



8 September 2008

Mr. John G. Mahoney  
Antrim Construction, Inc.  
1635 Chestnut Street, Suite A  
Livermore, California 94551

Subject:       **RECOMMENDATIONS FOR BACKFILL OF EXCAVATION**  
Commercial Service Building  
461 McGraw Avenue  
Livermore, California  
Project No. JH-773

Dear Mr. Mahoney;

As requested, we are providing letter for backfilling the large excavation at the subject site. The purpose of this letter was to review our referenced geotechnical report and provide supplemental recommendations for the backfill of the large excavation at the subject site. Our referenced geotechnical report was dated 29 March 2007, Project No. JB-701.

We understand some soils were excavated from the subject site to remove the potential of hydrocarbons from the soil. Subsequently, the subject site consist of a large excavation near the center of the site and crossing from the north to south, nearly crossing and dissecting the site. The depth of the excavation is about 25 feet deep. Excavation spoils were observed on either side of the site. Groundwater was observed at the bottom of the excavation at about 15 feet below existing grade.

Based on the existing site conditions, we recommend the following recommendations. Backfill operations and testing should follow our recommendations stated Section 6.1.4 Fill Placement and Compaction of our referenced geotechnical report. We understand that analytical test results indicate that the onsite stockpiled soils may be used as backfill material. From a geotechnical aspect, the on-ste stockpiled soils may be used as structural backfill. The preparation and testing of these soils shall follow recommendations provided in Section 6.1.4 or our referenced report and according to supplemental recommendations provided in this letter.

As discussed previously, groundwater was encountered at about 15 feet below existing grade. It is our opinion that groundwater in the construction area can be controlled be either several well points located around the perimeter of the excavation or be several sump pumps placed at the bottom of the excavation. Prior to placing compacted, engineered fill, we recommend the groundwater be removed.

If soft or pumping subgrade soils are encountered, we recommend either over-excavating to firm, non-yielding soil and placing recompacted fill as recommended in Section 6.1.4. If non-yielding soil is not encountered, an acceptable option is to place a woven geotextile and backfill with a the onsite material. The geotextile should consist of Mirafi 500X or an approved equivalent. A test area should be prepared to evaluate the

performance of the method. If a non-yielding pavement subgrade is not achieved, deeper excavation may be necessary.

Due to the near vertical walls of the excavation, we recommend our representative observe the placement and compaction of fill until the excavation is at a depth that will be safe to enter.

General fill and/or excavation backfill should be compacted to a minimum of 90 percent relative compaction at a minimum of 2 percent over the optimum moisture content according to the latest ASTM test methods and procedures.

### Construction Observations

Our representative must be present during earthwork operations and as determined necessary by our representative at the site. The representative's presence is necessary to observe the work performed and is in conformance with specifications and recommendations provided here and in our referenced report. Records will be maintained of our visits to the site and the results of any tests performed. We will submit reports at the completion of earthwork operations for this phase of construction. The reports will summarize the work observed and the results of tests performed by our firm during these phases. We will also submit supplemental recommendations, if necessary.

To allow proper scheduling so that our personnel are present at the jobsite when needed, we must be given no less than two working days advance notice of commencement of work requiring our presence.

### Limitations

Our services were performed using that degree of care and skill ordinarily exercised, under similar circumstance, by reputable engineers practicing in this geographical area at the time this report was prepared. No other representation, express or implied, and no warranty or guarantee is included or intended as to the professional opinions or recommendations provided. If you have questions or require additional information, please call this office at your earliest convenience.

Respectfully submitted,

**KORBMACHER ENGINEERING, INC**

Bruno Korbmacher, PE

Copies to: Addressee (1, 7 email)

