DAVIES GEOTECHNICAL
CONSULTING ENGINEERS

1July 2022 21-023.A

Shaw Reynolds Lawyers
Level 29, Chifley Tower
2 Chifley Square
SYDNEY NSW 2000

Attention: Byron Knight

Dear Byron,

re: **GEOTECHNICAL REVIEW – LANDSLIDE RISK ASSESSMENT**
PLANNING PROPOSAL FOR PROPOSED RESIDENTIAL DEVELOPMENT
NO.6 MITCHELL RD PALM BEACH NSW

1.0 INTRODUCTION

In response to your request (Brief dated 26 April 2022 Ref:CHS:AK:210019) Davies Geotechnical has undertaken a geotechnical review of issues relating to the proposed development at 6 Mitchell Rd Palm Beach.

The review was requested in relation to a Planning Proposal for the site, part of which requires an amendment to the Pittwater LEP 2014 concerning the zoning of the site.

Northern Beaches Council requires an amendment to a geotechnical report (Crozier Geotechnical Consultants 2018[1]) (submitted for DA2020/1596), as below:

i. the Geotechnical Report must be amended to make clear it is for the purposes of a Planning Proposal; and

ii. the Geotechnical Report must be amended to reflect the Planning Proposal and the additional permitted use for the RE1 Public Recreation zoned land on the terms above at paragraph 2(c).

The following report provides supplementary advice and opinions on the geotechnical issues of the site, associated with the above requirements, in accordance with your request in the Brief, our subsequent discussions and your email dated 4 May 2022, and our scope of work (Phases A, B & C) dated 9 May 2022. As such, we confirm this report is for the purposes of a Planning Proposal, and acknowledges:-

i. the Planning Proposal[2] for 6 Mitchell Rd, and

ii. the intended additional permitted use for the RE1 Public Recreation zoned land associated with the Planning Proposal.

[1] Crozier Geotechnical Consultants (2018) *Geotechnical Report for Proposed New Residential Development at 6 Mitchell Road Palm Beach*, prepared for Roger Bain, Project No: 2018-145, Issue 1 dated 14 August 2020.

[2] The Planning Hub (2021) *Planning Proposal 6 Mitchell Road Palm Beach* (Draft), prepared for Roger Bain, Ref:21-393 dated 28 September 2021.

2.0 SUPPLIED & AVAILABLE DOCUMENTATION

Information supplied to us via the Brief for this review is listed below:

Name	Date Modified	Date Created
0. 20220414 Index.docx	19 Apr 2022 at 1:41 am	19 Apr 2022 at 1:41 am
1. 20181100 Geotechnical Report.pdf	4 Jun 2021 at 6:02 am	4 Jun 2021 at 6:02 am
2. 20210721 Planning Proposal Pre-lodgment Meeting Application relodged.PDF	21 Jul 2021 at 6:57 am	21 Jul 2021 at 6:57 am
3. 20210928 Draft Planning Proposal - 6 Mitchell Rd, Palm Beach.pdf	14 Dec 2021 at 5:32 am	14 Dec 2021 at 5:32 am
4. 20211214 Pre-Lodgment Meeting Notes NBC.pdf	20 Dec 2021 at 12:03 am	20 Dec 2021 at 12:03 am

Supplementary information obtained from Northern Beaches Council's DA-tracking web site in July/August 2021 is listed below:

Name	Date Modified	Date Created
Architect updated design drawings.pdf	28 Jul 2021 at 4:53 pm	28 Jul 2021 at 4:53 pm
Crozier Report 6 Mitchell Rd Palm Beach.pdf	2 Aug 2021 at 8:42 am	2 Aug 2021 at 8:42 am
NB Consulting Engineering.pdf	28 Jul 2021 at 3:57 pm	28 Jul 2021 at 3:57 pm
Submissions	2 Aug 2021 at 6:57 am	31 Jul 2021 at 8:52 am
Survey.pdf	28 Jul 2021 at 3:57 pm	28 Jul 2021 at 3:57 pm

Name	Date Modified	Date Created
Submission - Minter #1.pdf	30/7/21, 4:02 pm	30 Jul 2021 at 4:02 pm
Submission - Minter #2.pdf	30/7/21, 4:19 pm	30 Jul 2021 at 4:19 pm
Submission - Smith #1.pdf	30/7/21, 4:13 pm	30 Jul 2021 at 4:13 pm
Submission - Smith #4.pdf	30/7/21, 4:25 pm	30 Jul 2021 at 4:25 pm
Submission - Thomas.pdf	30/7/21, 3:54 pm	30 Jul 2021 at 3:54 pm
Submission - Tomasay Planning #1.pdf	30/7/21, 4:10 pm	30 Jul 2021 at 4:10 pm
Submission - Tomasay Planning #2.pdf	30/7/21, 4:24 pm	30 Jul 2021 at 4:24 pm

Other information and references of a technical nature are detailed at relevant sections in the report.

3.0 METHODOLOGY ADOPTED FOR THE REVIEW

Information supplied by the Project Architect Stephen Lesiuk, and obtained from Northern Beaches Council's DA-tracking web site in July/August 2021, listed in 2.0 above was initially reviewed for an understanding of the project.

A site meeting was arranged with Stephen Lesiuk on 3 August 2021, at which time geotechnical assessment of the site was undertaken by the undersigned in company with a Principal Engineering Geologist, Matthew Kilham. A further geotechnical site inspection was carried out on 6 August 2021.

Suitable equipment and procedures were subsequently evaluated for: (i) undertaking detailed slope mapping, including rope access to cliff faces and steep slope areas, and (ii) a borehole investigation, as may be required to determine the bedrock conditions with confidence, and to confirm geotechnical hazards for the landslide risk assessment (LRA) for purposes of the proposed development on the site *the Planning Proposal seeks to enable*.

Additional geotechnical slope sections were then prepared using the available site survey and with the benefit of the site mapping and photographic documentation undertaken at the time of our site visits.

The information gathered and interpreted from our site mapping has been used in our review of the LRA issues detailed in this report.

4.0 GEOTECHNICAL ASSESSMENT / LANDSLIDE RISK ASSESSMENT

4.1 2018 Geotechnical Report

The report submitted for DA2020/1596 by Crozier Geotechnical Consultants (refer footnote at 1.0 above) is referred to in the documentation as the '*November 2018 Geotechnical Report'* or simply the *'Geotechnical Report'*.

For consistency with past documentation, we also refer to the 2018 description in this report, but note the Crozier 2018 report version was re-issued on 14 August 2020. We have not sighted the 2018 version, and any reference below to the **Crozier Report** is to the 14 August 2020 issue.

Section 3 of the Crozier report provides a useful description of the site conditions in September 2018 at the time when Crozier's assessment was undertaken, and of the site geology. The current (August 2021) conditions on site are essentially unchanged from those described by Crozier.

Sections 1 and 2 of the Crozier report provide a fair summary of the proposed development on No.6 Mitchell Rd.

On review of the geotechnical issues raised and risk assessment undertaken by Crozier and assessed in their report, we provide the following comments:-

Table of Contents	Report numbering is wrong at Contents page and throughout text sections	'3.3 Subsurface Investigation' should be 4.3; '4.0 Comments' should be re-numbered to 5.0.
Page 6, 2nd para.	"The rear of the site …. appears founded off an outcrop of sandstone …. inspection was not feasible …. steep to very steep terrain covered with vegetation"	The report does not mention No.17 Florida Rd, situated below No.6. The steep slope conditions and possibility of sandstone boulders present potential hazards and risk to No.17. This slope component must be inspected and potential risks assessed.
Page 12, 5th para.	" … excavation depth …. approximately 3.0m ….. likely requiring greater depths of rock excavation"	Borehole investigation required for defining a reliable bedrock profile and subsurface conditions, for engineering design, prior to commencement of works.
Page 13, 3rd para.	"The overhang …… adjacent to the west end of the existing house also requires additional inspection ……. "	We agree.
Page 13, 4th para.	"Additional cored boreholes ….. reduce risk to the development …"	We agree.
Page 14, 1st para.	~~4.2~~ 5.2 Site Specific Risk Assessment	Rock detachment / roll downslope from rock wall supporting lawn terrace, or from steep slope is not treated as a hazard. Very important for downslope property No.17 Florida Rd. Refer White Geotechnical report May 2014.[3]
Page 14, 2nd para, 2nd bullet point	(Hazard B) "This hazard was considered for no further assessment of the cliff line and overhang conditions and without installation of a support system	This is unclear and requires clarification by Crozier.

[3] White Geotechnical Group Pty Ltd (2014) "*17 Florida Rd Palm Beach, Retaining Wall Stability*" Letter (unaddressed) Ref: J0167, 22 May 2014, referenced in and attached to Submission for DA2020/1596 by Petrina Minter dated 15 February 2021.

Page 14, 2nd para, 4th bullet point	(Hazard C) Editorial error ? Should be Hazard D ?	Requires clarification (and edit?) by Crozier.
	~~5.0~~ 6.0 Conclusion "Several hazards were assessed to have 'unacceptable' risk levels at present ……."	Borehole investigation recommended – we agree. Development approval could only be agreed on the basis of design and construction being undertaken so as to reduce geotechnical risks to within acceptable levels.
Appendix 3, Table A	Risk to Life Errors are noted Explanations necessary for some procedures adopted in the risk analysis	For Hazards B, C & D, the Likelihood descriptors ('possible' and 'likely') don't match the numerical value of 1 x 10^{-5} ('rare') adopted for the analyses.
		There is some confusion where the second conditional probability value is adopted for the spatial impact of the slide. Given the explanation for this in the notes below the table, it should be considered as part of the vulnerability component. If the numerical value at the vulnerability cell in the analysis already factors in the impact issues explained in the notes, then the risk outcome will be higher than the calculated value.
Appendix 3, Table B	Risk to Property Error noted	At Hazard A, the adopted likelihood ('Likely') is different from that used in Table A for risk to life ('Almost Certain'). They should be the same. Consequently, the risk outcome for Hazard A may be higher ('Moderate Risk') compared to the 'Low' outcome stated.

Overall, from our review, we agree with the conclusion from the Crozier report that "unacceptable" risk levels are associated with the proposed development on No.6, and accordingly, a development approval, granted in relation to the proposed development the Planning Proposal seeks to enable, should be based on design and construction for the works being undertaken so as to reduce geotechnical risks to within acceptable levels. Based on this review, and as further detailed in this report, the Planning Proposal can be supported on geotechnical grounds.

"Acceptable" risk levels are to be as determined through application of the Pittwater Geotechnical Risk Management Policy and associated AGS 2007 Guidelines.

4.2 Updated Geotechnical Slope Sections

Hazard D identified in the Crozier report, and the cliff line conditions at the western end of the proposed development footprint, represent a considerable degree of uncertainty for assessment of the rock structure features and scale of a potential collapse mechanism.

The full extent of the cliff line at the western side of the property cannot be viewed in its entirety from the ground within No.6. A substantial part is hidden by the elevated concrete road where the road abutment lands directly on the outcropping surface at the top of the approx. 8m high cliff face and large overhang described by Crozier.

At the time of writing we have not undertaken any extension or update of the landslide risk assessment for this site. A development application with respect to the proposed development the

Planning Proposal seeks to enable should carry out such an assessment and incorporate the data from further geotechnical site investigation and mapping of the cliff lines.

To illustrate the cliff line features where they can be observed, and how the proposed new development relates to the slope geometry, four geotechnical slope sections G1 – G4 have been prepared using the available site survey details as a base plan. The section locations are indicated on the Site Plan provided in Figure 1 (attached herewith) and the sections are provided in Figures 2 – 5.

4.3 Additional Geotechnical Investigation

Should the proposed development proceed, which the Planning Proposal seeks to enable, then we would recommend the following additional geotechnical investigation of the site should occur, either as part of a development application or as Conditions of Consent:

Fieldwork

- 3no. boreholes cored in bedrock on the grass terrace
- 1no. borehole cored in bedrock at proposed garage
- Inspect and map rock cliff face (engineering geologist with rope access equipment)
- Cut/deveg. and map 3 traverse lines down lantana and overgrowth on steep slope from grass terrace to northern boundary (engineering geologist with rope access equipment)
- Inspect rear boundary area on No.17 Florida Rd (with permission from owner)
- Inspect and map other (accessible) cliff face areas (engineering geologist with rope access equipment as necessary)

Desktop

- Compile data onto sections, assess/analyse
- Review geotechnical hazards for LRA update
- Provide engineering input/parameters for structural and building design
- Review for Construction Certificate

The Site Plan in Figure 1 shows indicative locations for 6no. boreholes which can be accessed by a several types of suitable equipment, eg small, lightweight 'tight access' drilling rig, portable equipment carried onto the site, or possibly a compact but robust drilling rig using crane access.

The proposed rope access area for cliff face mapping at the western side of the development footprint and for the steep slope down to the rear northern boundary are shown on Attachment A.

5.0 THE PLANNING PROPOSAL

Considering the geotechnical conditions of the site and associated development, presently and for the future, it is our opinion there are no matters that affect consideration of the Planning Proposal prepared by The Planning Hub (refer footnote at 1.0 above).

Reference is made in the Planning Proposal to geotechnical matters under Sections 2.2 (page 12), 5.2.3 (Table 2), 5.2.4 (Table 3), 5.5 and Appendix B.

Specifically, we are aware that the Planning Proposal includes a recommendation that Schedule 1 of the Pittwater LEP 2014 be amended to include provision that would permit development for the purposes of a dwelling house on the portion of the site at 6 Mitchell R presently zoned RE1 Public Recreation.

The Planning Proposal includes an 'additional permitted use' with respect to the RE1 Public Recreation zoning on No.6 Mitchell Rd relating to 'development for the purposes of a dwelling house'.

It is our opinion that future development on the site can be designed and constructed to ensure there are no adverse impacts on the adjoining public open space from a geotechnical risk viewpoint, whereby all potential impacts are minimised and properly managed.

The above opinion is contingent upon the geotechnical recommendations and controls discussed herein being included in a development consent issued with respect to the proposed development the Planning Proposal seeks to enable. The same applies for any update to the geotechnical report submitted with a future development application.

6.0 GEOTECHNICAL CONDITIONS OF APPROVAL

*If the proposed development the Planning Proposal seeks to enable is subject to a development application, then d*etermining appropriate engineering controls, and approval conditions for their implementation, will be a critical component in achieving the relevant LEP and DCP objectives for protecting adjoining developments, namely:

(i) to ensure there are no adverse impacts on adjoining developments, and
(ii) potential impacts are minimised and properly managed.

Should the proposed development proceed to the development application assessment process, as the Planning Proposal seeks to enable, then in our opinion, recognition and allowance are required for certain geotechnical matters.

We recommend a Staged Construction Certificate should be applied for the development so that demolition, further investigations and engineering design can be undertaken as Stage 1. Ground works for the development, particularly bulk excavation, should be delayed until Stage 2, pending the geotechnical investigations and engineering design.

Additional boreholes should be drilled and further investigations undertaken as outlined at 4.3 above, 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 of the Construction Certificate approval after a Consent is determined.

The information from the further investigations must be reviewed by the project geotechnical engineer at a Hold Point in the engineering design. This would permit review of the engineering design prior to commencement of any Stage 2 ground works, and for appropriate requirements for the construction methodology, involving excavation and monitoring, to be determined and controls/hold points confirmed.

Suggested Conditions of Approval for effective geotechnical controls are provided as Attachment B.

7.0 SUMMARY / CLOSURE

The Planning Proposal for this property relates to a proposed residential re-development of the site that will encroach into a small area of the land presently zoned as RE1 Public Recreation. *This report concludes that the additional permitted use sought by the Planning Proposal can be supported from a geotechnical risk standpoint.*

The report presented above reviews an earlier Geotechnical Report submitted under DA2020/1596 with Northern Beaches Council. In turn, the Report provides recommendations for management and mitigation measures to be incorporated in a development approval, should the proposed development proceed, which the Planning Proposal seeks to enable, to ensure this will not adversely impact on the site or surrounding land.

Recommendations are included for Northern Beaches Council's framing of Conditions of Approval *for a development application in relation to the proposed development the Planning Proposal seeks to*

enable. The recommendations are intended to address the geotechnical issues highlighted in the above report.

We trust the report meets your needs. Please contact the undersigned if you require further information.

Yours faithfully
DAVIES GEOTECHNICAL Pty Ltd

Warwick N Davies MIEAust CPEng NER
APEC Engineer IntPE (Aus)
Principal Geotechnical Engineer

a21023L.docx

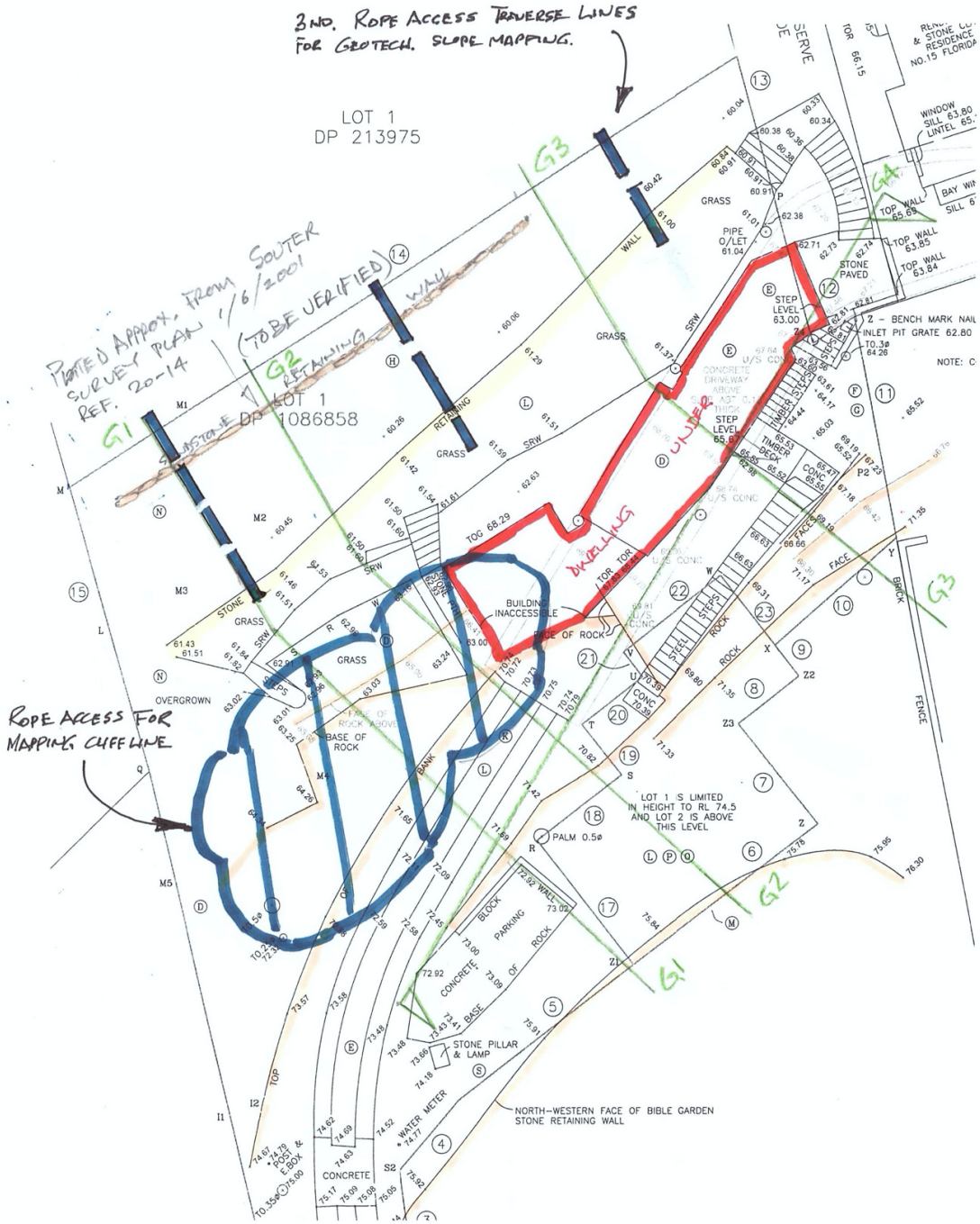
Encl:

Attachment A - Difficult Access Areas
Attachment B - Geotechnical Conditions of Approval

Figure 1 – Site Plan
Figure 2 – Geotechnical Section G1
Figure 3 – Geotechnical Section G2
Figure 4 – Geotechnical Section G3
Figure 5 – Geotechnical Section G4

ATTACHMENT A

Difficult Access Areas



ATTACHMENT B

Geotechnical Conditions of Approval

Suggested Conditions of Approval for a development application in relation to the proposed development, which the Planning Proposal seeks to enable, are detailed below for consideration and adoption by Council.

A. Form 1 and Form 1(a) are to be submitted with a Geotechnical Report accompanying a development application, in accordance with Northern Beaches Council's Geotechnical Risk Management Policy for Pittwater (Appendix 5 of DCP P21).

B. The recommendations of the submitted Geotechnical Report required under **'A'** above are to be incorporated into the engineering design and construction drawings as part of the Construction Certificate process, and must include the following requirements, as a minimum:-

a) Prior to commencement of any excavation or other ground works on the site, a Stage 1 geotechnical investigation is to be undertaken, comprising boreholes and any further investigations deemed appropriate or necessary.

b) The information from the Stage 1 investigation 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 issue of the Construction Certificate and commencement of any Stage 2 ground works.

c) The geotechnical engineer shall provide details on important subsurface conditions and suitable guidance to the structural design for excavation retention and for suitable and necessary engineering controls that must be implemented to ensure stable excavation.

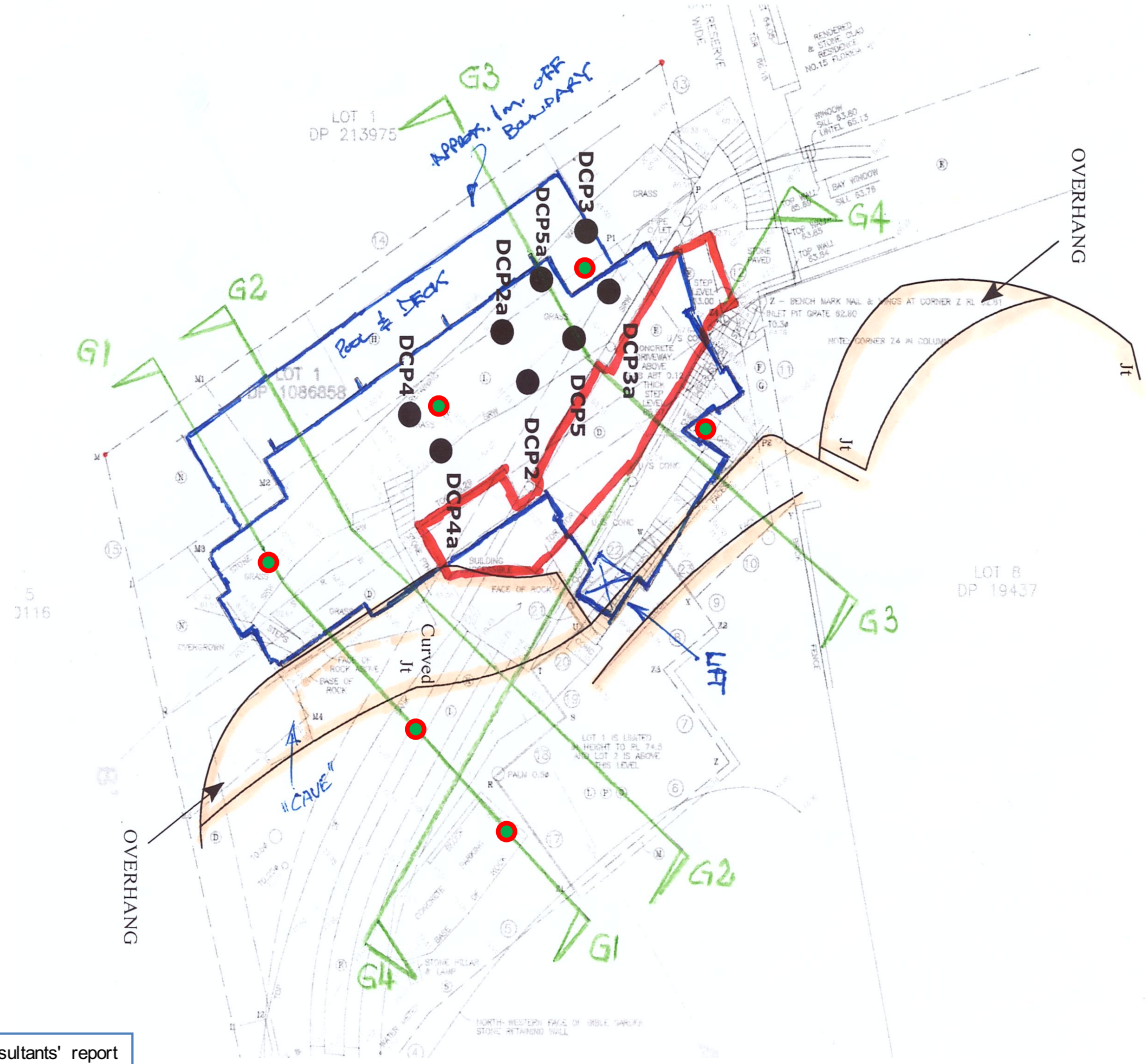
d) A Construction Methodology Statement (CMS) is to be determined, incorporating an Excavation Management Plan (EMP) and a Geotechnical Monitoring Plan (GMP), and controls/hold points are to be confirmed. The CMS/EMP/GMP are to incorporate or cross reference to:

i) excavation and support design, with regard for potential impacts of the excavation upon adjoining properties;
ii) staging, Hold Points, geotechnical controls;
iii) monitoring of excavation support for lateral deflections;
iv) monitoring of surface conditions along the boundary and building settlements on adjoining property;
v) monitoring of ground vibrations, and;
vi) monitoring of other aspects of the construction deemed important and necessary for protection of adjoining property;
vii) confirmation of geotechnical parameters for the structural engineer's design;
viii) geotechnical review of the design and monitoring program;
ix) an independent review carried out by a suitably qualified and experienced geotechnical engineer.

C. Prior to issue of the Construction Certificate, Form 2 of the Geotechnical Risk Management Policy for Pittwater (Appendix 5 of DCP P21) is to be completed and submitted to the Accredited Certifier.

D. Details demonstrating compliance are to be submitted to the Certifying Authority prior to issuing the Construction Certificate.

Reason: To ensure geotechnical risk is mitigated appropriately.



6no. proposed borehole locations

- Base plan from Crozier Geotechnical Consultants' report ref: 2018-145, Issue 1 dated 14 August 2020.
- Bedrock as interpreted by Crozier Geotechnical Consultants, and subject to verification by investigation or during construction.
- DCP's undertaken by Crozier Geotechnical Consultants, September 2018.

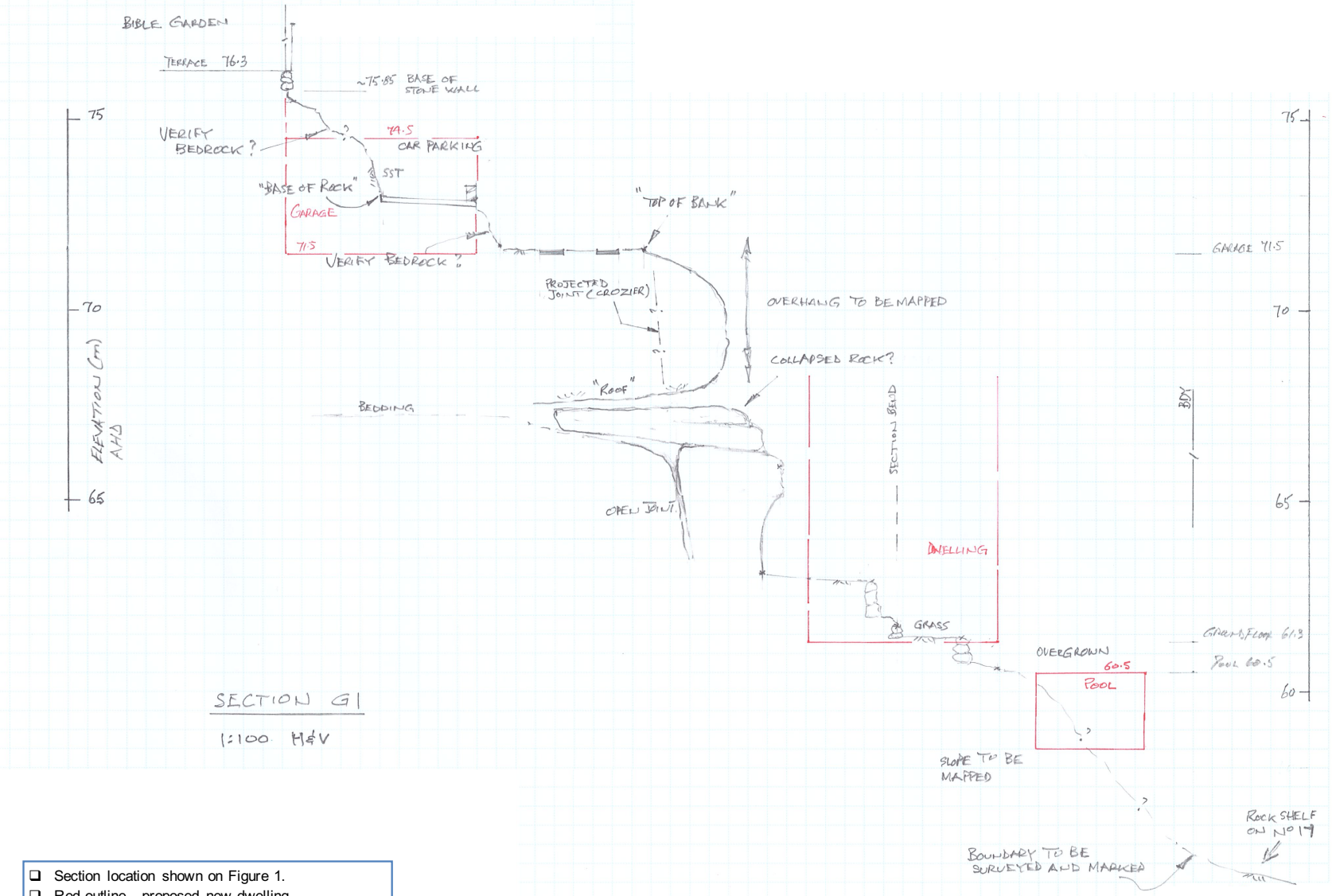
- Blue footprint - proposed new building.
- Red footprint - existing dwelling.
- Sections G1 to G4 shown on Figures 2 - 5.

DAVIES GEOTECHNICAL
CONSULTING ENGINEERS

Project No:	21-023	**Scale:**	as shown
Drawn:	wnd	**Date:**	17 Jun 22

SITE PLAN
NO.6 MITCHELL ROAD PALM BEACH NSW
(Roger Bain)

Figure 1



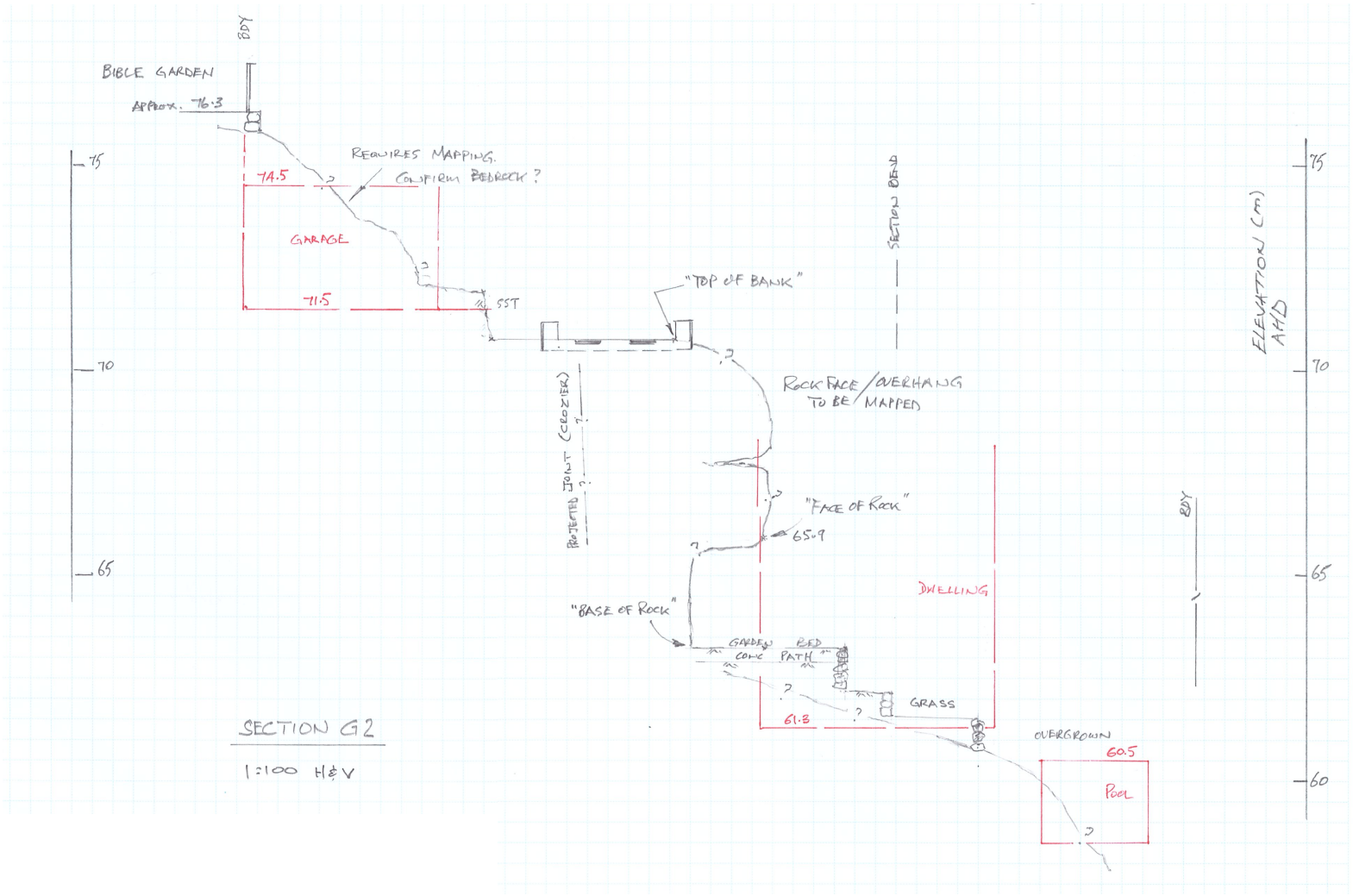
SECTION G1

1:100 H&V

- Section location shown on Figure 1.
- Red outline - proposed new dwelling.
- Survey base plan by DP Surveying ref: 3162 dated 11 September 2018.

DAVIES GEOTECHNICAL
CONSULTING ENGINEERS

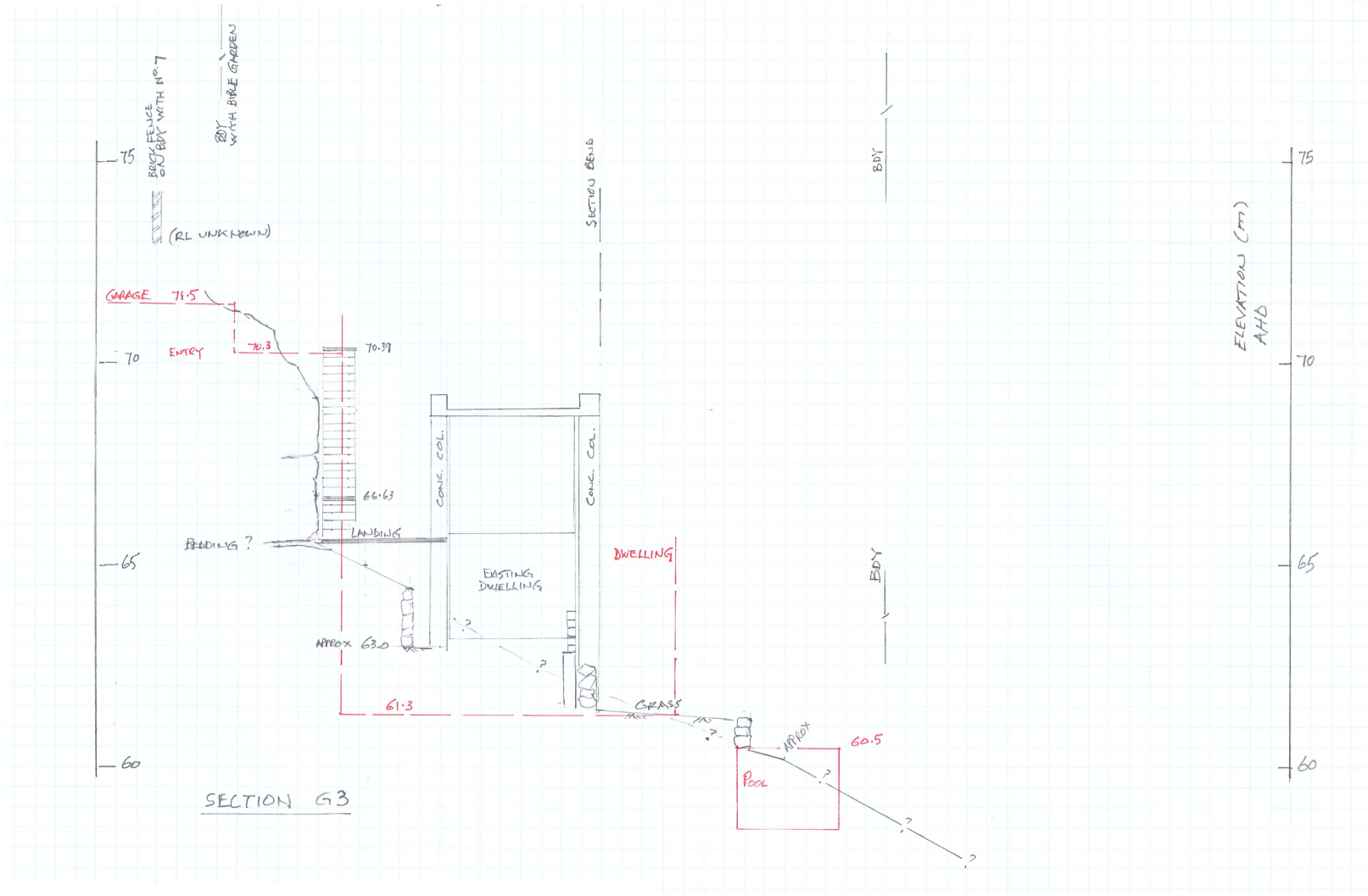
Project No:	21-023	**Scale:**	as shown	GEOTECHNICAL SECTION G1 NO.6 MITCHELL ROAD PALM BEACH NSW (Roger Bain)	**Figure 2**
Drawn:	wnd	**Date:**	17 Jun 22		



- Section location shown on Figure 1.
- Red outline - proposed new dwelling.
- Survey base plan by DP Surveying ref: 3162 dated 11 September 2018.

DAVIES GEOTECHNICAL
CONSULTING ENGINEERS

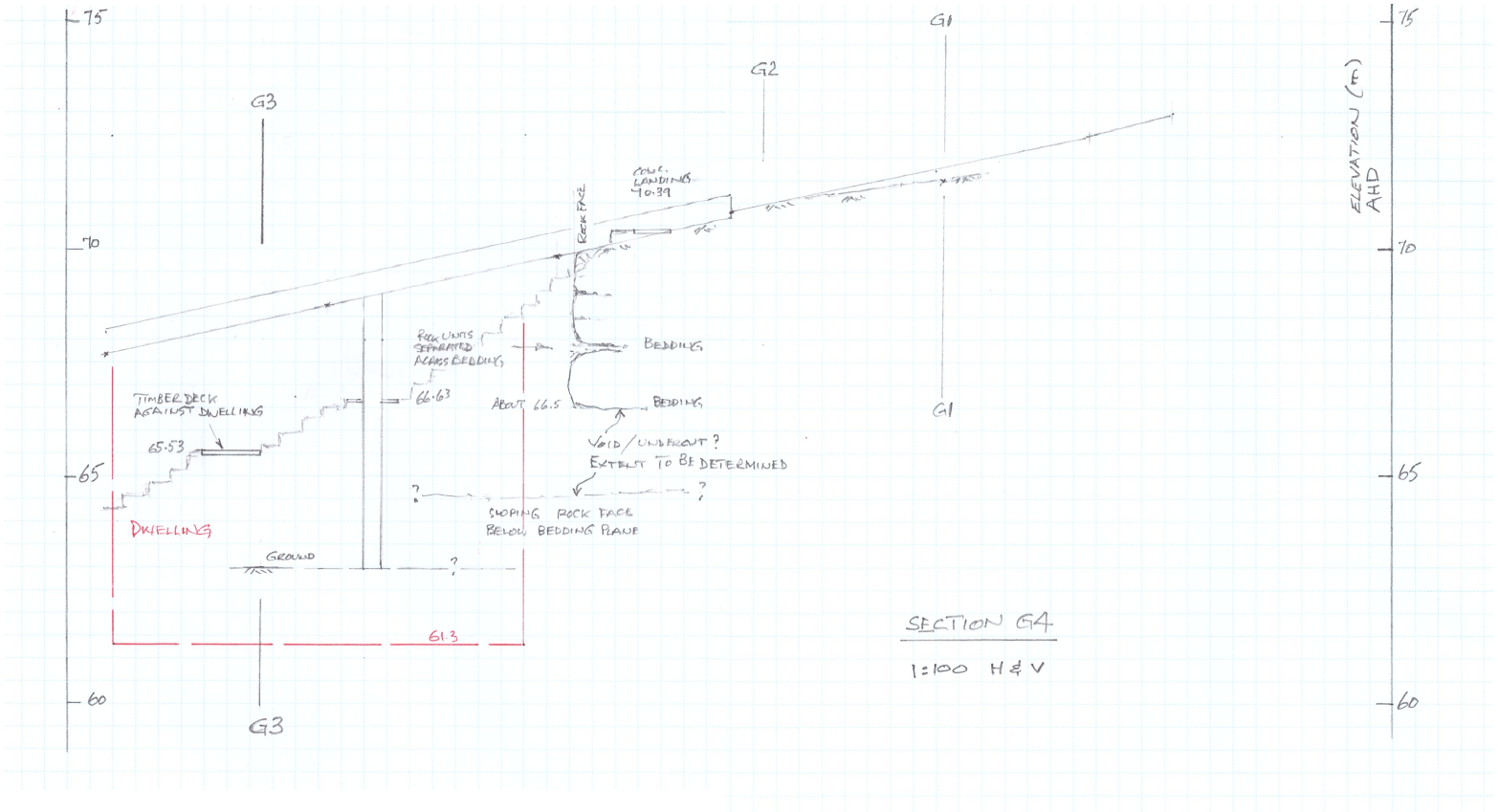
Project No:	21-023	**Scale:**	as shown	GEOTECHNICAL SECTION G2 NO.6 MITCHELL ROAD PALM BEACH NSW (Roger Bain)	**Figure 3**
Drawn:	wnd	**Date:**	17 Jun 22		



- Section location shown on Figure 1.
- Red outline - proposed new dwelling.
- Survey base plan by DP Surveying ref: 3162 dated 11 September 2018.

DAVIES GEOTECHNICAL
CONSULTING ENGINEERS

Project No:	21-023	**Scale:**	as shown	GEOTECHNICAL SECTION G3 NO.6 MITCHELL ROAD PALM BEACH NSW (Roger Bain)	**Figure 4**
Drawn:	wnd	**Date:**	17 Jun 22		



- Section location shown on Figure 1.
- Red outline - proposed new dwelling.
- Survey base plan by DP Surveying ref: 3162 dated 11 September 2018.

DAVIES GEOTECHNICAL
CONSULTING ENGINEERS

Project No:	21-023	**Scale:**	as shown	GEOTECHNICAL SECTION G4 NO.6 MITCHELL ROAD PALM BEACH NSW (Roger Bain)	**Figure 5**
Drawn:	wnd	**Date:**	17 Jun 22		