



May 29, 2008
Project No. 70,262-01

Peggy Hill
City of Placerville Department of Public Works
3101 Center Street
Placerville, California, 95667
Phone: 530-642-5250, Fax: 530-642-5568
Email: phill@cityofplacerville.org

Reference: *Broadway Avenue Sewer Installation*
Broadway Avenue, Placerville, California

Subject: *Bedrock Depth Determination Report*

Dear Peggy,

In accordance with your request on behalf of the City of Placerville Department of Public Works (City), Holdrege & Kull (H&K) subcontracted with Sierra Nevada Ground Scan Imaging (SNGSI) to perform a ground penetrating radar (GPR) geotechnical engineering investigation of the proposed sewer alignment along Broadway Avenue starting at Blairs Lane and extending about 600 feet to the west along Broadway Avenue. This geotechnical engineering investigation was performed consistent with our April 8, 2008 proposal (Proposal No. PCd08-036). The site investigation was performed by SNGSI on April 21, 2008. SNGSI prepared a May 27, 2008 report to present their findings and conclusions. The SNGSI report is included as Attachment No. 1. The results of the SNGSI investigation are summarized below.

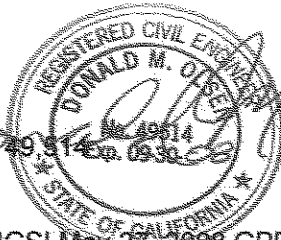
- The parking lot GPR survey did not detect any subsurface reflectors that suggested the presence of any abandoned underground fuel tanks.
- The Broadway Avenue alignment GPR survey indicated that hard bedrock was encountered at depths of from 8 to 10 feet below the existing street surface. Therefore, the contractor should anticipate difficult excavation conditions below a depth of 8 feet to the proposed excavation bottom elevation of about 12 feet below the existing street surface elevations.
- The Broadway Avenue alignment GPR survey indicated that the street pavement section consisted of about 16 inches of alternating layers of asphalt concrete and Portland cement. This finding was confirmed by H&K's borehole coring equipment.

Please call me at 530-362-2761 if you have any questions or need additional information. We look forward to working with you on this important City of Placerville project.

Sincerely,

Holdrege & Kull

Donald M. Olsen, R.C.E. 49,514
Principal



Attachment No. 1, SNGSI May 27, 2008 GPR Site Investigation Report, 5 pages.
Copies: 4 paper and 1 email report copies to addressee.

R70262-01, 052908A.DOC

Holdrege & Kull



May 27, 2008

Don Olsen
Holdrege and Kull
255 Floral Ave., Suite 10
Chico, CA 95973
Phone: 530-362-2761
Email: dolsen@handk.net

Holdrege and Kull subcontracted Sierra Nevada GSI to conduct a subsurface investigation of three areas of interest within the city limits of Placerville, California. The site investigation was performed April 21, 2008.

Ground Penetrating Radar Methodology:

Sierra Nevada GSI used electromagnetics and ground penetrating radar (GPR) to perform the shallow subsurface investigations. Ground penetrating radar uses a high frequency electromagnetic pulse transmitted from a radar antenna to probe the earth. The transmitted radar pulses are reflected from various interfaces within the ground and are detected by the radar receiver. The reflecting interface may be soil horizons, water tables, soil and rock surfaces, man-made objects or other interfaces that have contrasting dielectric properties. The reflected electromagnetic data are evaluated to provide estimates of depths and thicknesses of the various materials encountered.

Investigation 1:

Location: Parking lot in downtown Placerville

Scope of work: Locate if present a suspected underground storage tank.

Equipment used: G.S.S.I. Sir 3000 G.P.R. with a 270 megahertz antenna.

Average depth: The average depth viewed below the ground surface was about 12 feet.

Results: Sierra Nevada GSI conducted a survey grid on approximately three-foot centers over the entire parking lot area with the exception of an area where three cars were parked in the center of the lot that blocked our access. Our GPR survey did not show any features within the portions of the parking lot survey that we would interpret as being an underground storage tank.

Investigation 2:

Location: Broadway Boulevard – city limits of Placerville. Approximately 600 lineal feet. Start of survey was marked on road surface.

Scope of work: To determine the depth to bedrock for future installation of sewer lines.

Equipment used: G.S.S.I. Sir 3000 G.P.R. with a 270 megahertz antenna.

Depth viewed: The average depth viewed below the ground surface was about 12 feet.

Results: The GPR data indicated that the bedrock was encountered between 8 and 10 feet below the existing ground surface along the proposed sewer alignment. Figure 1 shows a typical GPR data screen for the surveyed alignment. When confirmed with a core sample, the data can then be a reliable estimated of the depth to bedrock along the survey alignment.

Investigation 3:

Location: Broadway-city limits of Placerville

Scope of work: To determine the existing road pavement layer thicknesses.

Equipment used: G.S.S.I. Sir 3000 G.P.R. with high definition 1500 megahertz antenna.

Results: The GPR data showed that the existing road pavement is comprised of several material layers each with different dielectric properties. Figure 2 shows a typical GPR data screen for the surveyed area. Our interpretation of the GPR data indicates that the existing road pavement section consists of the following material layers and estimated thicknesses:

Asphalt Concrete	4 inches
Portland Cement Concrete	6 to 12 inches
Gravels	8 to 12 inches
Subgrade Soil	12 to 16 inches

Holdrege & Kull drilled through the existing pavement section with a core barrel drill. The core specimen that was taken from the core hole measured about 15 inches long and consisted of several layers of asphalt concrete (AC), and Portland cement concrete. The thickness of the underlying aggregate base (AB) rock and subgrade soil were not cored through and therefore, their thicknesses were not confirmed. However, the total thickness of about AC and Portland

cement concrete as measured from the core specimen of 15 inches agrees very well with the GPR interpretation of about 16 inches.

Please contact the undersigned if you have any questions or need additional information. Thank you for selecting Sierra Nevada GSI to perform a GPR survey for this important City of Placerville and Holdrege & Kull project.

Sincerely,



Tom Nicholson, Owner
Sierra Nevada GSI
P.O. Box 1506
Grass Valley, CA 95945
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Cell (530) 277-4283
Email: tomandbuffy3@aol.com

Figures: Figure 1, Investigation 2 GPR Bedrock Interpretation
 Figure 2, Investigation 3 GPR Pavement Thickness Interpretation

Placerville, CA

Road Surface to Bedrock

File # 1

270MHz Antenna

Apr 21, 2008

Figure 1

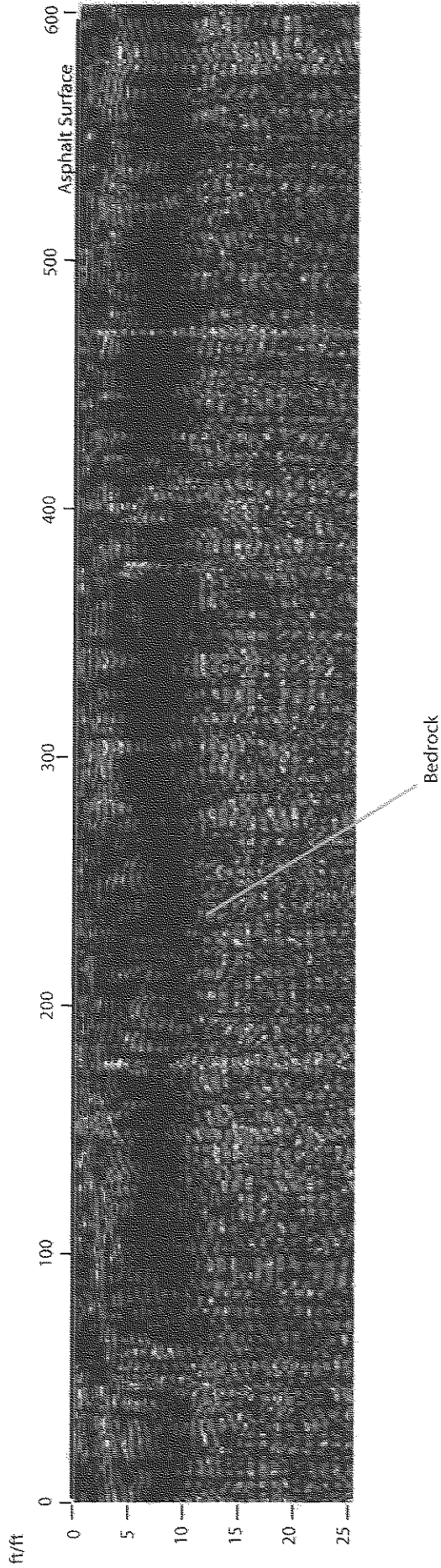


Figure 2

