summit Pass, North of Horizon Run, Powder Mountain Resort, Weber County, Utah, Project No. 01628-008, dated September 24, 2014.

IGES, 2014k, Geotechnical Investigation, The Ridge Nests Development, Powder Mountain Resort, Weber County, Utah, Project No. 01628-008, dated September 16, 2014.

IGES, 2014l, Geotechnical Investigation Report, Sundown Lift, Weber County, Utah, Project No. 01628-007, dated August 26, 2014.

IGES, 2014m, Geotechnical Investigation Report, Lot 37R of Powder Mountain Resort, 8343 East Heartwood Drive, Weber County, Utah, Project No. 01628-006, dated August 13, 2014.

IGES, 2014n, Geotechnical Investigation Report, Lot 83 of Powder Mountain Resort, 8527 East Spring Park, Weber County, Utah, Project No. 01628-006, dated August 13, 2014.

IGES, 2014o, Geotechnical Investigation Report, Lot 27 of Powder Mountain Resort, 7947 East Heartwood Drive, Weber County, Utah, Project No. 01628-006, dated August 12, 2014.

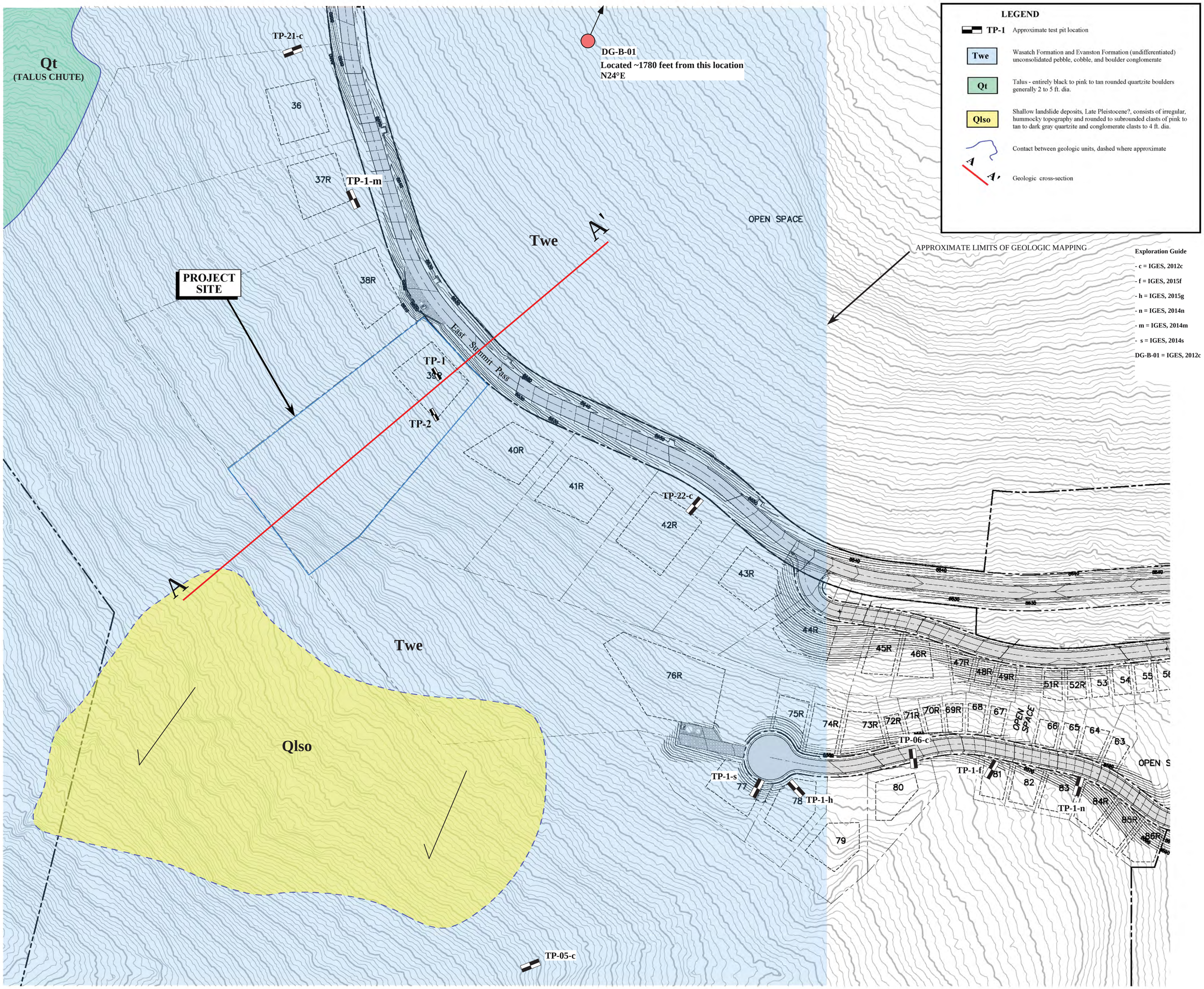
IGES, 2014p, Geotechnical Investigation Report, Lot 33 of Powder Mountain Resort, 7982 East Heartwood Drive, Weber County, Utah, Project No. 01628-006, dated August 12, 2014.

IGES, 2014q, Geotechnical Investigation Report (Revised), Lot 26 of Powder Mountain Resort, 7929 East Heartwood Drive, Weber County, Utah, Project No. 01628-006, dated August 11, 2014.

IGES, 2014r, Geotechnical Investigation Report (Revised), Lot 34R of Powder Mountain Resort, 7958 East Heartwood Drive, Weber County, Utah, Project No. 01628-006, dated August 11, 2014.

IGES, 2014s, Geotechnical Investigation Report, Lot 77 of Powder Mountain Resort, 8443 East Spring Park, Weber County, Utah, Project No. 01628-006, dated August 7, 2014.

APPENDIX A



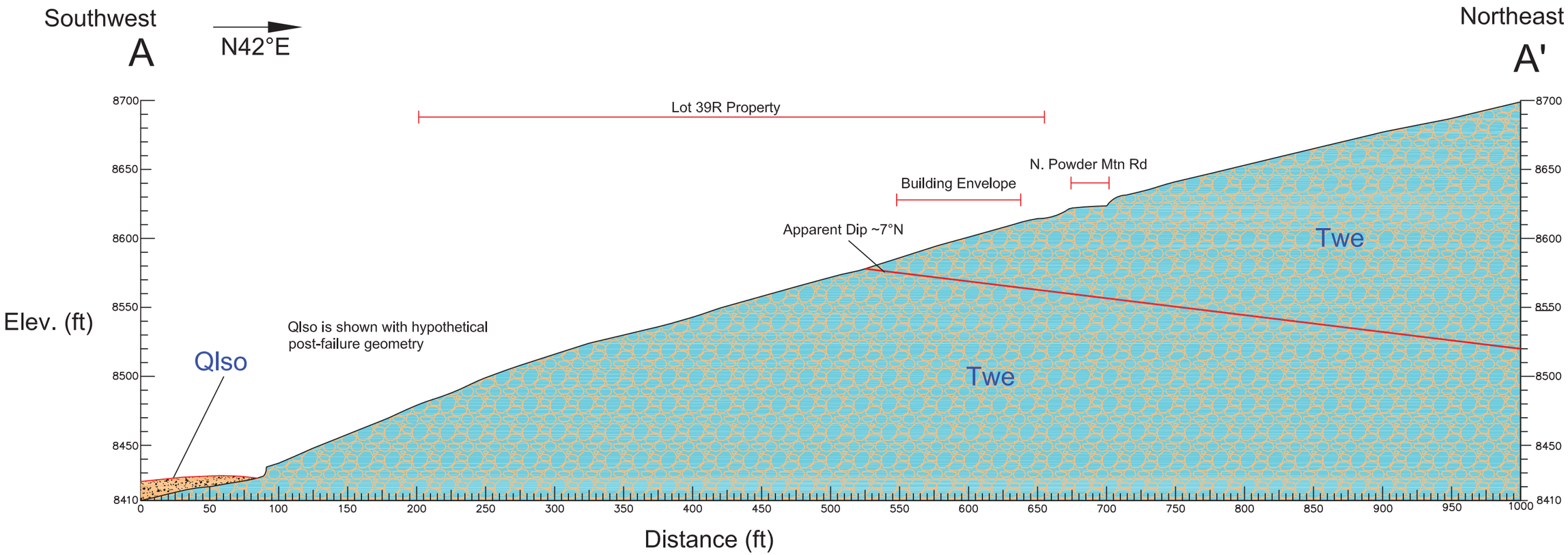
Base Map:
Topographic map prepared by NV5, undated

IGES®
Project No. 02052-001

Geotechnical Investigation
Lot 39R of Summit Eden Phase 1C
8365 East Summit Pass
Weber County, Utah

GEOLOGIC MAP

Plate
1



LEGEND

Qlso: Late Pleistocene? shallow landslide deposits

Consists of irregular, hummocky topography and rounded to subrounded clasts of pink to tan to dark gray quartzite and conglomerate clasts up to 4' in diameter.

Twe: Undifferentiated Wasatch and Evanston Formations

Consists of unconsolidated Precambrian clasts of rounded to subrounded pink to tan to dark gray quartzite and conglomerate up to 6' in diameter in a reddish-brown silty matrix. Clayey interbeds with some gravel seen in test pits up to as much as 8' thick. Apparent dip calculated from generalized attitude of bedding as shown on Crittenden, Jr. (1972).

0 50 100 150

FEET

FIGURE 2

GEOLOGIC CROSS-SECTION

GEOLOGIC INVESTIGATION
LOT 39R
POWDER MTN PHASE 1 SUBDIVISION
WEBER COUNTY, UTAH

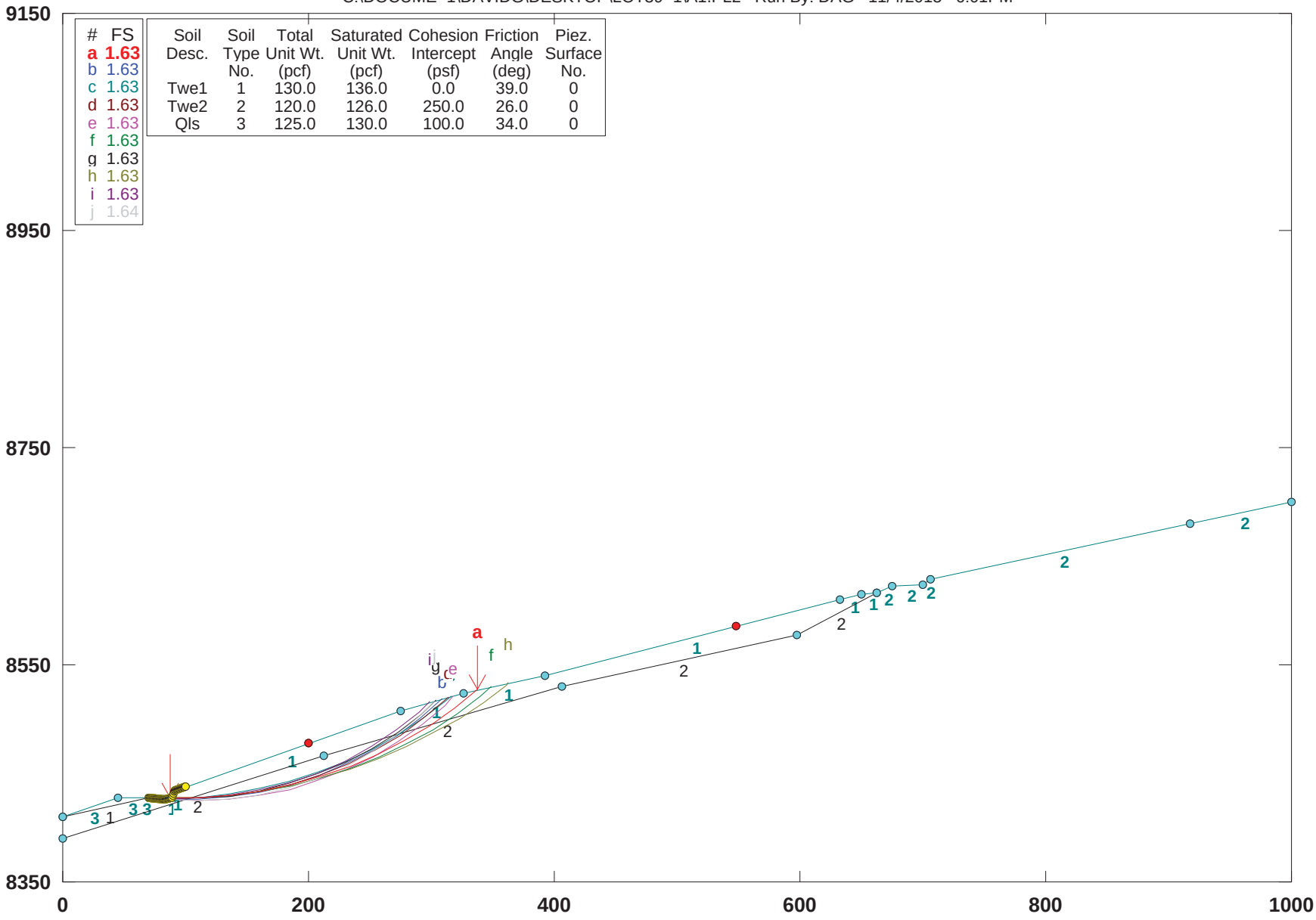
DATE: 10/30/2015	SCALE: 1"=75'
FILE: 02132-002	

Lot 39; A-A'; 02132-002; Post-LS Failure; Setback; Static

C:\DOCUME~1\DAVIDG\DESKTOP\LOT39~1\A1.PL2 Run By: DAG 11/4/2015 6:01PM

#	FS
a	1.63
b	1.63
c	1.63
d	1.63
e	1.63
f	1.63
g	1.63
h	1.63
i	1.63
j	1.64

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Twe1	1	130.0	136.0	0.0	39.0	0
Twe2	2	120.0	126.0	250.0	26.0	0
Qls	3	125.0	130.0	100.0	34.0	0



GSTABL7 v.2 FSmin=1.63

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static Earthquake, and Applied Force Options.

****

Analysis Run Date: 11/4/2015
Time of Run: 6:01PM
Run By: DAG
Input Data Filename: C:a1.
Output Filename: C:a1.OUT
Unit System: English

Plotted Output Filename: C:a1.PLT

PROBLEM DESCRIPTION: Lot 39; A-A'; 02132-002; Post-LS Failure ; Setback; Static

BOUNDARY COORDINATES

16 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	8410.00	45.00	8427.00	3
2	45.00	8427.00	70.00	8427.50	3
3	70.00	8427.50	83.00	8426.00	3
4	83.00	8426.00	89.00	8427.70	1
5	89.00	8427.70	91.10	8434.30	1
6	91.10	8434.30	275.00	8508.00	1
7	275.00	8508.00	326.00	8524.30	1
8	326.00	8524.30	392.00	8540.50	1
9	392.00	8540.50	632.00	8610.00	1
10	632.00	8610.00	650.00	8614.40	1
11	650.00	8614.40	662.00	8616.10	1
12	662.00	8616.10	675.00	8622.00	2
13	675.00	8622.00	700.00	8623.60	2
14	700.00	8623.60	706.00	8629.20	2
15	706.00	8629.20	917.00	8680.00	2
16	917.00	8680.00	1000.00	8700.00	2
17	0.00	8410.00	70.00	8427.50	1
18	0.00	8390.00	212.00	8466.00	2
19	212.00	8466.00	406.00	8530.00	2
20	406.00	8530.00	597.00	8578.00	2
21	597.00	8578.00	662.00	8616.10	2

User Specified Y-Origin = 8350.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	136.0	0.0	39.0	0.00	0.0	0
2	120.0	126.0	250.0	26.0	0.00	0.0	0
3	125.0	130.0	100.0	34.0	0.00	0.0	0

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

2500 Trial Surfaces Have Been Generated.

50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced Along The Ground Surface Between X = 70.00(ft)
and X = 100.00(ft)

Each Surface Terminates Between X = 200.00(ft)
and X = 548.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00(ft)

25.00(ft) Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -30.0

And 10.0 deg.

Following Is Displayed The Most Critical Of The Trial
Failure Surfaces Evaluated.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Evaluated = 2500

Statistical Data On All Valid FS Values:
   FS Max =   2.581   FS Min =   1.628   FS Ave =   1.990
   Standard Deviation =   0.188   Coefficient of Variation =   9.43 %

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	87.76	8427.35
2	112.75	8427.71
3	137.66	8429.89
4	162.34	8433.87
5	186.66	8439.64
6	210.50	8447.17
7	233.73	8456.41
8	256.23	8467.31
9	277.87	8479.83
10	298.55	8493.88
11	318.14	8509.41
12	336.56	8526.32
13	337.26	8527.06

Circle Center At X =   95.31 ; Y = 8770.59 ; and Radius =   343.33

Factor of Safety
*** 1.628 ***

Individual data on the 19 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.2	27.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.1	988.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	13.8	17117.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	7.9	13982.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	24.9	60552.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	24.7	80562.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	24.3	94078.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	23.8	101041.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	1.5	6532.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	21.7	95144.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	22.5	96369.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	18.8	74804.9	0.0	0.0	0.	0.	0.0	0.0	0.0
13	2.9	10760.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	20.7	67287.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	1.4	3993.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	18.2	39338.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	7.9	10244.1	0.0	0.0	0.	0.	0.0	0.0	0.0
18	10.6	5664.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	0.7	26.4	0.0	0.0	0.	0.	0.0	0.0	0.0

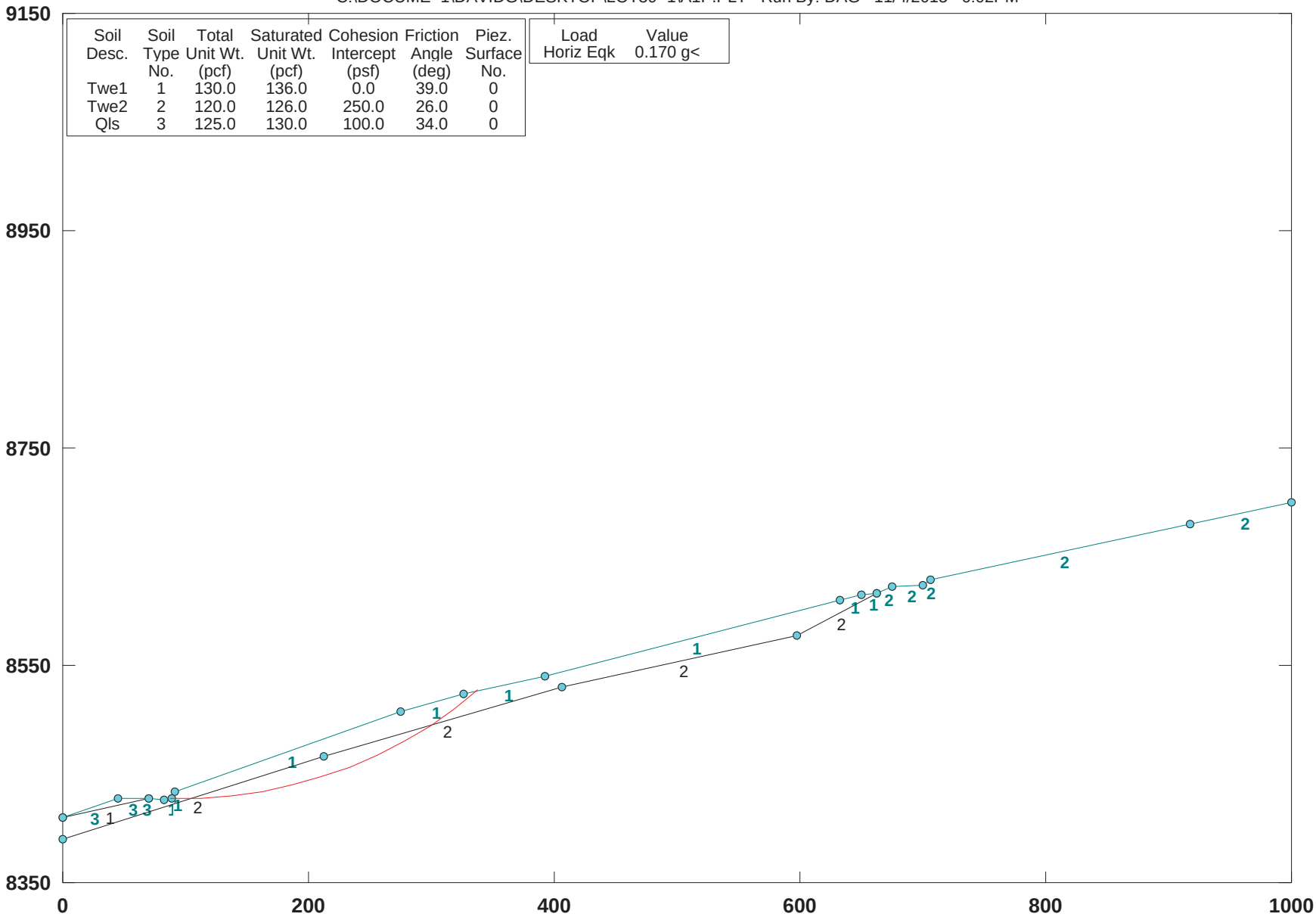
**** END OF GSTABL7 OUTPUT ****

Lot 39; A-A'; 02132-002; Post-LS Failure; Setback; P-Static

C:\DOCUME~1\DAVIDG\DESKTOP\LOT39~1\A1P.PLT Run By: DAG 11/4/2015 6:02PM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Twe1	1	130.0	136.0	0.0	39.0	0
Twe2	2	120.0	126.0	250.0	26.0	0
Qls	3	125.0	130.0	100.0	34.0	0

Load	Value
Horiz Eqk	0.170 g<



GSTABL7 v.2 FSmin=1.08

Factor Of Safety Is Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback, 1
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static Earthquake, and Applied Force Options.

****

Analysis Run Date: 11/4/2015
Time of Run: 6:02PM
Run By: DAG
Input Data Filename: C:a1p.
Output Filename: C:a1p.OUT
Unit System: English

Plotted Output Filename: C:a1p.PLT

PROBLEM DESCRIPTION: Lot 39; A-A'; 02132-002; Post-LS Failure
; Setback; P-Static

BOUNDARY COORDINATES 1

16 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	8410.00	45.00	8427.00	3
2	45.00	8427.00	70.00	8427.50	3
3	70.00	8427.50	83.00	8426.00	3
4	83.00	8426.00	89.00	8427.70	1
5	89.00	8427.70	91.10	8434.30	1
6	91.10	8434.30	275.00	8508.00	1
7	275.00	8508.00	326.00	8524.30	1
8	326.00	8524.30	392.00	8540.50	1
9	392.00	8540.50	632.00	8610.00	1
10	632.00	8610.00	650.00	8614.40	1
11	650.00	8614.40	662.00	8616.10	1
12	662.00	8616.10	675.00	8622.00	2
13	675.00	8622.00	700.00	8623.60	2
14	700.00	8623.60	706.00	8629.20	2
15	706.00	8629.20	917.00	8680.00	2
16	917.00	8680.00	1000.00	8700.00	2
17	0.00	8410.00	70.00	8427.50	1
18	0.00	8390.00	212.00	8466.00	2
19	212.00	8466.00	406.00	8530.00	2
20	406.00	8530.00	597.00	8578.00	2
21	597.00	8578.00	662.00	8616.10	2

User Specified Y-Origin = 8350.00(ft)

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	130.0	136.0	0.0	39.0	0.00	0.0	0
2	120.0	126.0	250.0	26.0	0.00	0.0	0
3	125.0	130.0	100.0	34.0	0.00	0.0	0

A Horizontal Earthquake Loading Coefficient
Of0.170 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned

Cavitation Pressure = 0.0(psf)

Trial Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	87.76	8427.35
2	112.75	8427.71
3	137.66	8429.89
4	162.34	8433.87
5	186.66	8439.64
6	210.50	8447.17
7	233.73	8456.41
8	256.23	8467.31
9	277.87	8479.83

10	298.55	8493.88
11	318.14	8509.41
12	336.56	8526.32
13	337.26	8527.06

Circle Center At X = 95.30 ; Y = 8770.61; and Radius = 343.35

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.077

Table 1 - Individual Data on the 19 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.2	26.9	0.0	0.0	0.0	0.0	4.6	0.0	0.0
2	2.1	987.8	0.0	0.0	0.0	0.0	167.9	0.0	0.0
3	13.8	17123.6	0.0	0.0	0.0	0.0	2911.0	0.0	0.0
4	7.9	13968.0	0.0	0.0	0.0	0.0	2374.6	0.0	0.0
5	24.9	60555.9	0.0	0.0	0.0	0.0	10294.5	0.0	0.0
6	24.7	80561.4	0.0	0.0	0.0	0.0	13695.4	0.0	0.0
7	24.3	94067.8	0.0	0.0	0.0	0.0	15991.5	0.0	0.0
8	23.8	101039.0	0.0	0.0	0.0	0.0	17176.6	0.0	0.0
9	1.5	6547.8	0.0	0.0	0.0	0.0	1113.1	0.0	0.0
10	21.7	95122.0	0.0	0.0	0.0	0.0	16170.7	0.0	0.0
11	22.5	96387.7	0.0	0.0	0.0	0.0	16385.9	0.0	0.0
12	18.8	74808.1	0.0	0.0	0.0	0.0	12717.4	0.0	0.0
13	2.9	10754.2	0.0	0.0	0.0	0.0	1828.2	0.0	0.0
14	20.7	67308.1	0.0	0.0	0.0	0.0	11442.4	0.0	0.0
15	1.5	4019.8	0.0	0.0	0.0	0.0	683.4	0.0	0.0
16	18.1	39301.6	0.0	0.0	0.0	0.0	6681.3	0.0	0.0
17	7.9	10244.9	0.0	0.0	0.0	0.0	1741.6	0.0	0.0
18	10.6	5660.1	0.0	0.0	0.0	0.0	962.2	0.0	0.0
19	0.7	26.0	0.0	0.0	0.0	0.0	4.4	0.0	0.0

Table 2 - Base Stress Data on the 19 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	0.83	88.38	1.24	17.39	2.76
2	0.83	90.05	2.10	376.79	8.24
3	0.83	97.99	13.77	995.93	18.19
4	0.83	108.81	7.88	1107.65	26.02
5	5.00	125.21	25.01	1380.93	211.22
6	9.16	150.00	25.00	1716.64	513.24
7	13.35	174.50	25.00	1929.17	868.83
8	17.53	198.58	25.00	2027.04	1217.38
9	21.69	211.25	1.61	2015.79	1501.03
10	21.69	222.86	23.39	2020.85	1503.49
11	25.85	244.98	25.00	1918.38	1680.90
12	30.05	265.61	21.69	1738.24	1727.76
13	30.05	276.43	3.32	1646.10	1625.18
14	34.19	288.21	25.00	1405.00	1513.04
15	38.41	299.28	1.85	1176.51	1348.16
16	38.41	309.07	23.14	1099.27	1055.04
17	42.55	322.07	10.67	624.37	649.62
18	42.55	331.28	14.33	256.75	267.23
19	46.75	336.91	1.02	16.74	21.53

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 414392.16 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 1501.30(psf)

Sum of the Driving Forces = 384919.50 (lbs)

Average Mobilized Shear Stress = 1394.53(psf)

Total length of the failure surface = 276.02(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

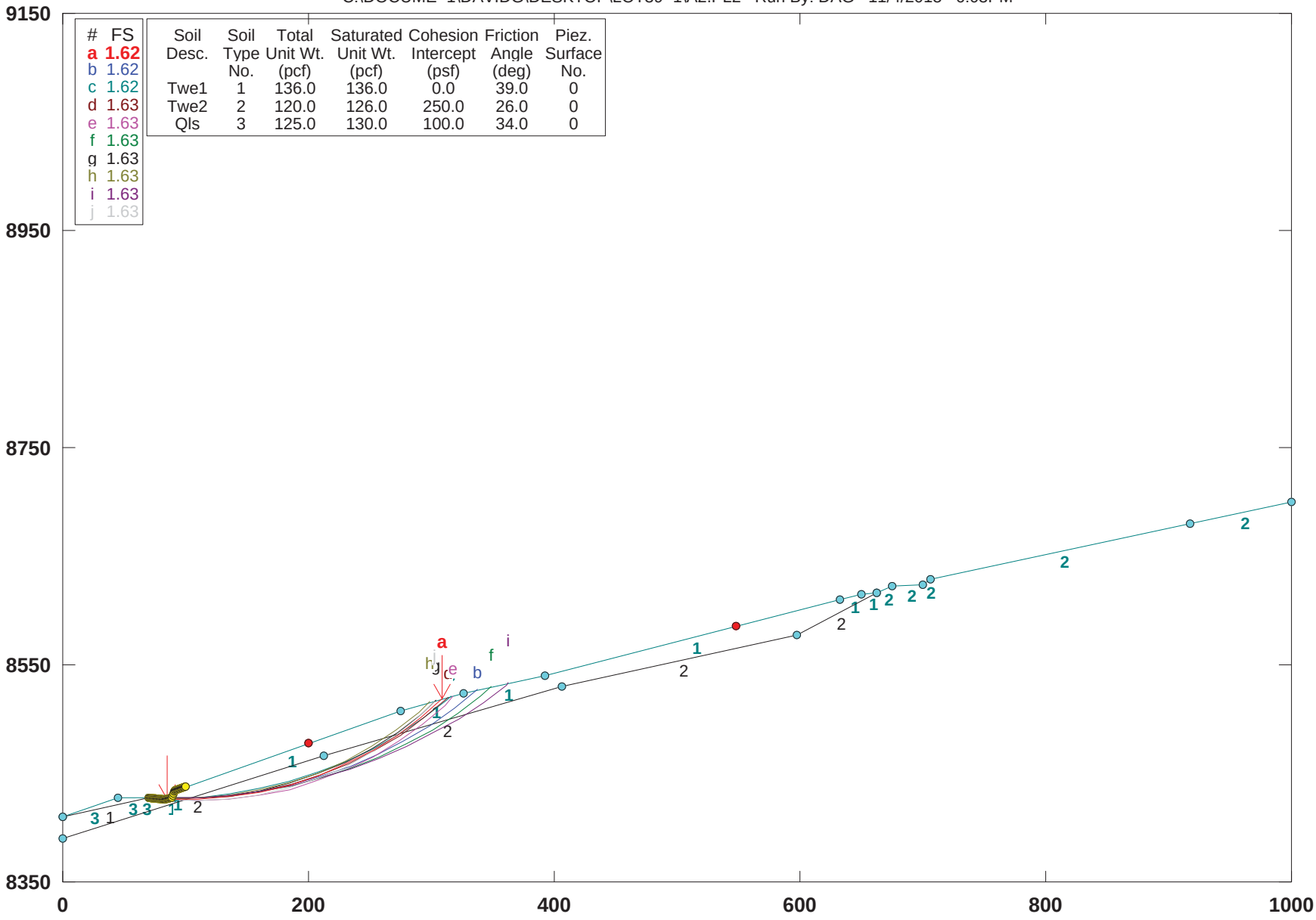
**** END OF GSTABL7 OUTPUT ****

Lot 39; A-A'; 02132-002; Post-LS Failure; Setback; Sat. Unit Weight; Static

C:\DOCUME~1\DAVIDG\DESKTOP\LOT39~1\A2.PL2 Run By: DAG 11/4/2015 6:03PM

#	FS
a	1.62
b	1.62
c	1.62
d	1.63
e	1.63
f	1.63
g	1.63
h	1.63
i	1.63
j	1.63

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Twe1	1	136.0	136.0	0.0	39.0	0
Twe2	2	120.0	126.0	250.0	26.0	0
Qls	3	125.0	130.0	100.0	34.0	0



GSTABL7 v.2 FSmin=1.62

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **

****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static Earthquake, and Applied Force Options.

****

Analysis Run Date: 11/4/2015
Time of Run: 6:03PM
Run By: DAG
Input Data Filename: C:a2.
Output Filename: C:a2.OUT
Unit System: English

Plotted Output Filename: C:a2.PLT

PROBLEM DESCRIPTION: Lot 39; A-A'; 02132-002; Post-LS Failure ; Setback; Sat. Unit Weight; Static

BOUNDARY COORDINATES

16 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	8410.00	45.00	8427.00	3
2	45.00	8427.00	70.00	8427.50	3
3	70.00	8427.50	83.00	8426.00	3
4	83.00	8426.00	89.00	8427.70	1
5	89.00	8427.70	91.10	8434.30	1
6	91.10	8434.30	275.00	8508.00	1
7	275.00	8508.00	326.00	8524.30	1
8	326.00	8524.30	392.00	8540.50	1
9	392.00	8540.50	632.00	8610.00	1
10	632.00	8610.00	650.00	8614.40	1
11	650.00	8614.40	662.00	8616.10	1
12	662.00	8616.10	675.00	8622.00	2
13	675.00	8622.00	700.00	8623.60	2
14	700.00	8623.60	706.00	8629.20	2
15	706.00	8629.20	917.00	8680.00	2
16	917.00	8680.00	1000.00	8700.00	2
17	0.00	8410.00	70.00	8427.50	1
18	0.00	8390.00	212.00	8466.00	2
19	212.00	8466.00	406.00	8530.00	2
20	406.00	8530.00	597.00	8578.00	2
21	597.00	8578.00	662.00	8616.10	2

User Specified Y-Origin = 8350.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	136.0	136.0	0.0	39.0	0.00	0.0	0
2	120.0	126.0	250.0	26.0	0.00	0.0	0
3	125.0	130.0	100.0	34.0	0.00	0.0	0

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

2500 Trial Surfaces Have Been Generated.

50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced Along The Ground Surface Between X = 70.00(ft)
and X = 100.00(ft)

Each Surface Terminates Between X = 200.00(ft)
and X = 548.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00(ft)

25.00(ft) Line Segments Define Each Trial Failure Surface.

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -30.0

And 10.0 deg.

Following Is Displayed The Most Critical Of The Trial
Failure Surfaces Evaluated.

.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Evaluated = 2500

Statistical Data On All Valid FS Values:
   FS Max =   2.582   FS Min =   1.621   FS Ave =   1.987
   Standard Deviation =   0.189   Coefficient of Variation =   9.52 %

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	85.31	8426.65
2	110.31	8426.52
3	135.22	8428.58
4	159.86	8432.82
5	184.03	8439.21
6	207.54	8447.71
7	230.22	8458.23
8	251.88	8470.71
9	272.36	8485.04
10	291.51	8501.12
11	309.16	8518.82
12	309.27	8518.95

Circle Center At X =   99.36 ; Y = 8710.44 ; and Radius =   284.13

Factor of Safety
*** 1.621 ***

Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	3.7	267.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.1	1248.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	10.9	14648.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.3	15394.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	24.9	63299.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	24.6	83044.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	24.2	94802.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	23.5	98571.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	4.5	18909.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	18.2	75893.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	21.7	84304.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	20.5	68008.9	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.7	4980.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	0.9	2653.5	0.0	0.0	0.	0.	0.0	0.0	0.0
15	16.5	36923.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	17.7	14710.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	0.1	0.7	0.0	0.0	0.	0.	0.0	0.0	0.0

**** END OF GSTABL7 OUTPUT ****

Lot 39R
02132-002
11/4/2015

c'	0	psf	Effective Cohesion
ϕ'	39	deg	Effective Friction Angle
Y_{sat}	136	pcf	Saturated Unit Weight of Soil
Y_w	62.4	pcf	Unit weight of water
h	7	ft	Depth to shear surface
β	15.0	deg	Slope Gradient (3.7H:1V)

FS 1.64

Input Variable
Calculated Value

This model assumes c>0 and the face of the slope is saturated to depth h

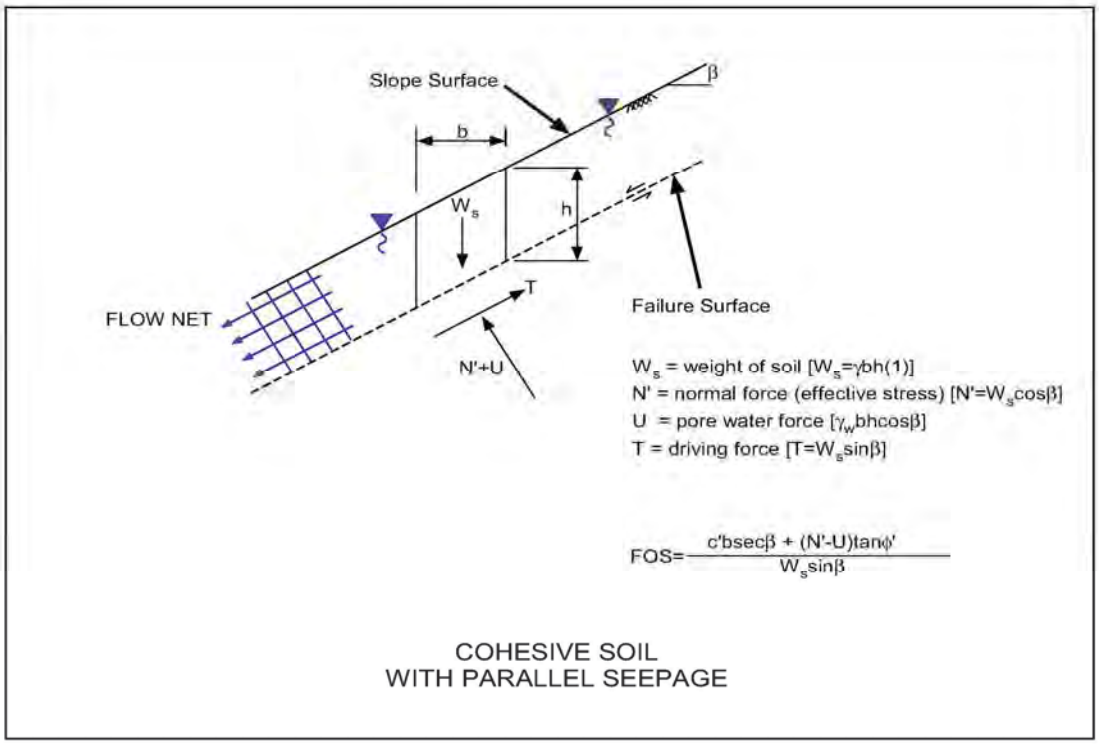


Figure 3

Lot 39R
02132-002
11/4/2015

c'	0	psf	Effective Cohesion
ϕ'	39	deg	Effective Friction Angle
Y_{sat}	136	pcf	Saturated Unit Weight of Soil
Y_w	62.4	pcf	Unit weight of water
h	7	ft	Depth to shear surface
β	21.8	deg	Slope Gradient (2.5H:1V)

FS 1.10

Input Variable
Calculated Value

This model assumes c>0 and the face of the slope is saturated to depth h

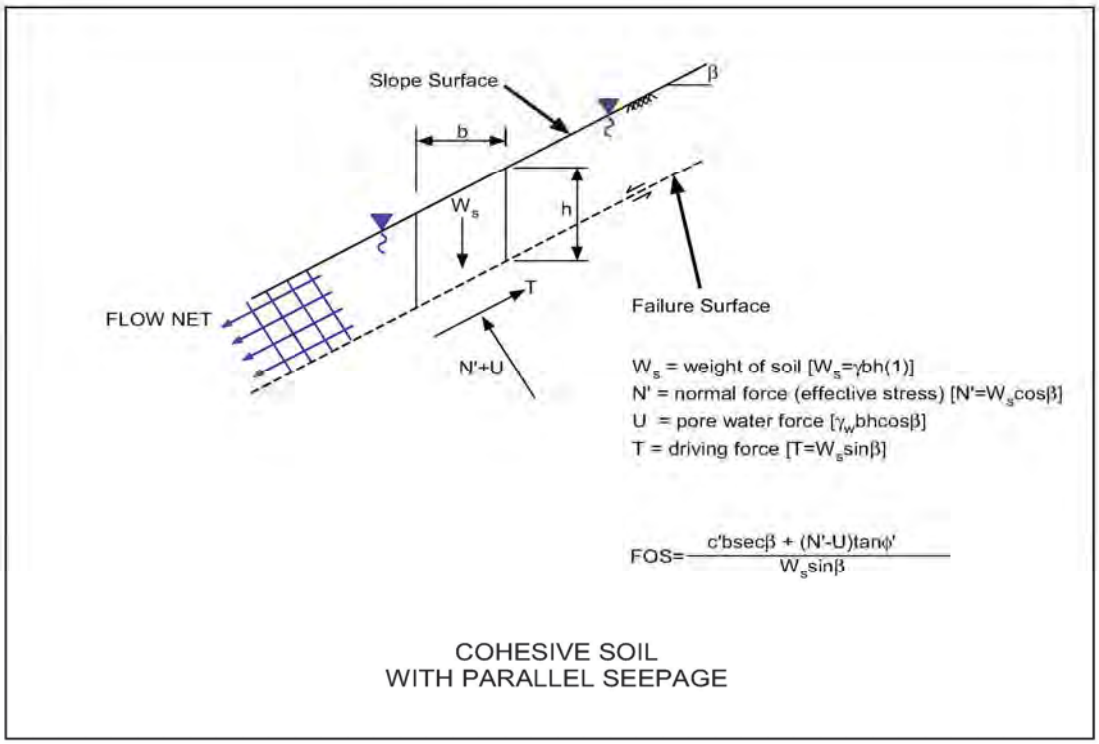


Figure 4

APPENDIX B

DATE
STARTED: 10/8/12
COMPLETED: 10/8/12
BACKFILLED: 10/8/12

Geotechnical Investigation
Summit LLC
Powder Mountain Development
Weber County Utah
IGES Project Number: 01628-003

IGES Rep: DAG
Rig Type: Odex
Boring Type:

BORING NO:
DG-B-1
Sheet 1 of 2

LOCATION
LATITUDE 41.36000 LONGITUDE 111.74640 ELEVATION 8,902 feet (above m.s.l)
Water Tank Site

ELEVATION	FEET	SAMPLES	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	N	Water Level	Dry Density(pcf)	Moisture Content (%)	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
					@ 0' Silty SAND with gravel and boulders, light brown, dry, abundant boulders on surface, non-plastic fines								
8900				CL	@ 2½' Gravelly CLAY, hard, low plasticity, grayish brown w/ iron staining, abundant gravel-size subrounded rocks, some pulverized rocks, ~15-20% fine sand	15 33 32							
	5				@ 5' no recovery	50/5"							
					@ 6' Odex becomes stalled in clay								
8895				SC	@ 7½'Clayey SAND, dense, fine-grained, low plasticity fines, moist, reddish brown, several pulverized rocks, homogenous appearance, uniform	8 13 20				33	24	10	
	10			GC	@ 10' Clayey GRAVEL, dense, coarse-grained, abundant angular/pulverized rock in a sandy lean clay matrix, low plasticity, reddish brown with orange mottling, moist, rocks are quartzite	28 49 50							
8890													
	15			SC	@ 15' Clayey SAND with gravel, dense, fine- to coarse-grained, abundant pulverized angular rocks, low plasticity clay, reddish brown with orange and white mottling, no reaction to HCl	27 36 28				33			
8885													
	20			CL	@ 20' Lean CLAY with gravel, first 6 inches is clay, medium stiff, low plasticity, reddish brown, most, ~25% coarse fraction, below is pulverized quartzite in a sandy/clayey matrix, reddish brown	46 50/3"					30	15	
8880													

N - OBSERVED BLOW COUNT PER 6 INCHES

IGES

SAMPLE TYPE
- 2" O.D./1.38" I.D. Split Spoon Sampler
- 3.25" O.D./2.42" I.D. 'U' Sampler
- 3" O.D. Thin-Walled Shelby Sampler
- Grab Sample
- Modified California Sampler
- Sample from Auger Cuttings

BORING LOG

NOTES:

WATER LEVEL
▼ - MEASURED ▽ - ESTIMATED

Figure A - 26a

LOG OF BORING (A) DAG V 3.01 01628-003 BORING.GPJ IGES.GDT 11/7/12

DATE
STARTED: 10/8/12
COMPLETED: 10/8/12
BACKFILLED: 10/8/12

Geotechnical Investigation
Summit LLC
Powder Mountain Development
Weber County Utah
IGES Project Number: 01628-003

IGES Rep: DAG
Rig Type: Odex
Boring Type:

BORING NO: B-1
Sheet 2 of 2

LOCATION
LATITUDE 41.36000 LONGITUDE 111.74640 ELEVATION 8,902 feet (above m.s.l)
Water Tank Site

DEPTH ELEVATION	DEPTH FEET	SAMPLES	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	N	Water Level	Dry Density(pcf)	Moisture Content (%)	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits: Plastic Limit / Moisture Content / Liquid Limit (10 20 30 40 50 60 70 80 90)
					@ 25' SPT refusal on hard rock - no recovery	n/a							
8875													
	30				@ 30' No recovery	50/3"							
8870													
	35			GM	@ 35' Silty GRAVEL with sand, coarse sand and gravel, dense, 4" recovery, bent shoe on hard rock	50/4"							
8865													
	40			GM	@ 40' Silty GRAVEL, dense, coarse gravel in a silty sand matrix, fine- to medium-grained sand, reddish brown, moist, several angular rocks, refusal on rock	50/3"							
8860													
				GM	@ 45' Silty GRAVEL, dense, coarse gravel in a silty sand matrix, fine- to medium-grained sand, reddish brown, moist, several angular rocks	50/3"							
	45												
8855					Total depth 45 feet No groundwater								
					Bottom of Boring @ 45.2 Feet								

N - OBSERVED BLOW COUNT PER 6 INCHES

SAMPLE TYPE
- 2" O.D./1.38" I.D. Split Spoon Sampler
- 3.25" O.D./2.42" I.D. 'U' Sampler
- 3" O.D. Thin-Walled Shelby Sampler
- Grab Sample
- Modified California Sampler
- Sample from Auger Cuttings

BORING LOG

NOTES:

WATER LEVEL
▼ - MEASURED ▽ - ESTIMATED

Figure A - 26b

LOG OF BORING (A) DAG V 3.01 01628-003 BORING.GPJ IGES.GDT 11/7/12

DATE
STARTED: 6/17/15
COMPLETED: 6/17/15
BACKFILLED: 6/17/15

Geotechnical Investigation
Sellfors/Lot 81
8509 E. Spring Park
Weber County, Utah
Project Number 02137-001

IGES Rep: DAG
Rig Type: 315C

TEST PIT NO:
TP-1-f
Sheet 1 of 1

LOCATION
LATITUDE 41.36270 LONGITUDE -111.74610 ELEVATION 8,560

DEPTH FEET	ELEVATION	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0						@ 0' Topsoil, poorly developed, rocky, loamy appearance in upper 6 inches						
					GC	@ 1' **COLLUVIUM** Clayey GRAVEL, subrounded boulders and cobbles to 36 inches in a clayey sand (SC) matrix, clast-supported, dense, moderate brown, moist, clasts are predominately dolomite and sandstone, low plasticity fines, very coarse, difficult to excavate						
						- bag sample at 3 feet		11.5	30.0	28	12	
5	8555					- Bucket sample at 5 feet						
									20.0			
10	8550					- mostly cobbles and boulders to 12 inches in reddish brown clayey/sandy matrix, difficult to excavate						
						Refusal on boulders at 13 feet						
	8545					No groundwater						

LOG OF TEST PITS (A) -(4 LINE HEADER W ELEV) 02137-001.GPJ IGES.GDT 7/12/15

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Figure

A-3

DATE
STARTED: 6/17/15
COMPLETED: 6/17/15
BACKFILLED: 6/17/15

Geotechnical Investigation
Balance/Lot 78
8457 E. Spring Park
Weber County, Utah
Project Number 02137-001

IGES Rep: DAG
Rig Type: 315C

TEST PIT NO:
TP-1-h
Sheet 1 of 1

LOCATION
LATITUDE 41.36248 LONGITUDE -111.74747 ELEVATION 8,540

DEPTH ELEVATION	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
8535	0					@ 0' Topsoil, silty clay, dark brown, moist, loamy appearance, mixed with rounded cobbles and boulders to 18 inches						
					SC	@ 2½' **COLLUVIUM** Clayey SAND with gravel, subrounded gravel and cobble to 6 inches w/ occasional boulders to 36 inches, gravel and boulders are within coarse sandy clay (SC) matrix, appears matrix-supported (borderline), low plasticity clay, some roots to 6 feet, moderate brown, wet, 'bony' soil however fairly easy to excavate (med. dense), 32% gravel, 41% sand, 27% fines						
	5					- bucket sample at 5 feet			26.8			
						- bag sample at 6 feet		11.8	28.4	27	11	
					GC	@ 8' increasingly difficult to excavate, appears clast-supported, rounded cobbles to 16 inches but mostly 4 to 8 inches						
8530	10					@ 8½ to 10' seepage - water seeping into test pit caving, water is ponding						
						Refusal on boulders at 12 feet No groundwater, seepage between 8½ and 10 feet, soils are wet						
8525						Bottom of Test Pit @ 12 Feet						

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:
Sewer lateal was observed draining water into lot - likely cause of excessive moisture observed.

Figure A-3

LOG OF TEST PITS (A) -(4 LINE HEADER W ELEV) 02136-001.GPJ IGES.GDT 7/12/15

DATE
STARTED: 7/18/14
COMPLETED: 7/18/14
BACKFILLED: 7/18/14

Geotechnical Investigation
Lot 37R of Powder Mountain Resort
8343 East Summit Pass
Weber County, Utah
Project Number 01628-006

IGES Rep: SL
Rig Type: trackhoe

TEST PIT NO:
TP-1-m
Sheet 1 of 1

LOCATION
LATITUDE 41.36539 LONGITUDE -111.75023 ELEVATION 8,624

DEPTH FEET	ELEVATION	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	8620				GC	Topsoil - Clayey GRAVEL with sand - 70% cobbles - dense, dry, grey-brown, roots in upper 2 feet, sub-rounded to sub-angular cobbles up to 4 inches in diameter, reddish brown clayey matrix, clast-supported						
					GC	Clayey GRAVEL with sand - 80% cobbles and boulders - dense, dry, reddish brown, coarse rock (colluvium) disaggregated into angular rock fragments up to 18 inches in diameter						
						@ 3' becomes increasingly difficult to exavate, well-cemented, large cobbles, *possibly* Wasatch Formation (Tw)						
5						Trackhoe refusal on hard, cemented colluvium No groundwater encountered Bottom of Test Pit @ 5 Feet						
10	8615											

LOG OF TEST PITS (A) -(4 LINE HEADER W ELEV) 01628-006 LOT 37R.GPJ IGES.GDT 8/13/14

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

FIGURE
A - 3

DATE
STARTED: 7/18/14
COMPLETED: 7/18/14
BACKFILLED: 7/18/14

Geotechnical Investigation
Lot 83 of Powder Mountain Resort
8527 East Spring Park
Weber County, Utah
Project Number 01628-006

IGES Rep: SL
Rig Type: trackhoe

TEST PIT NO: TP-1-n
Sheet 1 of 1

LOCATION
LATITUDE 41.36256 LONGITUDE -111.74547 ELEVATION 8,570

ELEVATION	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
	0				GM	Topsoil - Silty GRAVEL with sand - 80% cobbles - dense, moist, grey-brown, heavy roots in upper 3 feet, sub-angular to sub-rounded cobbles up to 8 inches in diameter						
					GM	Silty GRAVEL with sand - 70% cobbles - dense, moist, reddish brown, heavy roots in upper 3 feet, sub-angular to sub-rounded cobbles 3 to 6 inches in diameter						
						- 50% cobbles, amount decreasing with depth						
8565	5							7.9	31.0			●
					CH	Sandy Fat CLAY with gravel - medium stiff, moist, reddish brown						
8560	10								63.0	58	41	├──┤
						No groundwater encountered						
						Bottom of Test Pit @ 12 Feet						

LOG OF TEST PITS (A) -(4 LINE HEADER W ELEV) 01628-006 LOT 83.GPJ IGES.GDT 8/13/14

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

FIGURE A - 3

DATE
STARTED: 7/18/14
COMPLETED: 7/18/14
BACKFILLED: 7/18/14

Geotechnical Investigation
Lot 77 of Powder Mountain Resort
8443 East Spring Park
Weber County, Utah
Project Number 01628-006

IGES Rep: SL
Rig Type: trackhoe

TEST PIT NO: TP-1-s
Sheet 1 of 1

LOCATION
LATITUDE 41.36257 LONGITUDE -111.74771 ELEVATION 8,555

DEPTH FEET	ELEVATION	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0					GC	Clayey GRAVEL - 70% cobbles - dense, moist, dark brown, heavy roots in upper 3.5 feet, cobbles up to 8 inches in diameter, sub-rounded reddish brown clayey matrix, clast-supported						
					GC	- %60 cobbles - reddish brown, cobbles up to 6 inches in diameter						
5	8550					- cobbles and boulders up to 24 inches in diameter with a reddish brown lean clay matrix, clast-supported		10.7				●
10	8545					No groundwater encountered Bottom of Test Pit @ 11 Feet						

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

FIGURE A - 3

LOG OF TEST PITS (A) -(4 LINE HEADER W ELEV) 01628-006 LOT 77.GPJ IGES.GDT 8/6/14

DATE
STARTED: 7/2/12
COMPLETED: 7/2/12
BACKFILLED: 7/2/12

Geotechnical Investigation
Summit LLC
Powder Mountain Development
Weber County, Utah
Project Number 01628-001

IGES Rep: JMG
Rig Type: Kubota KX080-3

TEST PIT NO:
TP-05-c
Sheet 1 of 1

LOCATION
LATITUDE 41.36248 LONGITUDE 111.74710 ELEVATION (ft) 8,488

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0				ML	Gravelly SILT - stiff, dry, light brown, some cobbles						
					SM	Silty SAND with gravel - 20% cobbles - dense, slightly moist, light reddish brown, some boulders up to 30 inches throughout						
1												
	5				GC	Clayey GRAVEL with sand - 20% cobbles - dense, moist, reddish brown		10.6		27	10	●
2					GC-GM	Silty Clayey GRAVEL with sand - 20% cobbles - dense, moist, reddish brown						
						Bottom of test pit @ 9 Feet						
3	10											

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:
No ground water encountered

Figure A - 7

LOG OF TEST PITS (A) - (4 LINE HEADER) 01628-001 TEST PITS.GPJ IGES.GDT 11/7/12

DATE
STARTED: 7/3/12
COMPLETED: 7/3/12
BACKFILLED: 7/3/12

Geotechnical Investigation
Summit LLC
Powder Mountain Development
Weber County, Utah
Project Number 01628-001

IGES Rep: DAG
Rig Type: Kubota KX080-3

TEST PIT NO: TP-06-c
Sheet 1 of 1

LOCATION
LATITUDE 41.36262 LONGITUDE 111.74601 ELEVATION (ft) 8,506

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0				GM	Silty GRAVEL with sand - 50% gravel, cobbles, and boulders - medium dense, moist, reddish brown, subrounded gravel, cobbles and boulders up to 3 feet in silty sand matrix, easy to excavate, homogenous appearance - uniform from top to bottom						
1												
	5					- matrix classifies as SM		9.7	35.7			●
2												
3	10					Bottom of test pit @ 8 Feet						

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:
No ground water encountered

Figure A - 8

LOG OF TEST PITS (A) - (4 LINE HEADER) 01628-001 TEST PITS.GPJ IGES.GDT 11/7/12

DATE
STARTED: 10/8/12
COMPLETED: 10/8/12
BACKFILLED: 10/8/12

Geotechnical Investigation
Summit LLC
Powder Mountain Development
Weber County, Utah
Project Number 01628-003

IGES Rep: BMJ
Rig Type: Komatsu Tracked Hoe

TEST PIT NO: TP-21-c
Sheet 1 of 1

LOCATION
LATITUDE 41.36670 LONGITUDE -111.75050 ELEVATION (ft) ~8683

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0				SM	Silty SAND with gravel, medium dense, slightly moist, medium brown, clasts range from approximately ¼-inches to 2 feet in diameter, roots in upper 2 to 4 inches						
1					GM	Silty GRAVEL with sand, medium dense, slightly moist, tan, clasts range from approximately ¼-inches to 3 feet in diameter, sub-angular clasts						
	5					Small lenses of Lean CLAY (CL) with gravel, reddish brown, lenses do not appear continuous						
2												
3	10				CL	Lean CLAY with gravel, stiff, moist, reddish-brown, clasts range from approximately ¼-inches to 6 feet in diameter, clasts are sub-angular to sub-rounded						
4						Moisture increases with depth				34	16	
	15					No Groundwater Encountered Bottom of test pit @ 14.5 Feet						
5												
6												

LOG OF TEST PITS (A) - (4 LINE HEADER) 01628-003 TEST PIT LOGS.GPJ IGES.GDT 11/7/12

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Figure A - 24

DATE
STARTED: 10/8/12
COMPLETED: 10/8/12
BACKFILLED: 10/8/12

Geotechnical Investigation
Summit LLC
Powder Mountain Development
Weber County, Utah
Project Number 01628-003

IGES Rep: BMJ
Rig Type: Komatsu Tracked Hoe

TEST PIT NO: TP-22-c
Sheet 1 of 1

LOCATION
LATITUDE 41.36380 LONGITUDE -111.74820 ELEVATION (ft) ~8632

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0				GM	Silty GRAVEL with sand, medium dense, slightly moist, tan-brown, roots in upper 2 to 4 inches, clasts range from approximately ¼-inches to 3 feet in diameter, clasts sub-angular to sub-rounded					
1	5										
2						Color orange-brown, gravel up to 5 feet in diameter					
3	10								24.9		
4						No Groundwater Encountered Bottom of test pit @ 13 Feet					
	15										
5											
6											

Moisture Content and Atterberg Limits

Plastic Limit | Moisture Content | Liquid Limit

10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 01628-003 TEST PIT LOGS.GPJ IGES.GDT 11/7/12

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Figure A - 25

RABA KISTNER

Engineering • Testing • Environmental
Facilities • Infrastructure

1046 South 1680 West
Orem, Utah
P:(801)653-3120
F:(801)224-0365
www.rkci.com
TBPE Firm Number 3257

BORING LOCATION MAP

Powder Mountain
Water Storage Tank
Powder Mountain Resort
Utah

REVISIONS No.	Date	Description

PROJECT NO.:	AUA-13-046-00
ISSUE DATE:	6/25/2013
DRAWN BY:	TRG
CHECKED BY:	
REVIEWED BY:	AS

FIGURE

1

NOTE: This Drawing is Provided for Illustration Only. May Not be to Scale and is Not Suitable for Design or Construction Purposes

LOG OF BORING NO. B-1

Water Storage Tank
Powder Mountain
Utah

RABA KISTNER
TBPE Firm Registration No. F-3257

DRILLING METHOD: Air Rotary

LOCATION: See Figure 1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	SHEAR STRENGTH, TONS/FT^2 (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0) PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70 80)	PLASTICITY INDEX	% -200
			Fill - clayey gravel with cobble boulders, 2' diameter				9	46
5			Silty Gravel with Clay - very dense, moist, red-brown	13				
10			-2' diameter rock encountered with 6" gap between boulders	50/4"				
15			-decrease in cobbles/boulders/increase in angular gravel, yellowish color change	98/10"			NP	10
20			-encountered boulder - softened up between 24' - 25'	88/9"			NP	21
25			Silty Gravel with Clay - very dense, moist, red-brown	98			NP	27
			-decrease in gravels - @29' hit large rock, 12" diameter				4	
30			-sample of cuttings taken at 28'	94/7"			6	32
			- @33' hit large rock for 1.5' followed by 8" sandstone followed by another boulder @ 34' for 10" - Interchanging between boulder/sandstone/boulder					

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED:	60.0 ft	**DEPTH TO WATER:**		**PROJ. No.:**	AUA-13-046-00
DATE DRILLED:	6/13/2013	**DATE MEASURED:**	6/13/2013	**FIGURE:**	1a

LOG OF BORING NO. B-1

Water Storage Tank
Powder Mountain
Utah

RABA KISTNER
TBPE Firm Registration No. F-3257

DRILLING METHOD: Air Rotary

LOCATION: See Figure 1

DEPTH, FT	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT, pcf	PLASTICITY INDEX	% -200
	Silty Gravel with Clay - very dense, moist, red-brown	50/5"		NP	
	-dense drilling				
	-sample of cuttings taken at 38'				
40		50/3"			
	-cutting sample taken at 42' - 44'			NP	
45	-cobbles and boulders interchanging - 2' -3' max diameter, 2" - 6" clay layers between cobbles	50/3"			
	-sample of cuttings taken at 48'			NP	
50		50/2"			
55		50/4"			
	-cobbles end ~ 56' - gravels increase				
	-sample of cuttings taken between 50' - 55'				
60	Boring Terminated	50/3"			
65					

SHEAR STRENGTH, TONS/FT^2: 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT: 10 20 30 40 50 60 70 80

NOTE: THESE LOGS SHOULD NOT BE USED SEPARATELY FROM THE PROJECT REPORT

DEPTH DRILLED:	60.0 ft	**DEPTH TO WATER:**		**PROJ. No.:**	AUA-13-046-00
DATE DRILLED:	6/13/2013	**DATE MEASURED:**	6/13/2013	**FIGURE:**	1b

APPENDIX C

Direct Shear Test for Soils Under Drained Conditions

(ASTM D3080)

Project: Powder Mountain Development
No: 01628-002
Location: Powder Mountain Resort
Date: 11/1/2012
By: JDF

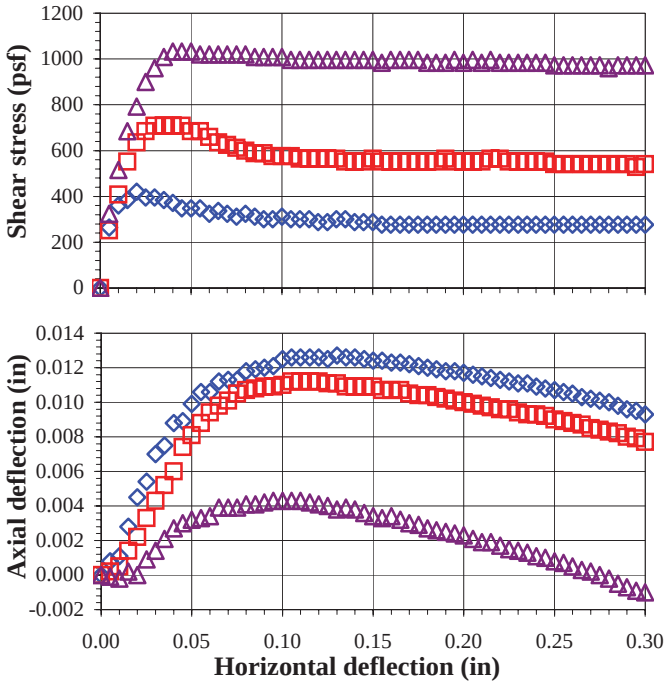
Boring No.: TP-16
Sample:
Depth: 6'
Sample Description: Brown clayey gravel
Sample type: Laboratory compacted
Dry unit weight 118 pcf
at 8.9 (%) w
Compaction specifications: 95% of ASTM D698B

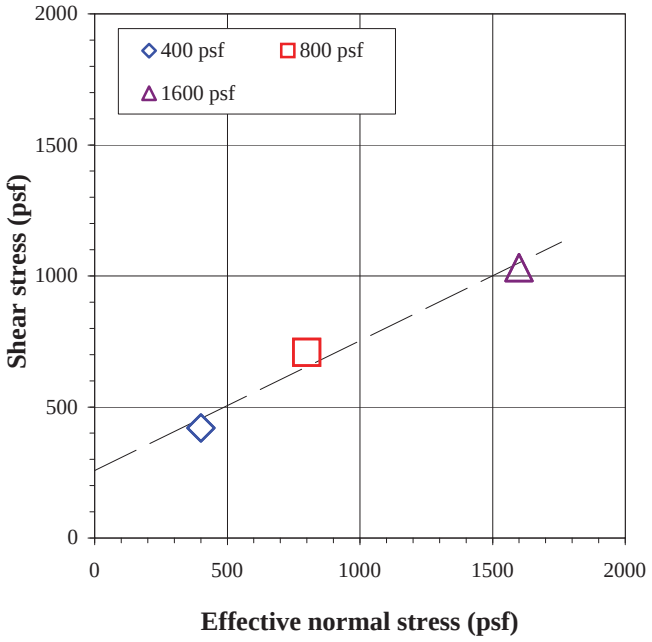
Test type: Inundated
Horizontal deformation (in.): 0.3
Shear rate (in./min): 0.0043

	Sample 1		Sample 2		Sample 3	
Effective normal stress (psf)	400		800		1600	
Peak shear stress (psf)	420		708		1032	
Horizontal deformation at peak(in)	0.020		0.030		0.040	
	Initial	Final	Initial	Final	Initial	Final
Sample height (in)	1.0000	1.0166	1.0000	1.0058	1.0000	0.9930
Sample diameter (in)	2.416	2.416	2.416	2.416	2.416	2.416
Wt. rings + wet soil (g)	197.22	208.08	197.94	208.57	199.78	209.78
Wt. rings (g)	42.46	42.46	43.18	43.18	45.02	45.02
Wet soil + tare (g)	336.40	184.29	336.40	183.56	336.40	184.35
Dry soil + tare (g)	319.10	161.35	319.10	160.86	319.10	162.23
Tare (g)	120.73	21.05	120.73	20.67	120.73	21.78
Water content (%)	8.7	16.4	8.7	16.2	8.7	15.7
Dry unit weight (pcf)	118.3	116.4	118.3	117.6	118.3	119.1

ϕ' (deg)	26
c' (psf)	258

Average of 3 samples	Initial	Final
Water content (%)	8.7	16.1
Dry unit weight (pcf)	118.3	117.7





Comments:
Specimens swelled upon inundation.

Entered by:_____
Reviewed:_____

Direct Shear Test for Soils Under Drained Conditions

(ASTM D3080)

Project: Powder Mountain
No: 01628-001
Location: Weber County
Date: 7/12/2012
By: JDF

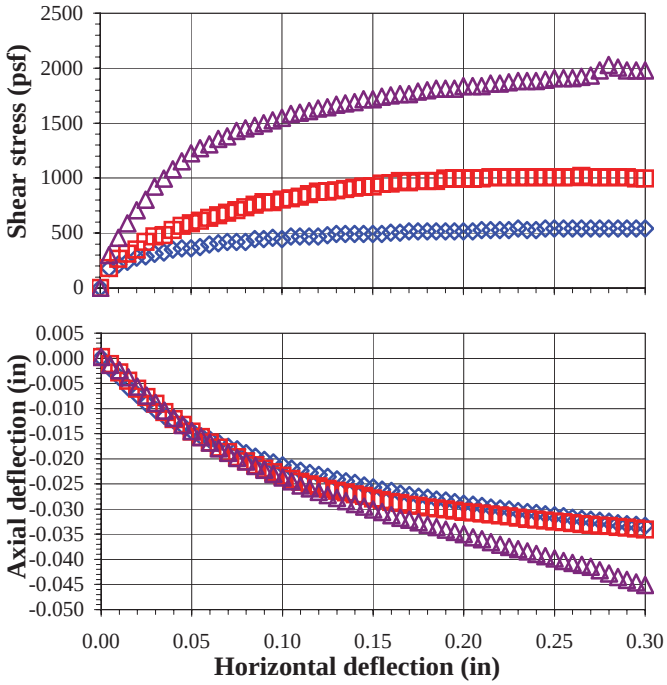
Boring No.: TP-03
Sample:
Depth: 2'
Sample Description: Brown clay with sand and gravel
Sample type: Undisturbed-trimmed from thin-wall

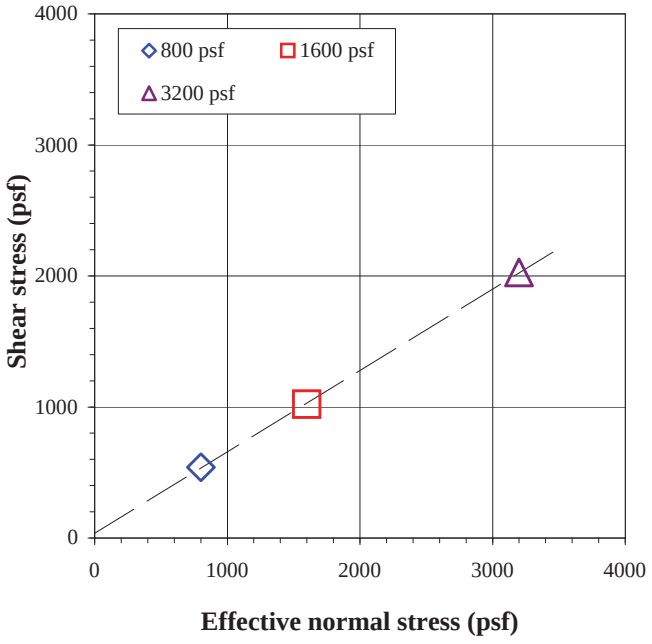
Test type: Inundated
Horizontal deformation (in.): 0.3
Shear rate (in./min): 0.0042

	Sample 1		Sample 2		Sample 3	
Effective normal stress (psf)	800		1600		3200	
Peak shear stress (psf)	540		1020		2028	
Horizontal deformation at peak(in)	0.230		0.265		0.280	
	Initial	Final	Initial	Final	Initial	Final
Sample height (in)	1.0000	0.9448	1.0000	0.8496	1.0000	0.8214
Sample diameter (in)	2.416	2.416	2.416	2.416	2.416	2.416
Wt. rings + wet soil (g)	165.19	170.32	151.32	154.25	155.36	157.23
Wt. rings (g)	43.28	43.28	43.18	43.18	42.03	42.03
Wet soil + tare (g)	325.73	145.41	325.73	132.97	325.73	136.26
Dry soil + tare (g)	285.92	116.52	285.92	108.27	285.92	112.02
Tare (g)	126.75	21.07	126.75	21.30	126.75	22.49
Water content (%)	25.0	30.3	25.0	28.4	25.0	27.1
Dry unit weight (pcf)	81.0	85.8	71.9	84.6	75.3	91.7

ϕ' (deg)	32
c' (psf)	36

Average of 3 samples	Initial	Final
Water content (%)	25.0	28.6
Dry unit weight (pcf)	76.1	87.4





Entered by:_____
Reviewed:_____