



15 August 2016
Ref No 29672 Let

The Interim General Manager
Northern Beaches Council
PO Box 882
MONA VALE NSW 1660

ATTENTION: Ms Rebecca England

Dear Madam

GEOTECHNICAL STABILITY ASSESSMENT
41 MARINE PARADE, AVALON BEACH
DA NO 279/16

This letter presents the results of our geotechnical assessment of the proposed development at the above site, as indicated in the above DA submission. The assessment was carried out on behalf of concerned neighbours being, Bill & Yvonne McCausland of No 37 Marine Parade, Les & Dayn Quayle of No 39, and Susan Hesse of No 43.

ASSESSMENT METHODOLOGY

We have reviewed the documents on the Pittwater Council website which were submitted in support of DA279/16, as well as the previous DA applications being No 365/12 and Tree Application TO 487/15. In particular, the following documents have significance relevance:

- 1 Architectural drawings (A1.1, A1.2, A1.3, A1.4, A2.1, A2.2 and A2.3) prepared by Casey Brown.
- 2 Survey plan (Ref 53985, Issue B, dated 27/9/12) prepared by Hill & Blume.
- 3 Basix Certificates 3A and 3B.
- 4 Geotechnical report (JO653, dated 3 May 2016) prepared by White Geotechnical Group.

In addition, the undersigned visited the site on 5 August 2016 and carried out a detailed inspection of the topographic, surface drainage and geological conditions, as well as the interface with neighbouring properties, buildings and structures. The inspection was completed from across the northern and western site boundaries.



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SITE SETTING AND PROPOSED DEVELOPMENT

We consider the site setting to be generally as described in the White Geotechnical Group report. In essence, a battle-axe property off Marine Parade with the main body located just below the crest of a locally west facing hillside, with a minimum of about 40m setback from the crest of a 20m high cliff above the ocean.

Sandstone bedrock is evident in a cutting along the eastern site boundary adjacent to the existing house on site. Sandstone bedrock also outcrops on the lower western portion of the site beyond the house. There are numerous relatively large detached blocks of sandstone or sandstone 'floaters' above the outcrops. Although the 'floaters' have been described by White to be "*in stable positions*", we consider some of these 'floaters' to only be marginally stable.

There are Norfolk pines on each of the north-western corner of the site, near the north-eastern corner of the site, and near the south-eastern corner of the site. There was also a Norfolk pine adjacent to the western side of the house which we understand has been recently removed.

Following demolition of the existing house and the other improvements, it is proposed to construct a two and three storey house with an attached garage.

The proposed ground floor level of the house and garage will be at similar levels as the ground floor level of the existing house. The lower ground floor level will require a maximum excavation depth of about 3.5m which will daylight on the western slope along ground contour 35.5m. Along the north, a sub-vertical cut face will be required about 1.8m from the northern site boundary. The excavation will also be within about 4m of the Norfolk pine near the north-eastern corner of the site.

The Basix Certificate No 3A indicates that a new sewer line will be laid in a trench which extends westwards from the north-western corner of the proposed house, adjacent to the northern site boundary, and the Norfolk pine on the north-western corner towards a manhole some distance downslope and further west some 40m in line with the boundaries of Nos 35 and 37 Marine Parade. The existing sewer line is laid with the stormwater along the driveway to Marine Parade. The majority stormwater will connect with the existing line along the driveway to Marine Parade.



GEOTECHNICAL EVALUATION

- 1 Based on the Council Geotechnical Hazard Map, the site is located in Hazard Zone 1 (ie. the most severe in terms of potential landslip).
- 2 A report is therefore required in accordance with Council's Geotechnical Risk Management Policy (2009). In any event, the Policy applies as there will be activities on site that include:
 - Excavation greater than 1m deep, the edge of which is closer to the site boundary or a structure to be retained on the site, than the overall depth of the excavation.
 - An excavation greater than 1.5m deep below the existing surface.
 - An excavation that has the potential to destabilise a tree capable of collapsing in a way that any part of the tree could fall onto adjoining structures (proposed or existing) or adjoining property.
- 3 We consider that the White Geotechnical Group report has not been completed in accordance with Council's Geotechnical Risk Management Policy (2009), with the following significant omissions:
 - (i) Mapping details have not been presented on a contoured site plan (refer second box of Form 1a).
 - (ii) Not all of the geotechnical hazards have been identified (refer fifth box of Form 1a). We consider that the most significant hazards are the potential dislodgment of 'floaters' from the western portion of the site during bulk and trench excavation, and the potential of trees being destabilised by the above excavations and collapsing onto adjoining properties.
 - (iii) As not all of the hazards were identified, a complete risk assessment has not been completed (refer boxes 7 to 10 of Form 1a).
 - (iv) Similarly, the opinion that the site is considered suitable for the development is based on incomplete information. This opinion also is not in accordance with the Geotechnical Risk Management Policy which requires that an opinion be provided *"that the design can achieve the 'Acceptable Risk Management' criteria provided the specified conditions are achieved"* (refer box 12, Form 1a).
 - (v) The geotechnical conditions as specified in the White Geotechnical Group report have not been provided to all four phases as described in the Geotechnical Risk Management Policy for Pittwater (2009) (refer box 14, Form 1a).



4 With respect to Item 3(ii) above, we consider that both omitted hazards are significant.

- (i) We do not consider that the issue of 'floaters' dislodging and/or becoming destabilised and toppling over can be addressed by a simple condition requiring the geotechnical professional to inspect the cut face. This hazard should first be assessed in terms of establishing the risks and then specific recommendations to reduce the risks to 'acceptable' levels. Specific recommendations (aside from a geotechnical inspection of the excavation) must be provided as to how the stability of the numerous 'floaters' which will be impacted by the proposed bulk and trench excavation over the northern and western portions of the site will be ensured.
- (ii) Also in terms of zone of influence, the presence of very large 'floaters' means that a simple 1V in 1H (ie. 45°) within the soil profile is not appropriate. The zone of influence will be controlled by the size and location of some of the 'floaters' relative to the excavation. On this basis, it is our opinion that the zone of influence extends several metres beyond the perimeter of the excavation and will extend beyond the northern site boundary (into No 39) and the western site boundary.
- (iii) The issue of the proposed sewer trench has not been addressed or assessed at all. We acknowledge that White Geotechnical Group may not have been aware of the proposed sewer. However, we consider it incumbent on the geotechnical engineer to ensure that he has all of the available information (ie. the information submitted to Council in support of a DA) before signing off such onerous forms as Form 1 and Form 1a.
- (iv) It is our opinion that the proposed sewer installation adjacent to the northern site boundary will present significant challenges in terms of trench excavation due to the presence of outcrops and 'floaters' which extend to heights in excess of 2m above the ground level. In this regard, we note that the '*rock outcrops*' shown on the survey plan (Ref 53985, Issue B, dated 27/09/12) over the western portion of the site are incomplete and should extend to the western site boundary and beyond. (No survey information is shown on the western side of the site for 6m from the western boundary.) The trench for the sewer, if it is excavated, will extend adjacent to the Norfolk pine on the northern western corner of the site and will likely cause irreparable damage.

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- 5 The effect of the proposed bulk excavation which will extend well below the canopy, and to about 4m, of the existing Norfolk pine towards the eastern end of the northern site boundary has not been assessed by either the Geotechnical or Flora and Fauna assessment reports. In this regard, we note that the survey was carried out in 2012 and the current survey plan (Rev B) was not updated to show the subsequent notable increase in tree growth, with both Norfolk pines along the northern site boundary having a larger canopy (or spread) and trunk diameter to that shown. An arborist's report concerning the effect of the new sewer on the existing tree has not been submitted.
- 6 Basix Certificate 3A (Drawing A1.1) states "*Existing boulders and rock formations to be protected*" on western side of site. Also, Section A on Drawing A2.3 shows existing ground line at lower level dotted, but no 'floaters'. We consider that such protection will not be feasible.

CONCLUSIONS

Based on our evaluation, we consider that the White Geotechnical Group report has not been completed in accordance with the Pittwater Geotechnical Risk Management Policy (2009) as required.

Issues not considered in, or omitted from, the geotechnical report are listed in the section titled '*Geotechnical Evaluation*' above.

Given the above, we consider that Council should not in the first instance be considering reports which are not in accordance with its own Policy.

The issue of the effect of the proposed development on the existing Norfolk pines and the issue of protecting the existing boulders and rock formations have not been given adequate consideration.

Finally and more significantly, we do not believe that the development proposal, as currently presented for DA, can be completed without significant risk to life, property and flora.



Should you require any further information regarding the above, please do not hesitate to contact the undersigned.

Yours faithfully
For and on behalf of
JK GEOTECHNICS



Agi Zenon
Principal | Geotechnical Engineer.