REPORT
GEOLOGICAL STUDY
PROPOSED VIA CORTINA
ACCESS ROADWAY EXTENSION
THE SUMMIT AT SKI LAKE PHASE 13
WEBER COUNTY, UTAH

Submitted To:

Mr. Ray Bowden
c/o Great Basin Engineering
Attention: Mr. Mark E. Babbitt, PE PLS
5746 South 1475 East Street
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Submitted By:

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December 9, 2015

Job No. 0582-24N-15

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Mr. Ray Bowden
C/O: Great Basin Engineering, Inc.
5746 South 1475 East Street
Ogden, Utah 84403

Attn: Mr. Mark E. Babbitt, PE PLS

RE: Geological Study
Proposed Via Cortina Access Roadway Extension
The Summit at Ski Lake Phase 13, Weber County, Utah
(Parts of Section 24, Township 6 North, Range 1 East, Salt Lake base and meridian)

1. INTODUCTION

In response to your request, GSH Geotechnical, Inc (GSH) has prepared this Geological Study for proposed roadway construction referenced above. The area of the proposed roadway construction consists approximately 750 feet of residential access roadway that is being constructed for the Summit at Ski Lake Phase 13 Subdivision. The proposed subdivision is located in the vicinity of Huntsville Town, Weber County, Utah (41.2429, -111.7884). The general Summit at Ski Lake development area is located on the south side of Utah SR-39 between MP-16.6 and -17.4, and entirely within Section 24, T6N-R1E SLBM, as shown on Figure 1, Vicinity Map. The Summit at Ski Lake Phase 13 is to consist of five residential development lots roughly one-acre or greater in area, comprising a total area of approximately 9.3 acres. Previous phases of the Summit at Ski Lake development are established to the north and down slope of the proposed Phase 13 parcel. The development of Phase 13 includes preparation of the lots for residential structures and service, and the construction of the Via Cortina access roadway extension which is currently in preliminary stages of construction along the south side of the development parcel, as shown on Figure 2, Aerial Coverage. The general area of the proposed Phase 13 parcel and the Via Cortina access roadway extension includes sloping surfaces on the order of 20-pecent to 32-percent.

General roadway construction and grading plans prepared by Great Basin Engineering (2015) have been reviewed for this study. The Via Cortina access roadway extension is to consist of an approximately 750 foot long lineal extension of roadway beginning on the west side of Ski Lake Phase 12 and extending westward across the Phase 13 project, traversing a north-facing side slope, and terminating at a turnaround cul-de-sac on the west side of Phase 13. Typical planned roadway sections for the extension include general right of way (ROW) widths of 50 feet or greater depending on cut and fill elevations for the roadway interval, with paved sections 24 to 28 feet in width generally centered within the ROW. Cut slopes on the upslope side of the roadway will be retained with stacked block wall systems. Fill slopes no steeper than two-horizontal to one-vertical will support the downslope side of the roadway. The cul-de-sac on the west end of the roadway extension will consist of a pavement radius of approximately 84 feet.

1.1 Weber County Natural Hazards Overlay Districts

Because the proposed Via Cortina access roadway extension is located on a sloping hill side area with susceptible expansive soil and rock conditions, Weber County (Planning Commission) has requested that geological studies be conducted to evaluate conformance with development plans.

At this time, specific guidelines for these studies have not been specified by the County, however Weber County Code Section 104-27-2, Potential Hazards (Weber County Code, 2015), pertaining to Landslide/Tectonic Subsidence provides the following requirements:

> ... *any development proposed within a designated landslide hazard area, as delineated on the Sensitive Lands Overlay District maps, shall require the submittal, review and approval by the planning commission, of specific site studies, including grading plans, cut/fill, and plans produced by a qualified engineering geologist and a Utah licensed geotechnical engineer. The site specific study shall address slope stability (including natural or proposed cut slopes), evaluate slope-failure potential, effects of development and recommendations for mitigative measures. Slope stability analysis shall include potential for movement under static, development-induced and earthquake-induced conditions as well as likely groundwater conditions.*

Sensitive Lands Overlay District maps addressing Landslide/Tectonic Subsidence zones for Weber County is not available for the site. A review of site geological mapping prepared by Utah Geological Survey (UGS) geologists (King, et al, 2008), has indicated that neither the Phase 13 parcel or the proposed Via Cortina access roadway extension is within mapped "landslide deposits." Based upon our review of the mapping, the Phase 13 parcel and roadway extension area is almost entirely underlain by Tertiary age Norwood Tuff formation (Tn) rocks (King, et al., 2008).

To further address the expectations of the Weber County Planning and Engineering Staff a scoping meeting was held between the Summit at Ski Lake proponents and Weber County Staff for November 17, 2015. A November 13, 2015 e-mail communication from Mr. Chad Meyerhoffer of Weber County Engineering staff regarding the scoping meeting provided the following paraphrase concerning the purpose of the scoping meeting:

> *Scoping Meeting: The developer or consultant should schedule a scoping meeting with the Weber County to evaluate the engineering geologist's/geotechnical engineer's investigative approach. At this meeting, the consultant should present a work plan that includes locations of anticipated geologic hazards and locations of proposed exploratory excavations, such as trenches, borings, CPT soundings, etc., which meet the minimum standard of practice. The investigation approach should allow for flexibility due to unexpected site conditions. Field findings may require modifications to the work plan*

1.2 Scoping Meeting and Revised Work Plan

The following individuals were present for the November 17, 2015 scoping meeting with Weber County Planning and Engineering Staff:

Chad Meyerhoffer (Weber County Engineering)
Dana Schuler PE (Weber County Engineering)
David Simon PG, (Simon and Associates), Weber County Geological Consultant (teleconference)
Greg Schlenker, PG, GSH Geoterchnical Inc., Applicant Geological Consultant.
Andrew Harris, PE, GSH Geotecnical Inc., Applicant Geotechnical Engineering Consultant
Mark E. Babbitt, PE PLS Great Basin Engineering, Applicant Engineering Consultant.

During this meeting the scale of the investigation was discussed, and it was clarified by all present that the scope of the investigation was to evaluate the engineering geological conditions of the Via Cortina roadway extension and not the Phase 13 residential development lots. The development lots are to be evaluated later on an individual lot by lot basis.

Based upon the discussions from the scoping meeting, GSH was approved to conduct an engineering geology evaluation of the Summit at Ski Lake Phase 13 Via Cortina access roadway extension. This evaluation is to focus on the existing Via Cortina roadway construction excavation (cut). A preliminary layout of our proposed roadway cut sections to be evaluated for this study is shown on Figure 3, Work Plan. Our proposed study effort was to include; 1) a search and review of previous relevant documentation of site engineering and geologic studies and including UGS mapping (King, et al, 2008), and reports and studies prepared by others (Applied GeoTech, 2013; KPS and Associates, Inc., 2001); 2) a field reconnaissance study including the geologic logging of existing roadway cuts exposed by Via Cortina extension construction; 3) site specific geological mapping and classification to identify critical geological units and exposure of proposed roadway improvements; 5) slope analysis from DEM-LiDAR geoprocessing identifying critical areas of 25-percent or greater across the site; and 6) preparation of this summary report presenting results of our analysis.

During the course of our field operations, an area of stability concern was identified on the site, and four test pits as shown on Figure 3 were amended to this study on December 1, 2015.

2. INVESTIGATIONS

2.1 Field Program

GSH conducted field operations at the site on the dates November 19, 20, and 23, 2015 and again on December 1, 2015. The field program involved the geological logging of the exposed cut face for the construction of the Via Cortina roadway, and the excavation, logging, and sampling of four "walk-in" test-pits/trenches at locations shown on Figure 3, Work Plan. The exposed cut and test pits were logged to characterize site subsurface/geologic and groundwater conditions for the proposed roadway and recover soil samples for laboratory testing (if required). The exposed Via Cortina road cut consisted of a 700 foot long section of continuous vertical wall exposure 5.0 to 18.0 feet in height, and the test pits/trenches consisted of short approximately 30 to 40-foot long trenches 5.0 to 15.0 feet in depth (the Test Pit 4 location consisted of an existing open cut utility excavation and was logged as a test pit). The cut and the test pits were logged so as to illustrate the vertical and lateral characteristics and variations of soil and rock conditions underlying the site and proposed roadway extension. The test pits were excavated using a 20-ton class excavator with a 24-inch bucket. In addition to the observations of the cut and excavations, the general surface of the site and surrounding area was reconnoitered to assess geological conditions.

Our field program was conducted by Dr. Greg Schlenker PG of our geotechnical staff and Mr. Robert Gifford, also of our geotechnical staff, visited the site to assist Dr. Schlenker and to collect soil samples from the test pits for laboratory geotechnical testing.

The soils and geology in the test pits were classified in the field based upon visual and textural examination, and interpretation of geologic site formation processes. These classifications have been supplemented by subsequent inspection in our laboratory. Detailed graphical representations of the subsurface conditions encountered are presented on Figures 5-A through 5-H, Log of Road Cut, and Figures 6-A and 6-B Log of Test Pits. The soil and rock units observed on the cut and in the test pits were classified in accordance with the Unified Soil Classification System (USCS), and were further classified on the basis of geological site formation processes.

Bulk and thin wall samples of representative soil layers encountered in the test pits were obtained in sealable bags and/or were recovered undisturbed using driven sample tubes. The results of our laboratory analysis and testing of the soils recovered from the test pits will be included in subsequent correspondence. Groundwater was not observed in any of the excavations or test pits during the dates of our field program.

2.2 Slope Analysis

Although specific slope stability analysis was not conducted as part of this current study, an analysis to characterize and inventory the site slopes for the purpose for development planning was conducted. Elevation data consisting of 2.0 meter LiDAR digital elevation data (DEM), for the site was obtained from Utah Automated Geographic Reference Center (AGRC). This data was geo-processed using the QGIS® GIS platform, and using the r.slope, r.shaded.relief and r.contour.level GRASS® (Geographic Resources Analysis Support System) modules. Slope percentages, renderings and elevation contours were calculated for the site area.

Figure 7, Slope Analysis, presents the results of our slope analysis efforts. Shown on Figure 7 are the slope percentage gradients across the site. The critical gradient for slope development considerations according to the Weber County Section 108-14-3 (Weber County Code, 2015), includes slopes greater that 25-percent.

3. SITE CONDITIONS

The site conditions and site geology were interpreted through an integrated compilation of data including a review of literature and mapping from previous studies conducted in the area (Sorensen and Crittenden, 1979; Currey and Oviatt, 1985; Bryant, 1988; Coogan and King, 2001; and King et al., 2008), photogeologic analyses of 2012 and 2014 imagery shown on Figure 2 and Figure 3, and historical stereoscopic imagery flown in 1946. GIS analyses of elevation and geoprocessed DEM terrain data as discussed in the previous section (Slope Analysis) and shown on Figure 7, field reconnaissance of the general site area, and the interpretation of the 700 foot road cut presented on Figures 5-A to 5-H, and the four test pits excavated at the site and presented on Figures 6-A and 6-B as part of our field program. Seismic hazards information was developed from United States Geologic Survey (USGS) databases (Peterson, et al., 2008).

3.1 Surface

As shown on Figure 1 and 2, the site consists of an area of approximately nine acres that is currently vacant and undeveloped. Surface vegetation consists of open areas of grasses, weeds and sage brush evenly covered with wooded areas of scrub oak, alder and maple trees. The topography of the site consists of a rounded knoll with slopes on the property generally facing downward toward the north and northwest toward Ogden Valley. The top of the knoll on the adjacent property (south) is occupied by a 275,000 gallon water storage tank (KPS and Associates, Inc., 2001) and a communications antenna platform.

Topographically, the site is located on the base foothills on the northeast side of Mount Ogden, and overlooks Ogden Valley and the South Fork of the Ogden River floodplain, which is inundated by Pineview Reservoir waters, to the north of the site. The site, as shown on Figure 2, is bordered on the south, and east by vacant undeveloped lands, and on the north and west and by residential estate property land uses.

3.2 Geologic Setting

The site is located on the eastern flank of Mount Ogden of which the western flank comprises the Wasatch Front. The Wasatch Front is marked by the Wasatch fault, which is 7.0 miles to the west of the site, and provides the basis of division between the Middle Rocky Mountain Physiographic Province on the east and the Basin and Range Physiographic Province on the west.

The Basin and Range Physiographic Province is characterized by approximately north-south trending valleys and mountain ranges that have been formed by extensional tectonics and displacement along normal faults, and extends from the Wasatch Range on the east to the Sierra Nevada Range on the west (Hunt, 1967).

The Middle Rocky Mountain province covers parts of Utah, Colorado, Wyoming, Idaho, and Montana. The geology of the province is an assemblage of sedimentary, igneous, and metamorphic rocks that have been folded, faulted, and uplifted. Mountain building (orogenic) activity commenced about 30 million years ago (Cretaceous time) and continues to the present.

The province is characterized by mountainous terrain with deep canyons and broad intervening basins, with temperate semi-arid to mesic climatic conditions (Hunt, 1967).

The surficial geology of the site vicinity is the result of the uplift and exposure of older pre-Cambrian rocks which forms the crest of Mount Ogden to the west of the site. This exposure was the result of movement along high-angle faults during late Tertiary and Quaternary age (Bryant, 1988).

Bounding the east foothill flank of Mount Ogden are mid Tertiary units of the Norwood Tuff Formation that ramp along the base of the mountains south and west of the Mount Ogden Valley floor. The Norwood Tuff Formation is described as "light-gray to light brown, altered tuff (claystone), tuffaceous siltstone, sandstone, and conglomerate" derived from volcanic ash deposition (King, et al., 2008), and has been measured to be as much as 7000 feet thick in the vicinity of the site. The claystone, siltstone, and sandstone occurrences of the formation are primarily a result of lacustrine (lake processes) redeposition of the volcanic ash. The site location is largely underlain by Norwood Tuff Formation lacustrine rock units. The associated beds appear to slope gently down to the northeast across the site (King et. al, 2008). The existing surface of the site appears to have been modified by Quaternary age erosion, and localized late-Quaternary stream, lacustrine (Currey and Oviatt, 1985), residual soil weathering and development, and mass movement processes (King, et al., 2008).

3.3 Site Engineering Geology

Our interpretation of the site engineering geology is presented on Figure 4, LiDAR Coverage and Engineering Geology. The engineering geology shown on Figure 4 is largely based on previous mapping prepared by King, et al., (2008), with amendments to the mapping drawn on the basis of the findings of this study. A summary of the mapping units identified on the site vicinity are listed below in relative age sequence (youngest-top to oldest bottom):

Qmc; Landslide and slump, and colluvial deposits.
Qms; Landslide and slump deposits.
Qms-2015; Landslide and slump deposits (this study).
Tn; Norwood "Tuff" Formation.

In addition to the areal distribution of the geological deposits shown on Figure 4, a wave-cut shoreline attributed to the "Bonneville highstand" of ancient Lake Bonneville that was cut approximately 15,000 years ago (Currey and Oviatt, 1985), is shown to cross on the northwest and north sides of the site vicinity.

4. DISCUSSIONS AND RECOMMENDATIONS

4.1 Summary of Findings

4.1.1 Subsurface Observations:

The geology exposed by the road cut exposures and test pits, are depicted on Figure 5-A through 5-H and 6-A and 6-B. Generally, the upper one to three feet consists (where undisturbed) of surficial pedogenic A-B soil. Underlying the A-B soil horizons and extending in thickness as deep as nine to ten feet, -C vertisol sequenceswere encountered consisting of medium-stiff to stiff silts and clays derived from weathered rock and colluvial sources. At-depth rock sequences consisting of, *tuffaceous claystone, siltstone, sandstone,* and *breccia-conglomerate* were observed on the road cut exposure. These rock units, logged as shown on Figures 5-A to 5-H, generally consisted of moderate to thick bed units, (one to two feet in thickness) typically fining upward (sandstone-siltstone-claystone), colored light shades of buff, tan red and green and gray, and ranged from *weak* to *strong* in field test competency.

4.1.2 Expansive soils.

Vertical cracking associated with vertisol development was observed to extend from two to nine feet below the surface along the road cut exposures (Figure 5-A to 5-H) and within Test Pit, 4. The vertical cracking demonstrated by these soils is a result of naturally high expansive clay content within these soils (Graham and Southard, 1982). The presence or absence of the vertisol soils should be evaluated where structural loads are to be placed during future development.

4.1.3 Sloping Surfaces.

The surface of site slopes developed from our LiDAR analysis range from level to over 55-percent as shown on Figure 7, Slope Analysis. For the site, the slope areas averaged 29.8-percent for the Via Cortina ROW extension area, and 29.4-percent for the entire Phase 13 parcel area. As previously discussed in the Slope Analysis section of this report, the critical gradient for slope development considerations according to the Weber County Code is 25-percent.

4.1.4 Site Engineering Geology And Mapping

The engineering geology mapping of the site presented on Figure 4 reveals two issues pertinent to site development planning. These issues include: (1) **Landslide and slump deposits** (**Qms-2015)** - the presence of landslide and slump deposits **Qms-2105** deposits on the east side of the roadway extension and Phase 13 property; (2) **Norwood "Tuff" Formation (Tn)** - the presence of Norwood Tuff Formation **Tn** underlying much of the area comprising the roadway extension and Phase 13 parcel. These issues are addressed in order importance below:

1. **Landslide and slump deposits:** Presence of mass-movement landslide and slump deposits (**Qms-2015,** this study) is based upon developed field observations including: 1) deformation of rock beds observed and logged between STA 153 to 158 shown on Figure

5-C and 5-H; 2) the deep soil sequence (greater than15 feet) observed in Test Pits 2 and 3; 3) the highly fractured rock structures observed at the base of Test Pit 4; 4) the presence and location of the topographic swale evident on the LiDAR imagery on Figure 4; 5) the observed occurrence of deformed woody vegetation (pistol-butt tree stumps) within the swale area; and 6) the location of this swale relative our subsurface observations and the contagious areal relationship of this swale with Landslide and slump deposits **(**Qms) previously mapped by King, et al. (2008) immediately north of the site.

Based on our observations, the area of movement, **Qms-2015** shown on Figure 4 consists of a relatively shallow, up to approximately 15.0-feet in thickness, prism of soil beneath the proposed roadway that appears to have moved or "creeped" downslope in response to inherent weak and expansive soil characteristics, and moderately steep slope conditions in this area. Based upon our observations of the deformed woody vegetation within the swale, we believe that the shallow soil-creep movement may be presently active.

The contagiously mapped **Qms** deposit mapped by King et al., (2008) shown downslope of the site on Figure 4, is believed to have moved during late-Quaternary to possibly Holocene time (within the past 10,000 years). On the basis of areal morphostratgraphic relationships, these deposits appear to have moved since the formation of the lake Bonneville level shoreline shown on Figure 4, which was formed approximately 15,000 years ago (Currey and Oviatt, 1985).

Mitigation of the landslide and slump deposits within the right of way are recommended for the Via Cortina roadway extension. Removal and replacement of the affected soils within the roadway right of way along with improvements to the site surface drainage in this area will be required to maintain the integrity of the proposed roadway. Removed soils must be replaced with compacted structural fill meeting the requirements for composition and placement indicated in the referenced geotechnical study for the development (AGEC, 2013). Drainage within the delineated landslide and slump deposit must be improved to minimize the potential for saturation of the associated soils and slope. A cut-off drain installed within the right of way along with improved grading to prevent potential ponding of surface water must be designed as part of the final improvement plans for the development. Observation and design of remediation activities must be completed by GSH.

Site specific geological and geotechnical studies are required for individual lots with the proposed development. Based on the results of the current study for the proposed Via Cortina roadway extension, planning of further mitigation of landslide and slump features on the proposed building lots will be required.

2. Norwood Tuff Formation (Tn): The Norwood Tuff Formation has a notoriety of poor stability performance and geotechnically challenging soils throughout Northern Utah. Based upon our past experience with areas underlain by Norwood Tuff Formation rock and soil, we believe that appropriate geological/geotechnical studies should be conducted before structural improvements are made in those areas.

4.1.5 Geoseismic Setting

Utah municipalities have adopted the International Building Code (IBC) 2012. The IBC 2012 code determines the seismic hazard for a site based upon 2008 mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class (Peterson, et al., 2008). The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points).

Based on probabilistic estimates (Peterson, et al., 2008) queried for the site , the expected peak horizontal ground acceleration on rock from a large earthquake with a ten-percent probability of exceedance in 50 years is as high as 0.16*g*, and for a two-percent probability of exceedance in 50 years is as high as 0.33*g* for the site. Ground accelerations greater than these are possible but will have a lower probability of occurrence.

4.1.6 Active Earthqauke Faults

Based upon our review of available literature, no active faults are known to pass through or immediately adjacent to the site. The nearest active (Holocene) fault is the Weber Segment of the Wasatch fault, located 7.0 miles west of the site (Black et al., 2004). The Wasatch Fault Zone is considered capable of generating earthquakes as large as magnitude 7.3 (Arabasz, et al., 1992).

4.1.7 Liquefaction Potential Hazards

In conjunction with the ground shaking potential of large magnitude seismic events as discussed previously, certain soil units may also possess a potential for liquefaction during a large magnitude event. Liquefaction is a phenomenon whereby loose, saturated, granular soil units lose a significant portion of their shear strength due to excess pore water pressure buildup resulting from dynamic loading, such as that caused by an earthquake. Among other effects, liquefaction can result in densification of such deposits causing settlements of overlying layers after an earthquake as excess pore water pressures are dissipated. Horizontally continuous liquefied layers may also have a potential to spread laterally where sufficient slope or free-face conditions exist. The primary factors affecting liquefaction potential of a soil deposit are: (1) magnitude and duration of seismic ground motions; (2) soil type and consistency; and (3) occurrence and depth to groundwater.

Liquefaction commonly occurs in saturated non-cohesive soils such as alluvium, thus no areas of the Phase 13 site appears to be susceptible to liquefaction processes.

4.1.8 Alluvial Fan Deposits

Alluvial fan deposits indicative of processes including flash flooding and debris flow hazard do not occur on the site: The nearest active alluvial fan deposits to the site, mapped as Qafy by King, et al., (2008), are located on a small fan surface (<4.0 acres in area) approximately 700 feet southwest of the site, and do not appear to represent a potential impact the site.

4.1.9 Flooding Hazards

No significant water ways pass in the vicinity of the site and flood insurance rate mapping by Federal Emergency Management Agency for the site vicinity has not been prepared at this time.

4.1.10 Rockfall and Avalanche Hazards

The site is located a minimum of two miles from steep slope areas where rockfall and avalanche hazards may originate, therefore rockfall and avalanche processes do not appear to represent a potential impact the site.

4.2 Conclusions

Based upon our geological studies herein, we believe that the proposed Via Cortina access roadway extension is suitable for development as discussed in Section 1 of this report, provided the recommendations contained in this report are complied with. Based upon the results of this study we understand that the proposed subdivision and development lots comprising the Summit at Ski Lake Phase 13 subdivision will be permitted on a "restricted" status requiring additional studies specific to the individual building plans for each of the lots to be performed,. as specified in the Weber County Geologic Hazards Ordinance prior to development activities.

GSH

CLOSURE

If you have any questions or would like to discuss the results of this study further, please feel free to contact us at (801) 393 2012.

Respectfully submitted,

GSH Geotechnical, Inc.

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12/9/15
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Encl.	Figure	1,	Vicinity Map
	Figure	2,	Aerial Coverage
	Figures	3,	Work Plan
	Figure	4,	LiDAR Coverage and Engineering Geology
	Figure	5-A	to 5-H Log of Road Cut
	Figure	6-A	and 6-B Logs of Test Pits
	Figure	7,	Slope Analysis

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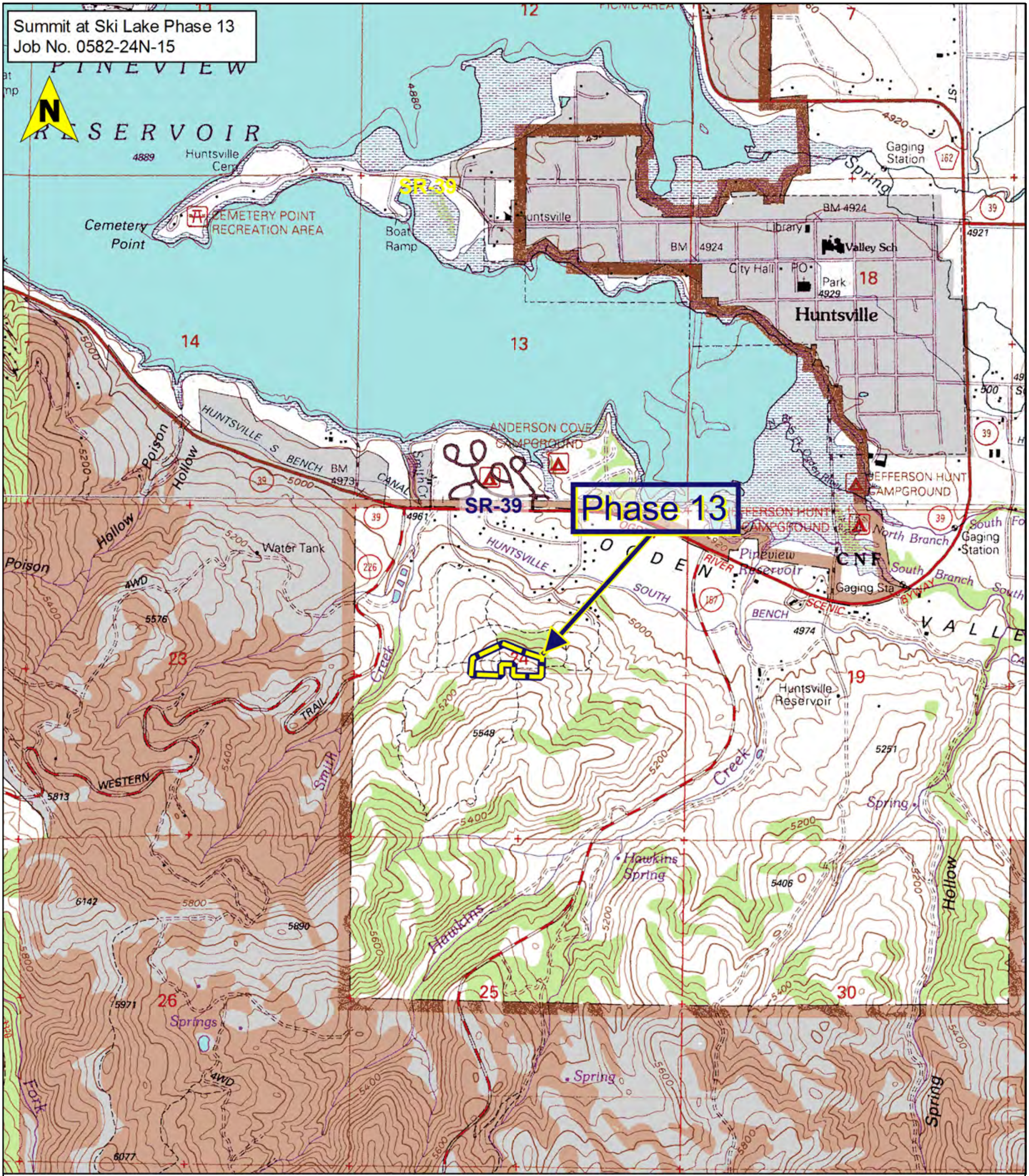


Base:
1998 7.5 Minute USGS Toporgraphic Maps Titled
Snowbasin, Utah, and Huntsville, Utah.

0 1000 2000 3000 4000 ft

1:24,000

FIGURE 1
VICINITY MAP

GSH

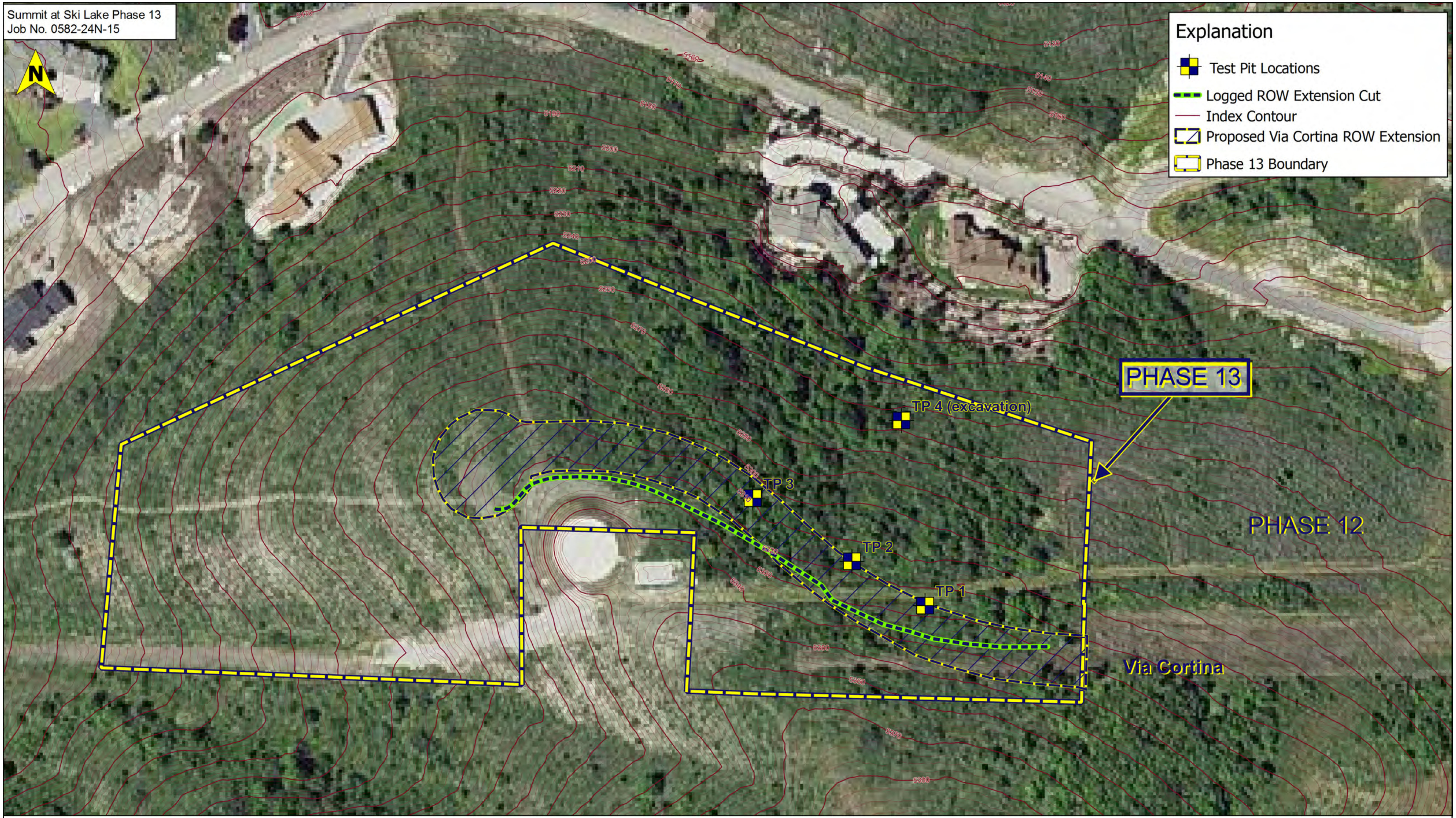
Base:
2014 1.0m Color NAIP Orthoimagery, from Utah AGRC; http://gis.utah.gov/

0 200 400 600 800 ft

1:4,800

FIGURE 2
AERIAL COVERAGE

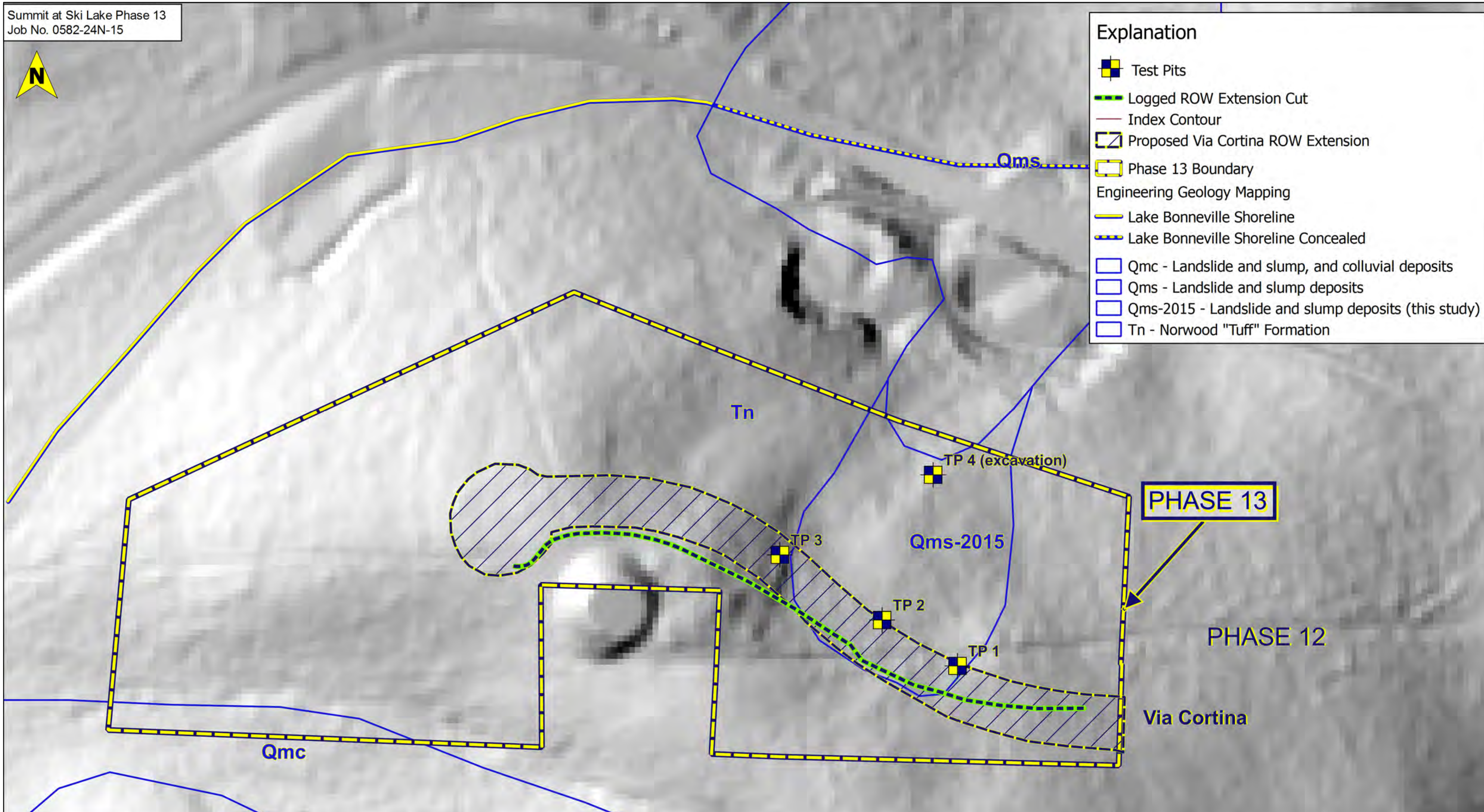
GSH



Base: 2014 1.0m Color NAIP Orthoimagery,
from Utah AGRC; http://gis.utah.gov/
Elevation: 2006 2.0m Geoprocessed LiDARfrom Utah AGRC;
http://gis.utah.gov/

FIGURE 3
WORK PLAN

GSH



Coverage-Elevation: 2006 2.0m Geoprocessed LiDARfrom Utah AGRC; http://gis.utah.gov/

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0 100 200 300 400 ft

1:1,200

FIGURE 4
LiDAR COVERAGE AND ENGINEERING GEOLOGY

GSH

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

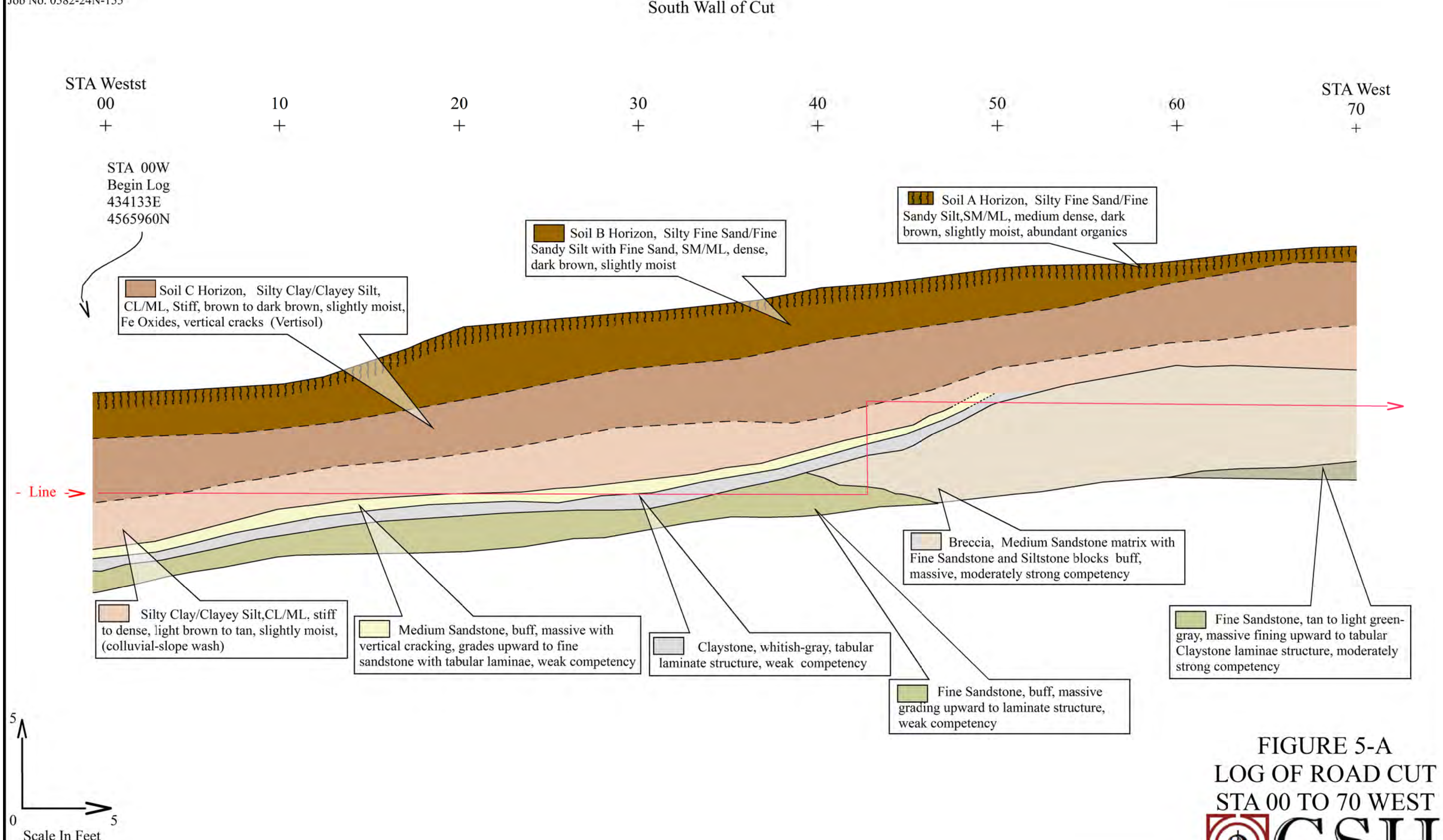


FIGURE 5-A
LOG OF ROAD CUT
STA 00 TO 70 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

South Wall of Cut

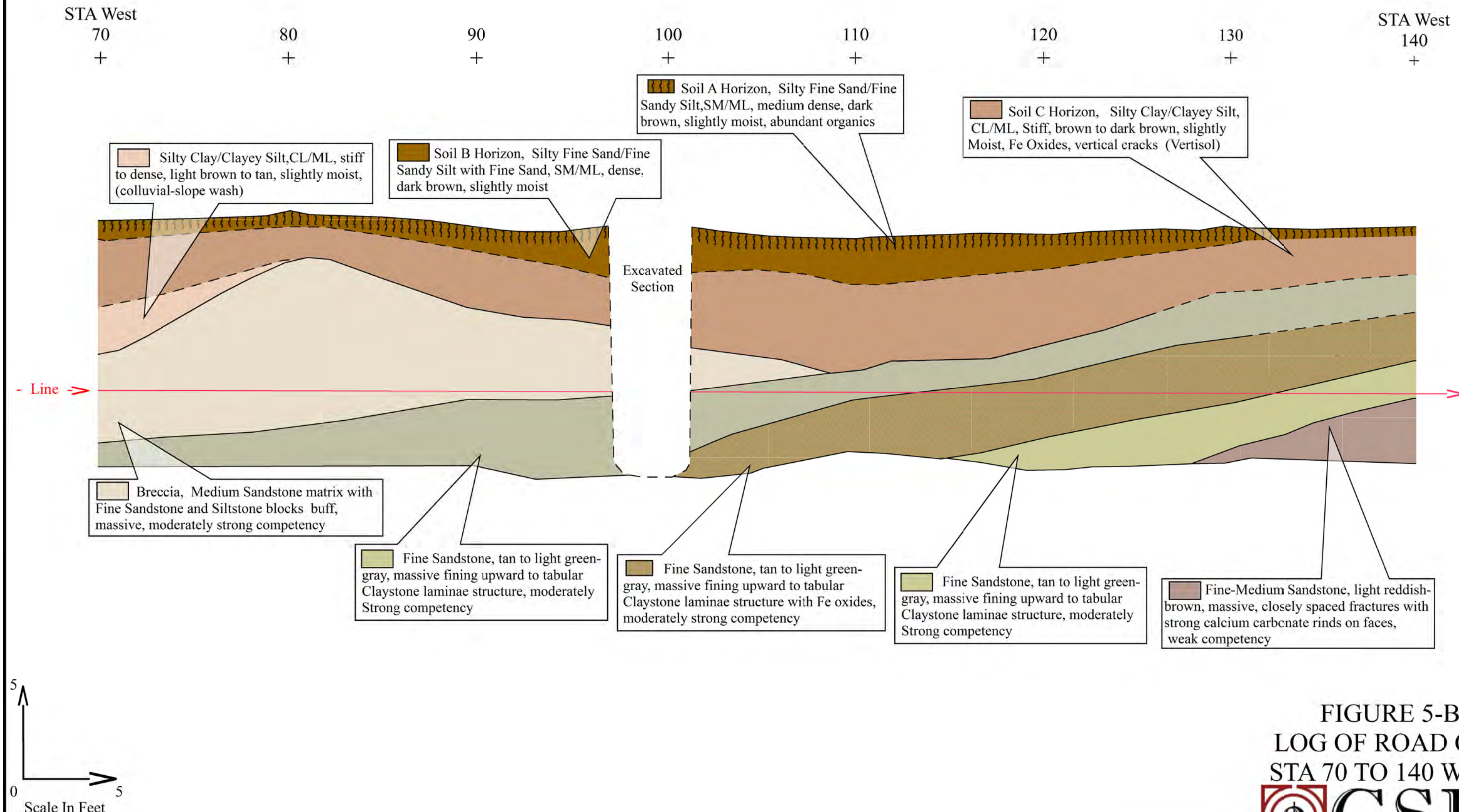


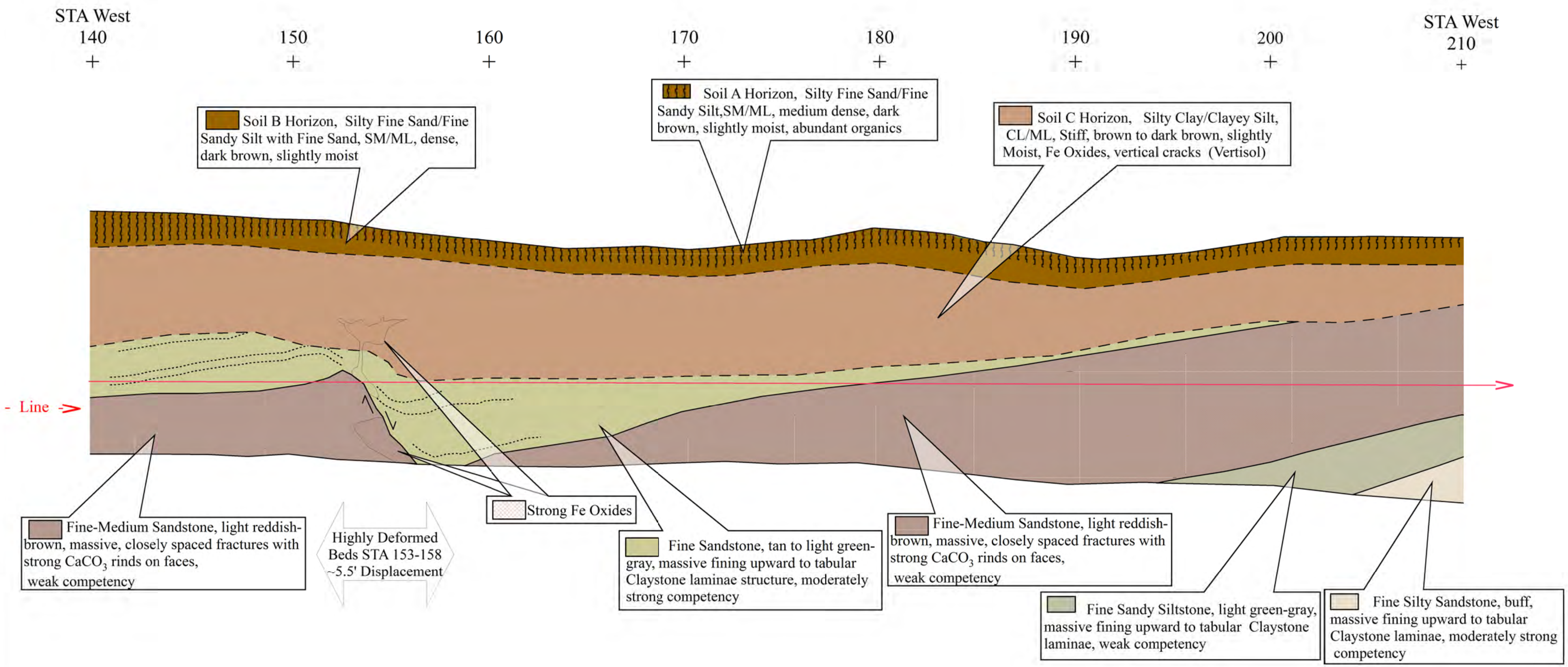
FIGURE 5-B
LOG OF ROAD CUT
STA 70 TO 140 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

South Wall of Cut



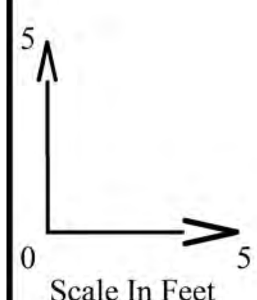


FIGURE 5-C
LOG OF ROAD CUT
STA 140 TO 210 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

South Wall of Trench

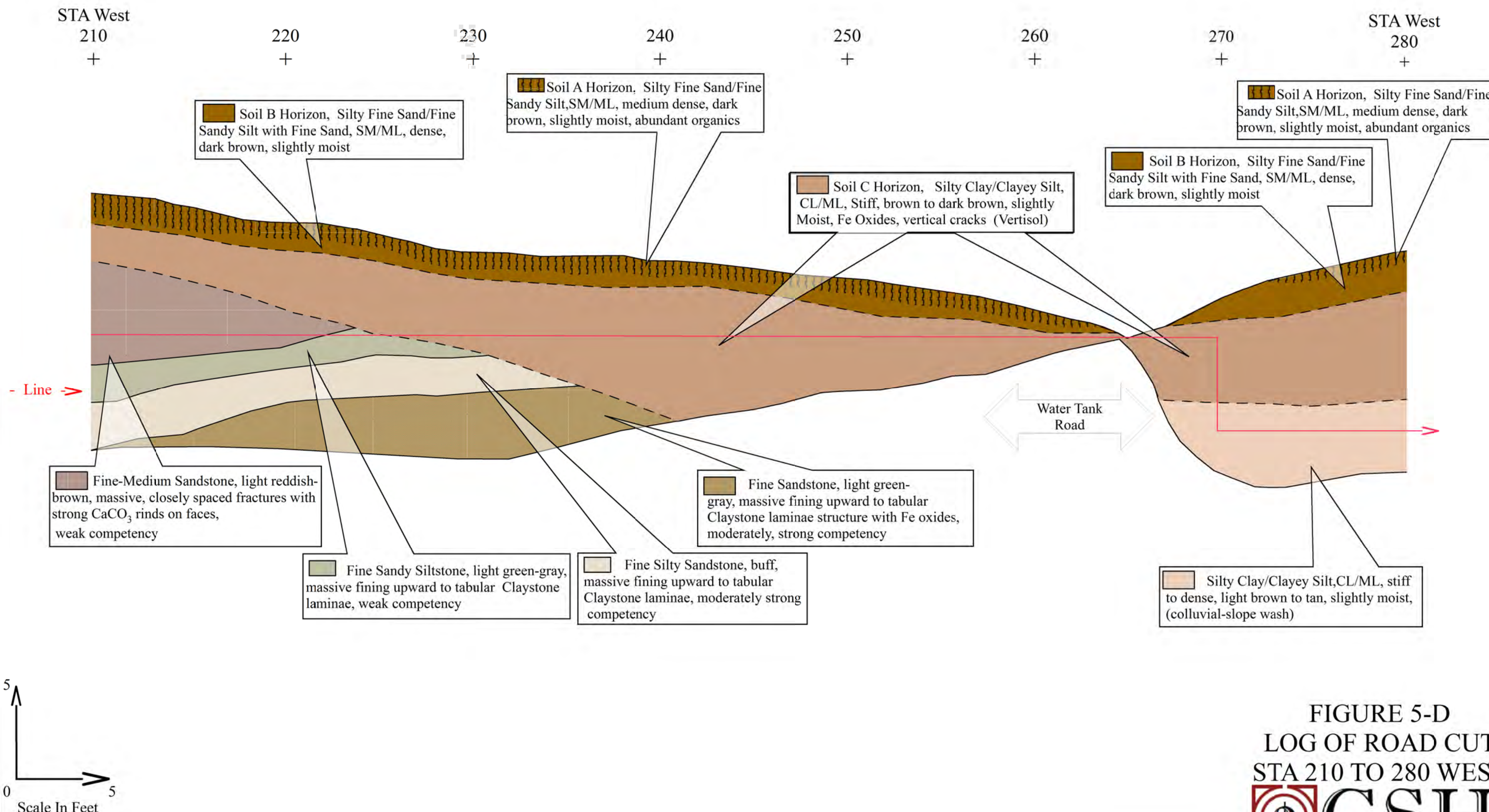


FIGURE 5-D
LOG OF ROAD CUT
STA 210 TO 280 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

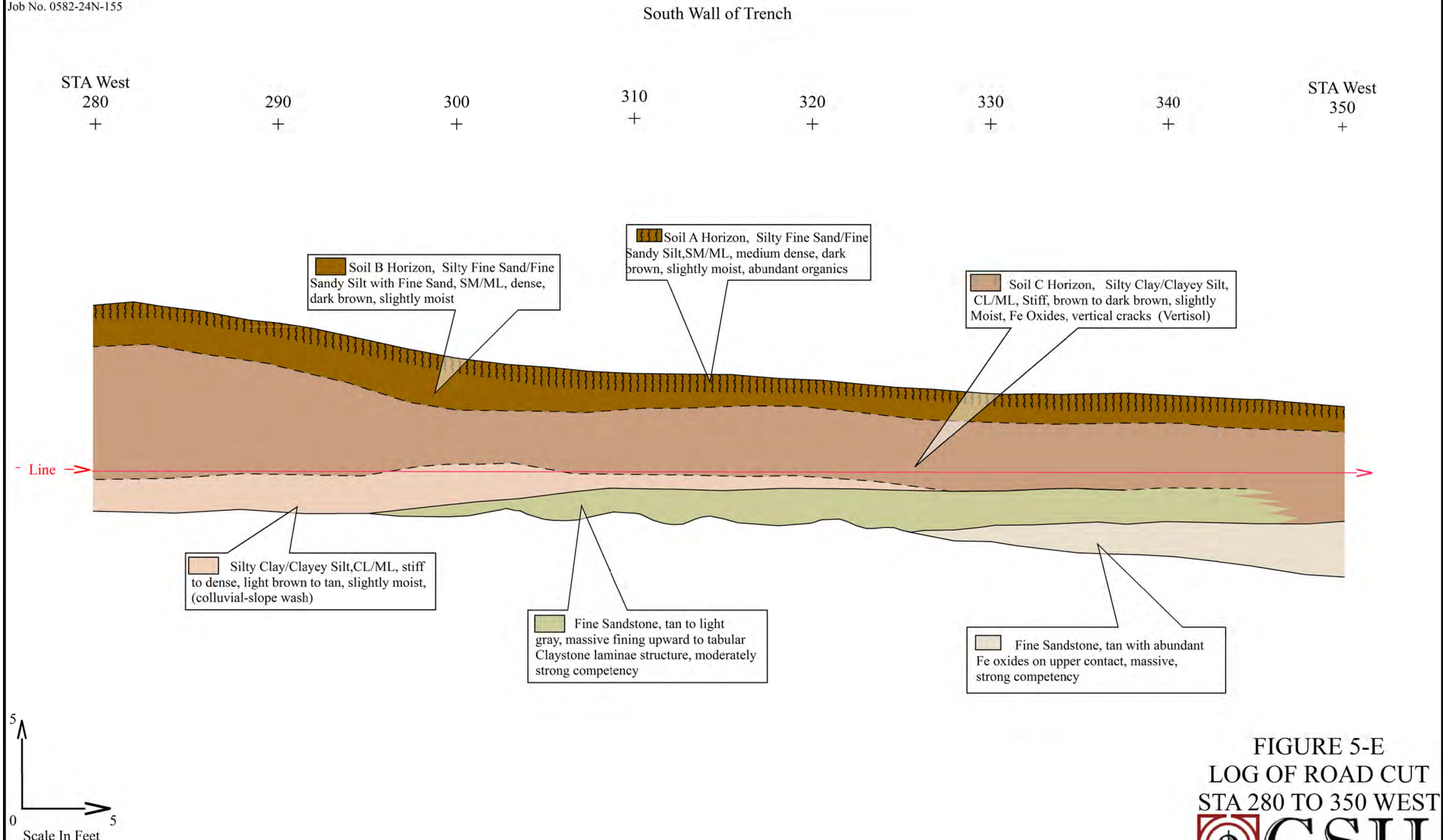


FIGURE 5-E
LOG OF ROAD CUT
STA 280 TO 350 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

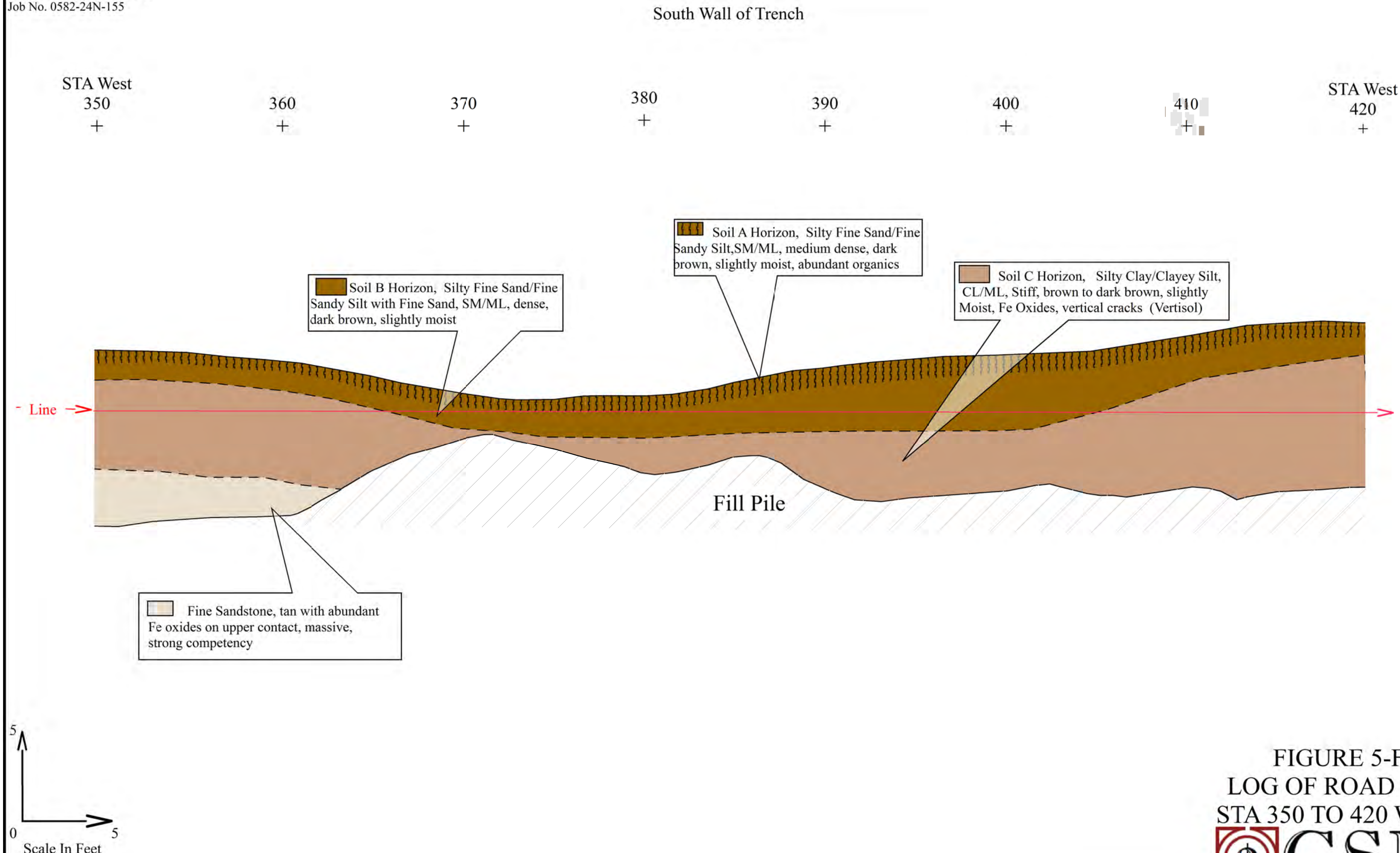


FIGURE 5-F
LOG OF ROAD CUT
STA 350 TO 420 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

South Wall of Trench

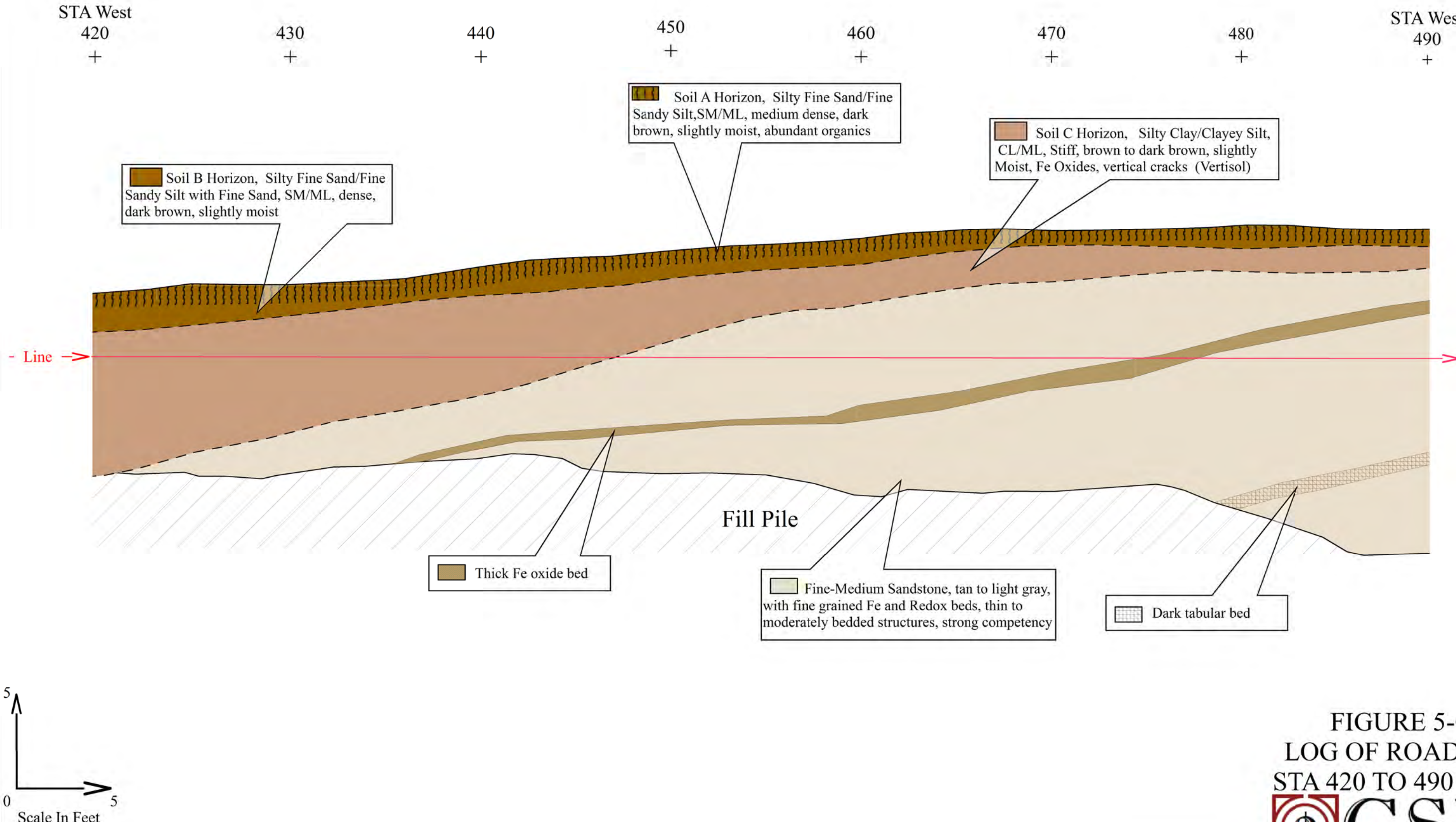


FIGURE 5-G
LOG OF ROAD CUT
STA 420 TO 490 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

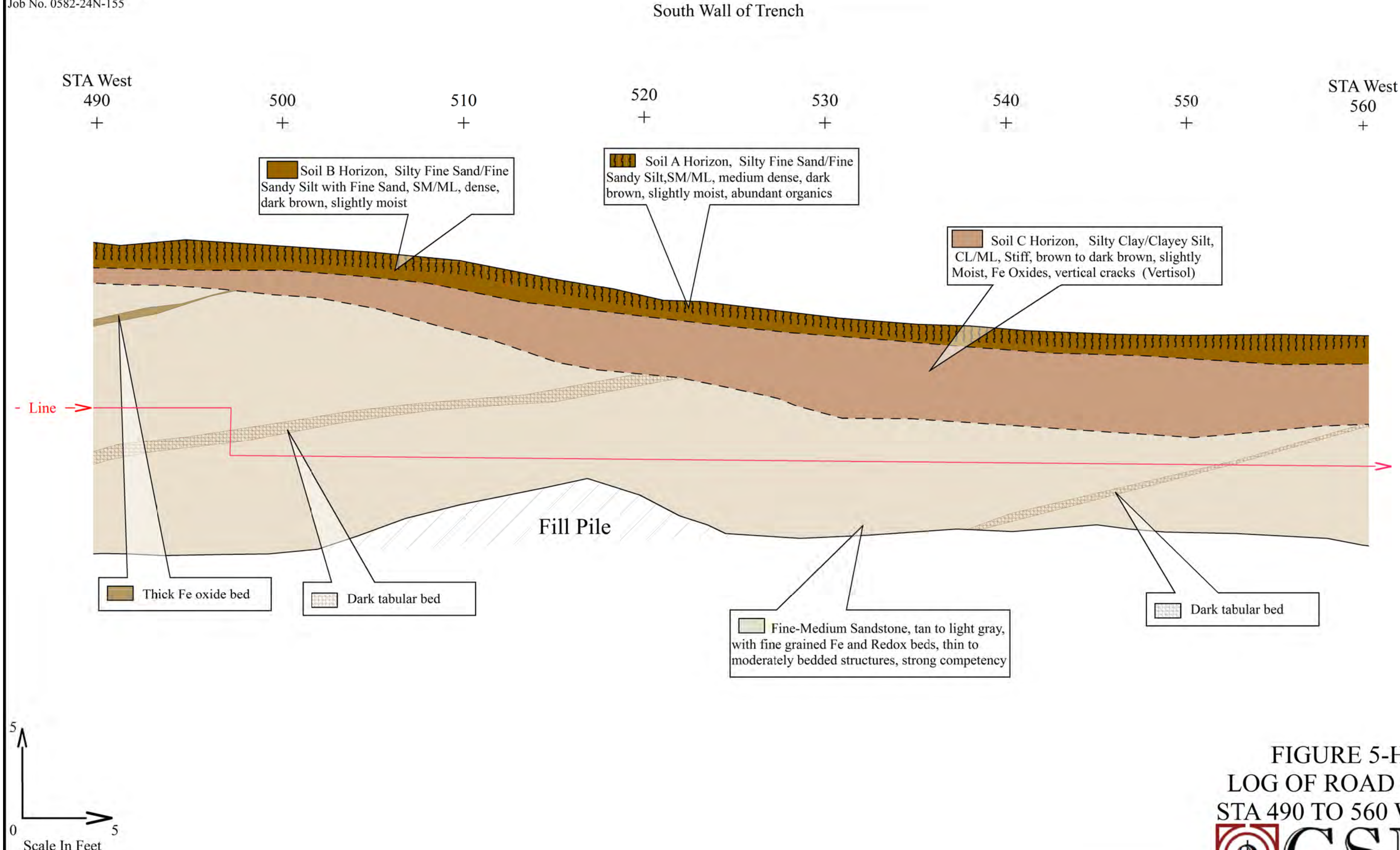


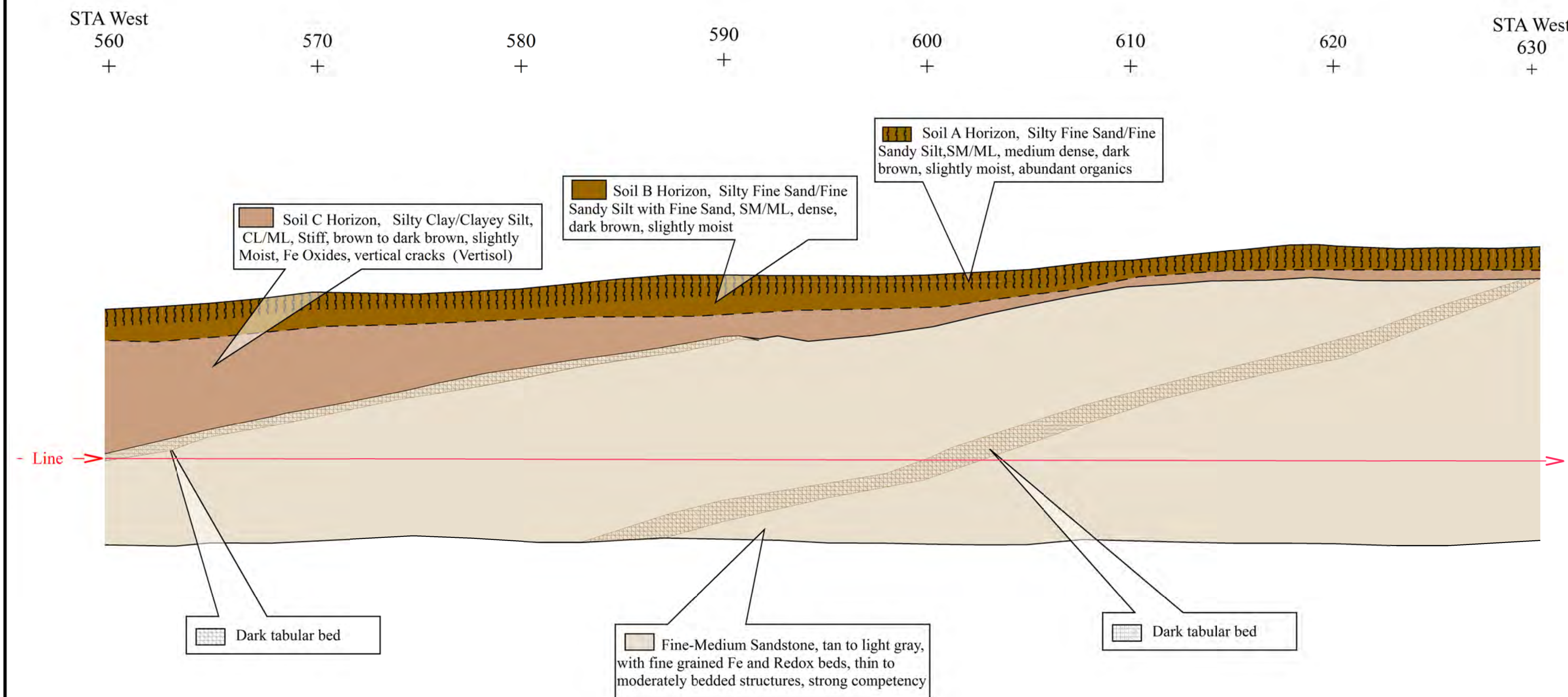
FIGURE 5-H
LOG OF ROAD CUT
STA 490 TO 560 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

South Wall of Trench



5
0
5
Scale In Feet

FIGURE 5-H
LOG OF ROAD CUT
STA 560 TO 630 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

South Wall of Trench

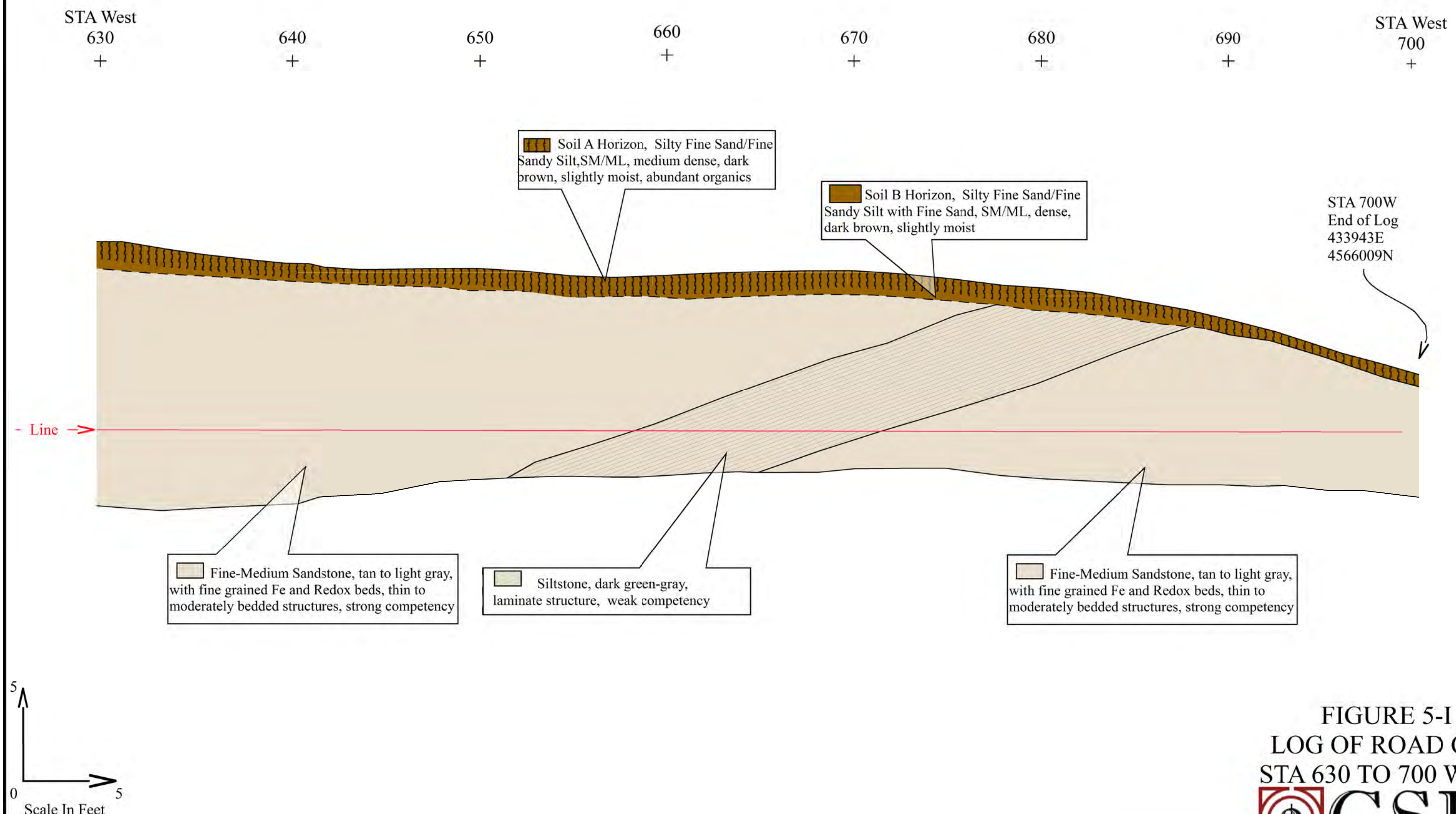


FIGURE 5-I
LOG OF ROAD CUT
STA 630 TO 700 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-155

South Wall of Trench

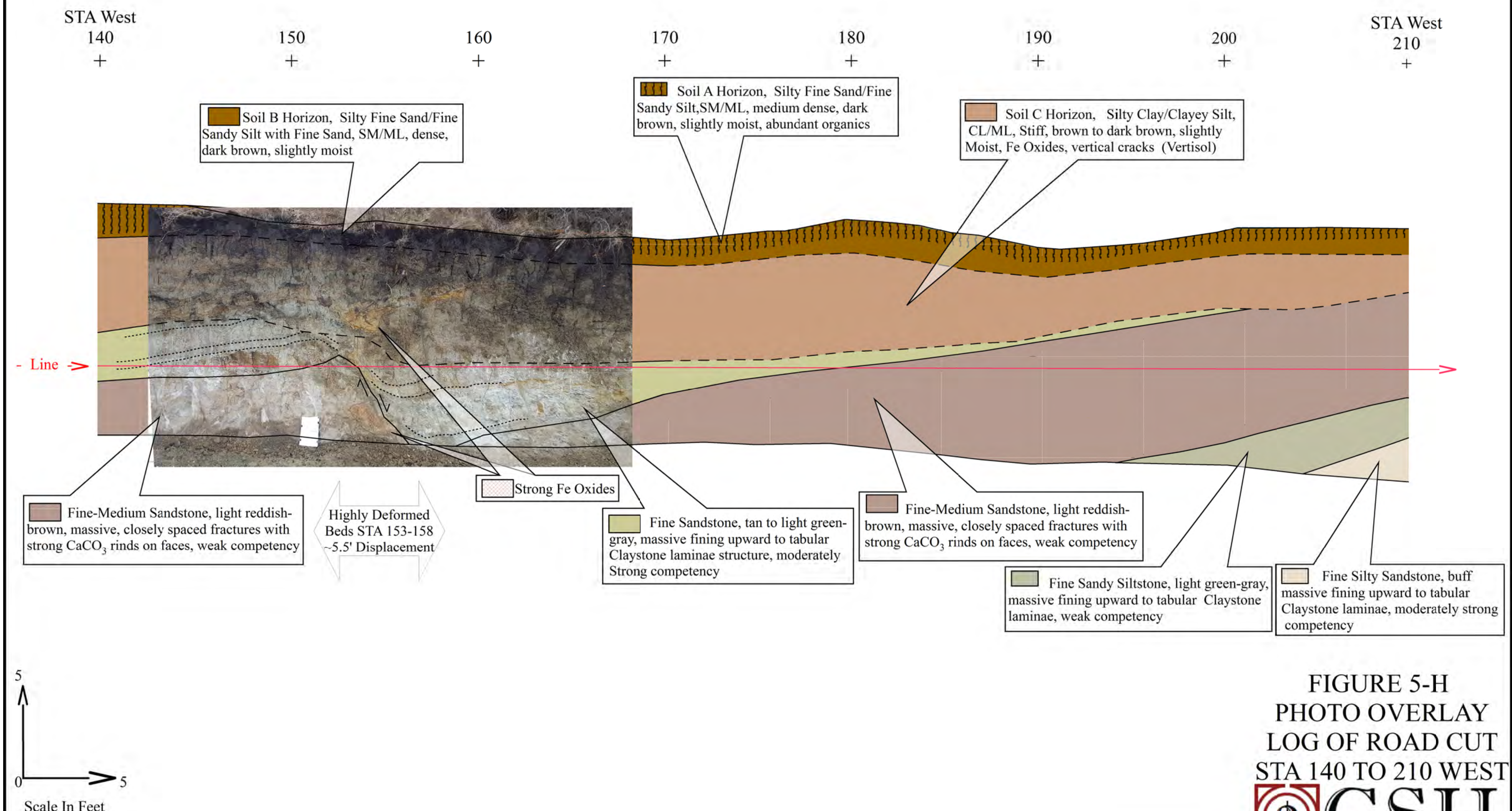


FIGURE 5-H
PHOTO OVERLAY
LOG OF ROAD CUT
STA 140 TO 210 WEST

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

Summit at Ski Lake Phase 13
Job No. 0582-24N-15

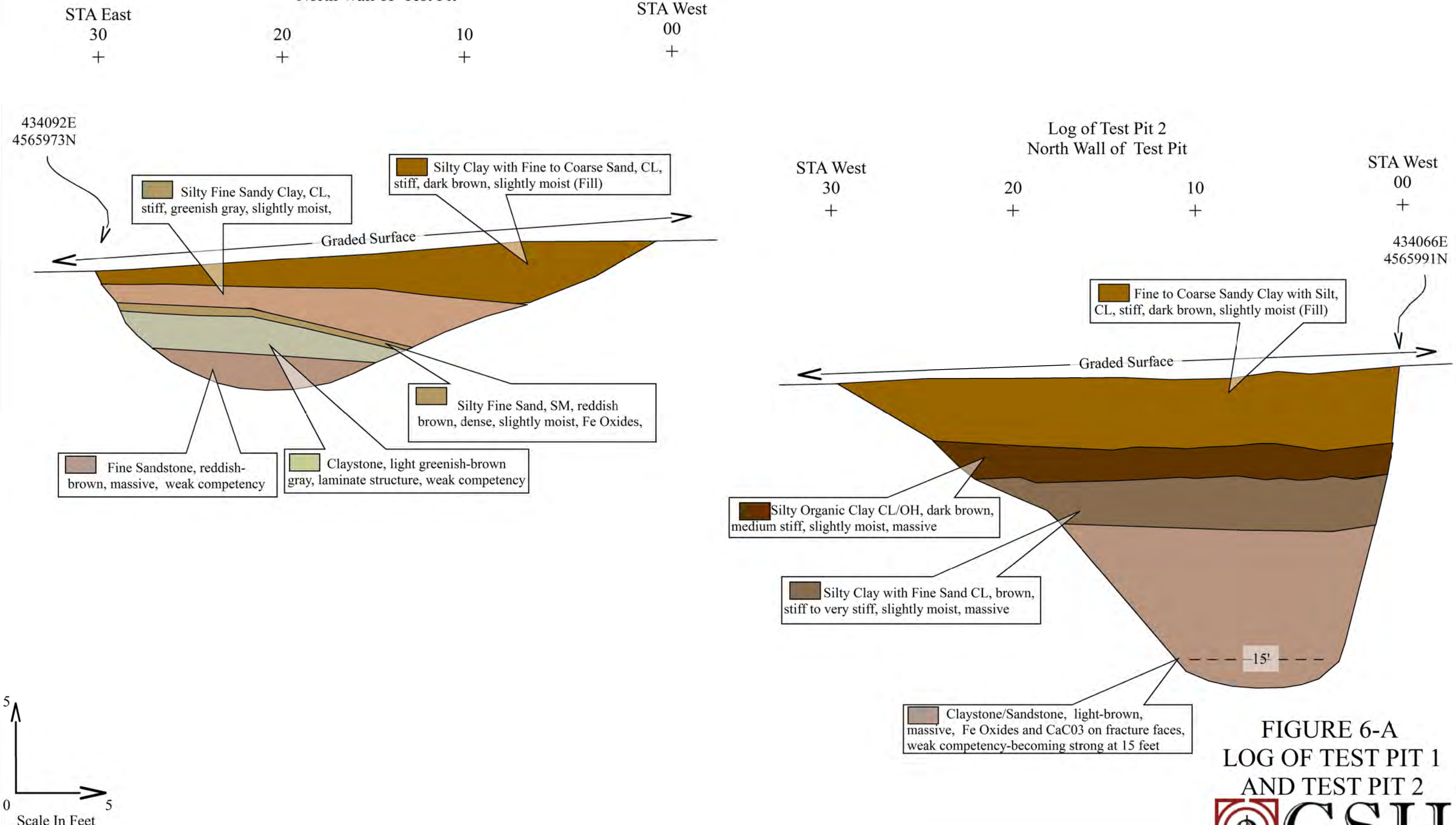


FIGURE 6-A
LOG OF TEST PIT 1
AND TEST PIT 2

GSH

ANALYSIS BY: GS and BG | CHECKED BY AH | DATE 12/4/15

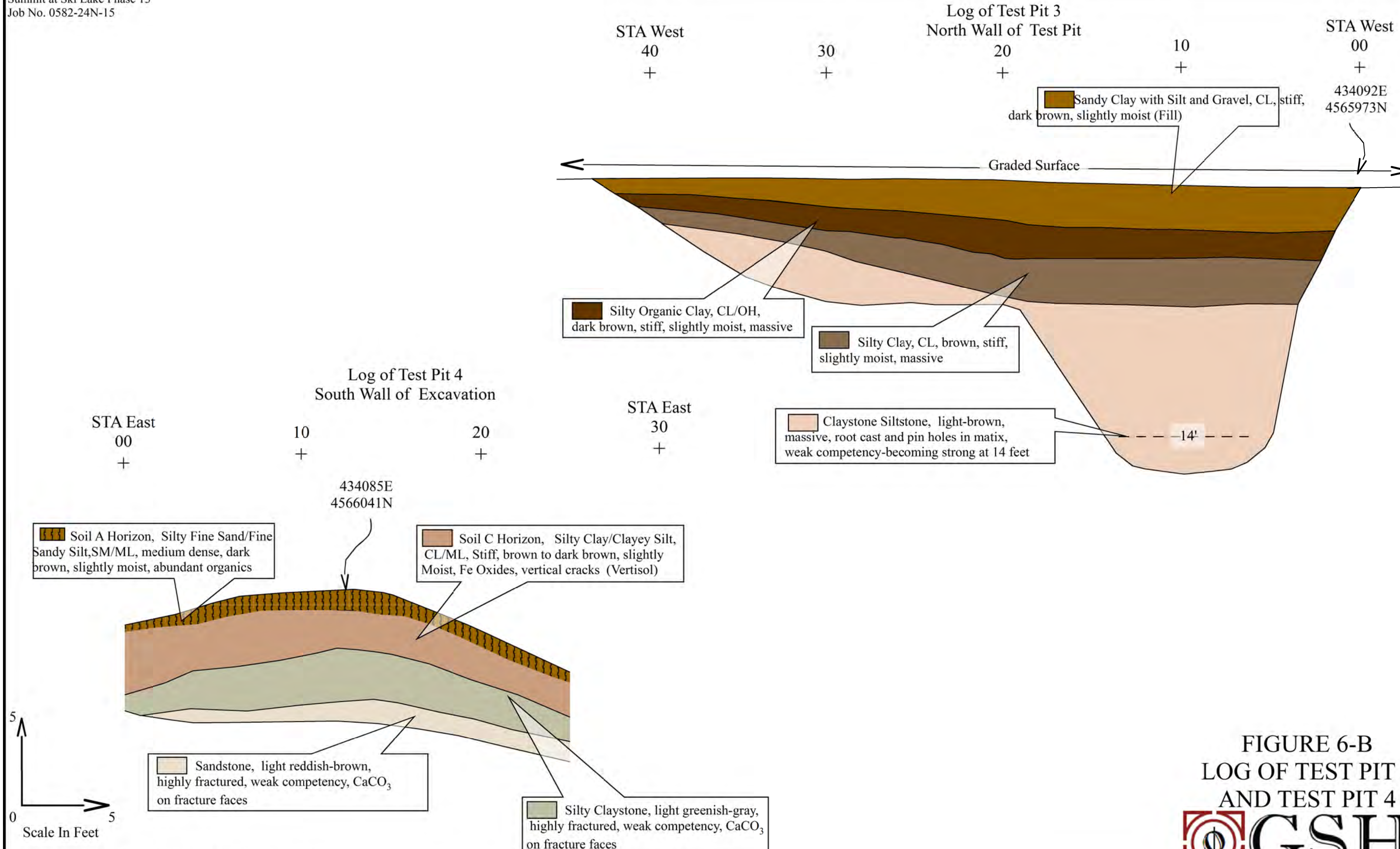
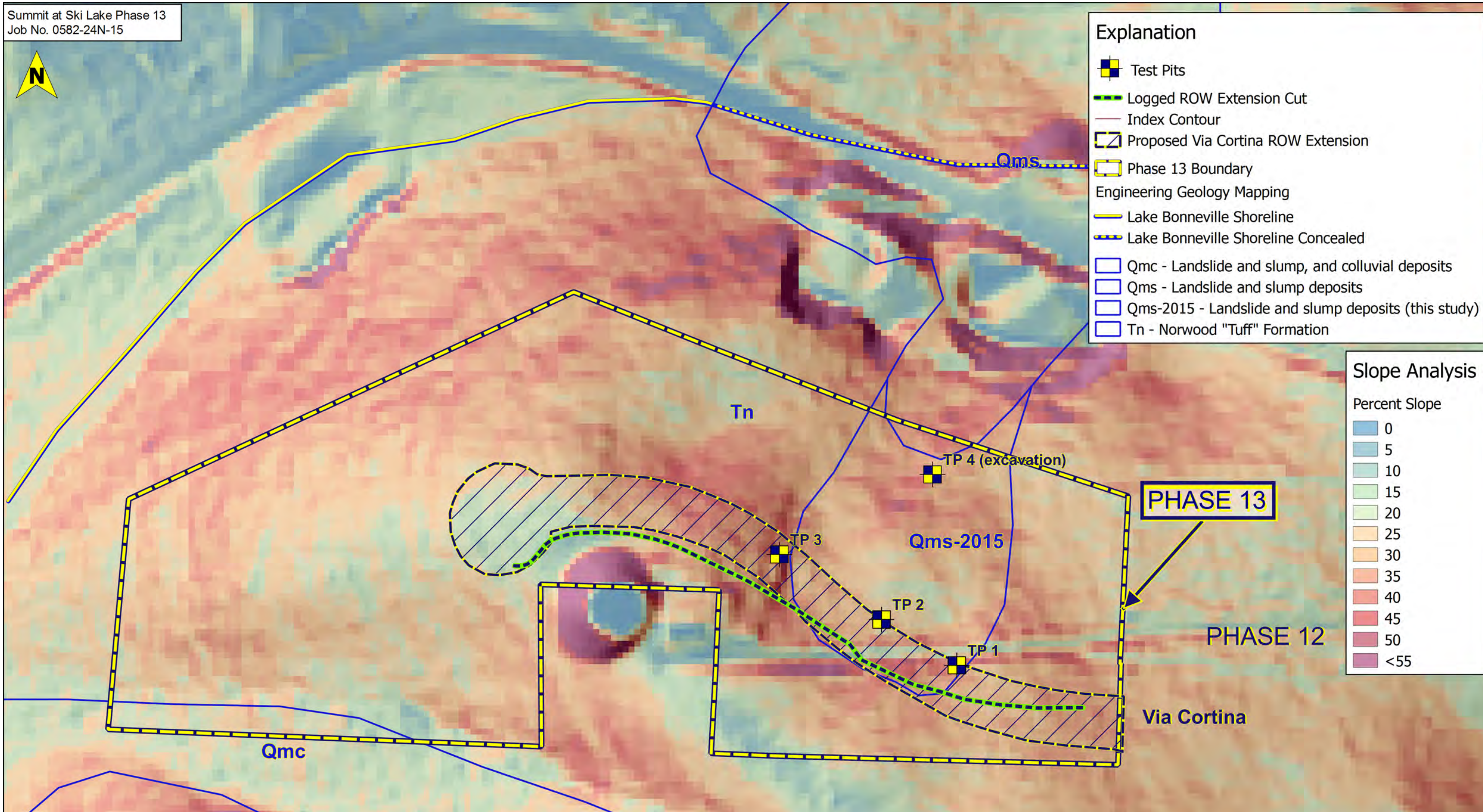


FIGURE 6-B
LOG OF TEST PIT 3
AND TEST PIT 4

GSH



Elevation-slope: 2006 2.0m Geoprocessed LiDARfrom Utah AGRC; http://gis.utah.gov/
Geology: 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.

0 100 200 300 400 ft

1:1,200

FIGURE 7
Slope Analysis

GSH