

DAVIES GEOTECHNICAL

CONSULTING ENGINEERS

5 July 2021

21-019.A

Prue Rydstrand
1100 Barrenjoey Rd
PALM BEACH NSW 2108

Dear Prue,

re: **GEOTECHNICAL ASSESSMENT/REVIEW – EXCAVATION ISSUES
PROPOSED RESIDENTIAL DEVELOPMENT, NO.1110 BARRENJOEY RD PALM BEACH
NORTHERN BEACHES COUNCIL DA2021/0200**

1.0 INTROCUCTION / BACKGROUND

In response to your request on 29 June 2021, and subsequent communications, Davies Geotechnical has undertaken a review of information available concerning a proposed residential development at No.1110 Barrenjoey Rd Palm Beach, adjoining your property No.1100 Barrenjoey Rd.

The review and assessment were requested for advice on potential impacts upon your property due to the proposed development, specifically the proposed bulk excavations associated with benching the adjoining site for the multi-level dual dwelling development.

The following information was accessed from Northern Beaches Council's DA-tracking web site for the purpose of our review, associated with the DA for the proposed development:-

Document	Author	Reference No.	Date
Architectural Plans	Jorge Hrdina Architects Pty Ltd	Project 2004, set of 24 DA drawings, either Rev 0 or Rev A Landscape Plan LP0001, Rev A Sediment Control Plan H-DA-00-A	22/2/21, 15/6/21, 18/6/21 20/2/21 21/12/20
Survey Plan	Adam Clerke Surveyors Pty Ltd	20688S	23/11/2020
Stormwater Plans	ITM Design Consulting Hydraulic Engineers	Project 20/117 Dwg. No.H-DA-01 Rev A	21/12/20
Geotechnical Report	Crozier Geotechnical Consultants	2020-232 Issue 0	15/12/20
Development Engineering Response	Northern Beaches Council	DA2021/0200	12/5/2021
Arborist Report	Rain Tree Consulting	221	14/1/21

Relevant information and/or extracts from the above documents and drawings are provided in the following report where appropriate.

A site inspection was undertaken by the undersigned on 5 July 2021.

The following commentary and opinions concerning potential impacts on No.1100 from the proposed excavation and development on No.1110 are based on the documentation as above, and our experience in the Northern Beaches area.

2.0 SITE OBSERVATIONS No.1100 & No.1110

Our observations were limited to the slope conditions generally on No.1100 and partly on the southern boundary area of No.1110 that could be seen from your adjoining property.

The slope on both properties is steeply graded up to the east, continuing beyond the rear boundary across adjoining developed land to an elevated ridge/plateau area.

The existing development on No.1100 comprises a 2-storey timber residence on the Barrenjoey Rd frontage at the base of the slope and a timber home-office/studio further upslope, against the northern boundary with No.1110.

The slope supports a number of mature eucalypts (notably two spotted gums against the northern boundary with No.1110) and other species, which provide a canopy over a substantial area of the property uphill from the main residence.

3.0 PROPOSED EXCAVATION ON NO.1110 (INFLUENCING NO.1100)

There are three elements of the proposed development that involve excavation close to the northern boundary of No.1100:-

- the ground floor level second dwelling at RL12.27m, requiring approximately 4m depth of excavation at 1.2m set-back from the boundary;
- the pool with coping level at RL20.1, and at least 2m depth of excavation at 2.5m set-back from the boundary; and
- the 2nd floor Master Bedroom and Ensuite at RL24.79m, requiring approximately 1.2m depth of excavation at approximately 2m set-back from the boundary.

The excavation for the second dwelling poses the most potential impact for the stability of the boundary of your property. Two significant trees on your land close to the boundary are also considered at risk of influence from the proposed excavations.

4.0 CROZIER GEOTECHNICAL INVESTIGATION

4.1 Our Review Comments

Our review of the Crozier Geotechnical Report indicates it provides a reasonable assessment of the slope conditions and risk issues for purposes of planning for the proposed development at No.1110.

We note that the assessment undertaken was based on a preliminary set of architectural design details prepared in November 2020. Since that time, some of the drawings have been updated to Rev A and new drawings have been added to the design set. The current design is detailed on the drawings listed in the table under Section 1.0 above.

In our opinion, Crozier Geotechnical should review any amendments related to geotechnical issues.

The subsurface investigation undertaken for the assessment presented in the Crozier report, comprising DCP probes only, is not adequate for engineering design or setting of controls for the construction in regard to the proposed excavations and their safe support.

The soil conditions, bedrock profile and rock quality, and groundwater conditions are important parameters for the proposed excavation and design of the excavation support system and accordingly we recommend boreholes should be drilled and tests undertaken to confirm the subsurface conditions for the excavation and support systems required for the proposed excavations.

Crozier acknowledge the requirement for further investigation to provide subsurface information and geotechnical parameters for the engineering design.

The Crozier report does not provide any geotechnical parameters for the preliminary engineering design. The report provides only limited 'generic' recommendations for additional investigations and engineering designs associated with excavation support requirements.

There are no recommendations for geotechnical analysis to assist the design for excavation support systems and assessment of a predictive deflection response of the ground from the excavation processes. This would be a necessary requirement for establishing parameters for geotechnical monitoring of support system lateral movements.

We note there is no recommendation for a Construction Methodology Statement or Excavation Management Plan.

4.2 Excavation Conditions

The Crozier report does not identify or provide any details on important subsurface conditions and issues the might provide suitable guidance to the structural design for excavation retention and for suitable and necessary engineering controls that must be implemented to ensure stable excavation.

Presumably, such advice would be forthcoming from a detailed geotechnical investigation of the slope prior to commencement of any excavations on the site.

It is our opinion that such advice and recommendations are an important function of the geotechnical report at DA stage so as to inform the local authority properly on consent conditions, should the application proceed to that outcome.

4.3 Excavation Support Assessment

The Crozier Report does not provide any assessment of excavation support requirements.

5.0 FURTHER INVESTIGATIONS

Additional boreholes should be drilled and further investigations undertaken as soon as access to the site is arranged, and prior to commencement of any works on the site. This would comprise works undertaken either as a requirement of the DA approval, or as a Stage 1 Construction Certificate approval after a Consent is determined.

The information from the additional boreholes must be reviewed by the project geotechnical engineer at a Hold Point in the engineering design to allow review of the engineering design prior to commencement of any Stage 2 piling work or bulk excavation.

At that stage, appropriate requirements for the construction methodology involving excavation can be determined and controls/hold points confirmed.

6.0 COUNCIL'S ENGINEERING REVIEW FOR THE DA ASSESSMENT

6.1 Relevant Local Experience

The following commentary provides recommendations for guidance in Council's assessment of the DA and formulation of Conditions of Consent, taking the above matters into account.

Geotechnical experience and knowledge of numerous developments in the Northern Beaches/Pittwater area indicates that a significant level of risk is involved with excavation on the steep hillslopes in the Palm Beach locality, with and without groundwater presence, actually causing settlements or other damage, and ground collapse affecting development on adjoining properties.

For the above reasons, and considering the slope characteristics and challenges they bring to the proposed development, adherence to Council's Pittwater Geotechnical Risk Management Policy will require rigorous geotechnical investigation, design and monitoring of excavations and other ground works.

Clause 7.2 of the Pittwater LEP 2014 requires the consent authority to consider the following matters *inter alia* in determining whether consent for earthworks should be granted:

- (d) the effect of the development on the existing and likely amenity of adjoining properties,*
- (h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*

In our experience, application of these regulatory controls during planning, engineering design and undertaking site works too often lacks rigour or commitment by responsible parties.

In our opinion, it is therefore essential that determining appropriate engineering controls and the approval conditions for their implementation is a critical component in achieving the relevant LEP and DCP objectives for protecting adjoining developments.

6.2 Development Engineering Response 12 May 2021

The Engineering Referral Response for the DA correctly requires conditions of approval for submission of geotechnical certification under Form 2 prior to release of the Construction Certificate, and under Form 3 prior to issue of the Occupation Certificate.

However, the Response has not picked up the fact that the architectural design dated 26 November 2020, which the Crozier Report relied on, has been superseded by updated details ranging from February to June 2021 (the current details referenced above in this review).

At the least, the Engineering Referral Response ought to require that the submitted geotechnical report of Crozier Geotechnical Consultants be updated after review of the amended architectural details and any additional information submitted, which would include the arborist report of Rain Tree Consulting submitted 14 January 2021.

6.3 Recommended Engineering Controls for Excavation on No.1110

Additional consideration of some detailed matters relating to potential impacts of the works upon the development at No.1110 is required and should be undertaken by Crozier Geotechnical Consultants for the DA stage prior to any consent being determined, to ensure the ground works are undertaken with appropriate engineering controls, caution and safety to avoid potential adverse impacts on the adjoining residential property.

In our opinion, recognition and allowance for the following matters are required as part of the DA process for the proposed development:-

- additional investigations to be undertaken by the geotechnical engineer as recommended above;
- preparation of a Construction Methodology incorporating requirements for:
 - excavation and support design, with regard for potential impacts of the excavation upon No.1110 and other adjoining properties,
 - staging, Hold Points, geotechnical controls,
 - monitoring of (i) the excavation support for lateral deflection, (ii) the surface conditions along the boundary and building settlements on adjoining property, (iii) ground vibrations, and (iv) any other aspects of the construction deemed important and necessary for protection of; adjoining property;
- confirmation of geotechnical parameters for the structural engineer's design;
- geotechnical review of the design and monitoring program;
- an independent review carried out by a suitably qualified and experienced geotechnical engineer.

We recommend a Staged Construction Certificate be determined for the development so that demolition, further investigations and engineering design can be undertaken as Stage 1, and then bulk excavation commenced as Stage 2.

A Hold Point is recommended on completion of the Stage 1 demolition, to permit:-

- Project Geotechnical engineer to undertake additional investigation of subsurface conditions on No.1110 to verify soils, groundwater and bedrock levels.
- Structural engineer to finalise excavation support details, construction methodology, and monitoring requirements during excavation.
- Project Geotechnical engineer and the independent review geotechnical engineer to approve the above for continuation under Stage 2.

7.0 ARBORIST REPORT AND TREE IMPACTS

We note the recommendations in the Rain Tree Consulting report dated 14 January 2021 whereby certain investigations are required as part of the Construction Certificate process, to determine the potential impacts of the proposed excavations and foundation construction on existing tree root systems.

The report notes the potential for impact of excavations for the proposed secondary dwelling and the proposed pool on No.1110 as influencing the root systems of trees T21 and T22, being trees on neighbouring property (namely your land, No.1100).

The recommendations in 1.4.4 (page 8) of the report for protection of these two trees (both 20m high spotted gums with extensive canopy reach onto No.1110) seem somewhat casual and poorly defined.

As for the Crozier Geotechnical report, the arborist report refers to outdated architectural details (listed as December 2020). All updated architectural details post-date the arborist report.

Accordingly, it would be appropriate that the arborist report should be updated after review of the amended architectural details and any additional information submitted.

8.0 SUMMARY/LIMITATIONS

The review assessment reported above is limited as noted herein, at the DA stage of the proposed development on the property at No.1110 Barrenjoey Rd Palm Beach.

Assessment has been undertaken for potential impacts of the proposed bulk excavation upon your adjoining property at No.1100 Barrenjoey Rd.

Our comments and recommendations from the review reported above are intended for consideration as part of the assessment and determination of the DA currently before Northern Beaches Council, and for conditioning of any approval for the proposed development, with the interests and potential impacts upon No.1100 in mind.

We conclude that there are potential adverse effects for No.1100 in regard to the stability of the land at the boundary, and impacts on the two spotted gums T21 and T22 noted in the arborist report, from the proposed excavations on No.1110.

Accordingly, consideration is required for engineering controls for the project, relating to the excavation, for the benefit of protecting the adjoining property at No.1100 from damage.

Recommendations are included for Northern Beaches Council's framing of Conditions of approval for the DA, in the event the consent authority determines there is sufficient information available to approve the DA. The recommendations are intended to address the geotechnical issues highlighted in the above report.

Whilst our comments, opinions and recommendations may have relevance to other components of the proposed works and their potential effect on other adjoining properties, we have not undertaken any review or consideration in regard to impacts on other properties.

We trust the above is suitable for your needs at this time. Please contact the undersigned if you require further assistance.

Yours faithfully

DAVIES GEOTECHNICAL Pty Ltd



Warwick N Davies MIEAust CPEng NER (Civil)
Principal Geotechnical Engineer

a21019L.docx