

HIDALI PTY LTD  
11 Fitzroy St, Forrest  
ACT 2603  
Attention: Mr John Fielding

Project: Black Bear Inn  
Site Location: 30 Diggings Terrace, Thredbo NSW  
Reference: 13526-GR-6-1  
Report Date: 4 May 2022



Department of Planning  
and Environment

*Issued under the Environmental Planning and Assessment Act 1979*

Approved Application No DA 22/4825

Granted on the 1 August 2022

Signed M Brown

Sheet No 15 of 18

## **Re: Geotechnical Response to Point 1D of the Project SEE & Points 5B & 5C of the Public Enquiry Document: -Temporary Ground Anchors-**

### **1 Introduction**

Alliance Geotechnical Pty Ltd (Alliance) was engaged by Hadali Pty Ltd (the client) to provide a brief geotechnical statement in response to the Request for Information (RFI) from NSW Department of Planning and Environment in relation to development application (DA) no. 22/4825.

### **2 Supplied Documents**

To assist in background to the project, Alliance was supplied with the following documents:

- Letter from NSW Department of Planning and Environment, ref EF22/4825 from Daniel James. "Request for additional information" re DA No: 22/4825 (PAN-204581)
- Latest Structural drawings from PMI Engineers, ref PMI-2021-053,
  - S02 – A rev 1 dated 29/11/21
  - S10 rev 5 – dated 28/2/22
  - S10a rev 5 – dated 29/4/22
  - S10b rev 6 – dated 29/4/22
  - S10c rev 5 – dated 29/4/22
  - S10d rev 3 – dated 29/4/22
  - S10e rev 3 – dated 29/4/22
  - S10f rev 3 – dated 29/4/22

### **3 Temporary Ground Anchors**

To assist in an understanding of the potential impacts of the temporary ground anchors (aka. temporary rock anchors) to accompany the Statement of Environmental Effects (SEE) (ref Point 1D of the SEE and Points 5B & 5C of the Public Enquiry response) we would like to address this in two parts considering the temporary condition and permanent condition cases.

#### **3.1 Temporary Case**

Temporary ground anchors are proposed as part of this referenced DA application. The anchors are formed of steel bars encased in cast insitu cementitious grout within cored angled boreholes. The method of

installation only produces low levels of vibration and hence imparts very low engineering impact on adjacent structures or road infrastructure (this is managed by vibration monitoring with geophones should the adjacent structures be considered to be vulnerable). Ground anchors have a low environmental impact.

The risks of installation may include

- the striking of buried services (controlled and managed by reference to Dial Before You Dig searches and scanning of the ground by a registered services locator and direct observation by potholing if required).
- Collapse of bores – for this site the ground conditions consist of competent decomposed granite derived soils and weathered granite bedrock that is sufficiently cohesive to stand open with risk of collapse.
- Once the grout has set, the anchor is nominally stressed to take up the load, hence reducing the risk of lateral deflection of the shoring wall as further excavation proceeds. Internal propping conversely requires the shoring wall to move for it to take up load, so ground anchors are considered to be a better solution with a lower level of impact on adjacent structures and roads.
- As these are temporary anchors, the risk of creep movement (longitudinal extension of the anchor or grout interface) is of very low impact.

### **3.2 Permanent Case**

Once the shoring system is complete, the internal substructure and the superstructure can then be constructed and completed. On completion, the temporary ground anchors are de-stress by loosening off of the head bolts and removing the face plates. The remaining inert bars remain in the ground. These cause no long-term impact. If they corrode (which away from the face is unlikely due to the lack of oxygen) there is no risk of voids as the corrosion products are of higher volume than the original steel.

For the interim case, where temporary anchors are left for a longer period due to delays in the construction, there is a slightly increased risk of creep movement. We have put in place ground deflection monitoring (line and level of survey stations with precise levelling) to check for any movement. We consider this to be of very low risk but have addressed it all the same.

The permanent structures of the building provided long term support to the ground again with a very low impact on the adjacent structures and roads.

## **4 Requirement for Temporary Ground Anchors and Conclusion**

Temporary ground anchors are widely used in the construction industry and are designed and built by competent contractors. Their use is considered to be best practice and ensures the stability of the ground during the temporary excavation of basements and the like.

- Internal propping is not preferred due to the increase in risk of shoring wall movement for the internal propping to take up loads. This additional movement may result in an increased risk of foundation settlement in the surrounding properties,
- Internal propping presents an increased operational and safety risks to workers, the shoring wall itself, and surrounding properties, due to a reduced working space within the site footprint caused by large internal propping members, and
- Temporary ground anchors distribute the loading of the shoring wall to (more) various locations. Conversely, internal propping predominantly relies on single span beams and fixing points. Temporary ground anchors reduce the operational risk of a catastrophic machine strike and shoring wall failure.

- Removal of the internal temporary propping is significantly more difficult once the basement is complete. This is not the case with ground anchors.

It is considered that the necessity of the Temporary Ground Anchor requirement is in response to prevailing site conditions, risk reduction in design and site operations, and best outcomes for site safety.

We also note that (for the record, for the works completed to date);

- Preconstruction condition survey reports have been completed on all surrounding properties and the public domain,
- Dial Before You Dig applications / records were sought,
- Thredbo Service Mapping were sought,
- Onsite Services Assets Locating was completed,
- Vibration monitoring was installed during the process of installing the anchors (and excavation), and
- Ground deflection monitoring is installed

These records can be provided upon request from the builder.

Regards



Mark Green  
BSc(Hons) CPEng MIEAus NER RPEQ  
APEC IntPE(Aus) CGeol FGS JP  
NSW Reg PE/DP (geo)  
Principal Geotechnical Engineer