

**GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1 – To be submitted with Development Application**

Development Application for _____
Name of Applicant

Address of site 55 Robertson Road, Scotland Island

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report

I, Ben White on behalf of White Geotechnical Group Pty Ltd
(Insert Name) (Trading or Company Name)

on this the 13/8/20 certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least \$10million.

I:

Please mark appropriate box

- have prepared the detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- have examined the site and the proposed development in detail and have carried out a risk assessment in accordance with Section 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm that the results of the risk assessment for the proposed development are in compliance with the Geotechnical Risk Management Policy for Pittwater - 2009 and further detailed geotechnical reporting is not required for the subject site.
- have examined the site and the proposed development/alteration in detail and I am of the opinion that the Development Application only involves Minor Development/Alteration that does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.
- have examined the site and the proposed development/alteration is separate from and is not affected by a Geotechnical Hazard and does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.
- have provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report

Geotechnical Report Details:

Report Title: Geotechnical Report 55 Robertson Road, Scotland Island

Report Date: 12/8/20

Author: BEN WHITE


Author's Company/Organisation: WHITE GEOTECHNICAL GROUP PTY LTD

Documentation which relate to or are relied upon in report preparation:

Australian Geomechanics Society Landslide Risk Management March 2007.

White Geotechnical Group company archives.

I am aware that the above Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a Development Application for this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical Risk Management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature 
Name Ben White
Chartered Professional Status MScGEOLAusIMM CP GEOL
Membership No. 222757
Company White Geotechnical Group Pty Ltd

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist of Requirements for Geotechnical Risk Management Report for
Development Application

Development Application for _____	Name of Applicant
Address of site <u>55 Robertson Road, Scotland Island</u>	

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Report. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).


Geotechnical Report Details:

Report Title: Geotechnical Report <u>55 Robertson Road, Scotland Island</u>
Report Date: <u>12/8/20</u>
Author: <u>BEN WHITE</u>
Author's Company/Organisation: <u>WHITE GEOTECHNICAL GROUP PTY LTD</u>

Please mark appropriate box

- Comprehensive site mapping conducted 7/8/20
(date)
- Mapping details presented on contoured site plan with geomorphic mapping to a minimum scale of 1:200 (as appropriate)
- Subsurface investigation required
 - No Justification _____
 - Yes Date conducted 7/8/20
- Geotechnical model developed and reported as an inferred subsurface type-section
- Geotechnical hazards identified
 - Above the site
 - On the site
 - Below the site
 - Beside the site
- Geotechnical hazards described and reported
- Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
 - Consequence analysis
 - Frequency analysis
- Risk calculation
- Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater - 2009
- Opinion has been provided that the design can achieve the "Acceptable Risk Management" criteria provided that the specified conditions are achieved.
- Design Life Adopted:
 - 100 years
 - Other _____
specify
- Geotechnical Conditions to be applied to all four phases as described in the Geotechnical Risk Management Policy for Pittwater - 2009 have been specified
- Additional action to remove risk where reasonable and practical have been identified and included in the report.
- Risk assessment within Bushfire Asset Protection Zone.

I am aware that Pittwater Council will rely on the Geotechnical Report, to which this checklist applies, as the basis for ensuring that the geotechnical risk management aspects of the proposal have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated, and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.


Signature _____
Name Ben White
Chartered Professional Status MScGEOLAusIMM CP GEOL
Membership No. 222757
Company White Geotechnical Group Pty Ltd

GEOTECHNICAL INVESTIGATION:

Alterations and Additions at 55 Robertson Road, Scotland Island

1. Proposed Development

- 1.1** Construct a new deck on the downhill side of the house.
- 1.2** Construct a new lower ground floor extension.
- 1.3** Various other internal and external alterations.
- 1.4** Details of the proposed development are shown on 7 drawings prepared by Hao Design Pty Ltd, project number 1808141, drawings numbered 01 to 07, Revision A, dated 8/7/20.

2. Site Description

- 2.1** The site was inspected on the 7th August, 2020, and previously on the 20th September, 2018.
- 2.2** This waterfront residential property is on the low side of the road and has a N aspect. It is positioned on the moderate to steeply graded lower reaches of a hillslope. From the road frontage, the natural slope falls at an average angle of ~11° before increasing to ~45° near the waterfront. The land surface above the property continues at moderate angles.
- 2.3** Between the road frontage and the house, the slope has been terraced with a series of stable treated timber retaining walls reaching ~0.6m high (Photos 1, 2, & 3). The part two-storey timber framed and weatherboard clad house is supported on stable timber posts (Photo 4). Excavations have been made in the slope to create level platforms for the ground floor and lower ground floor. The cuts are supported by stable concrete block and treated timber retaining walls reaching ~1.8m high (Photos 5 & 6). A gently sloping lawn has been cut into the slope on the downhill side of the house. The proposed timber deck that is the subject of this report has been

constructed in this location. A stable stepped treated timber retaining wall supports a fill for a garden bed below the deck. The steps are ~0.6m high (Photo 7). From the base of the wall, the slope falls steeply to the waterfront (Photo 8). Competent Medium Strength Sandstone was observed to be outcropping through the slope and at the beach below (Photos 9 & 10). The waterfront was undergoing remediation works at the time of the inspection due to a small landslide that had occurred earlier in the year. This involved installing a sandstone block wall. The incomplete works to date appear to have temporarily stabilised the site. Upon completion, the site can be considered permanently stabilised.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. This is described as interbedded laminite, shale, and quartz to lithic quartz sandstone. There is a band of sandstone at the waterfront that extends through the otherwise shale-dominated profile.

4. Subsurface Investigation

Two Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to weathered rock. The locations of the tests are shown on the site plan. It should be noted that a level of caution should be applied when interpreting DCP test results. The test will not pass through hard buried objects so in some instances it can be difficult to determine whether refusal has occurred on an obstruction in the profile or on the natural rock surface. This is not expected to be an issue for the testing on this site. However, excavation and foundation budgets should always allow for the possibility that the interpreted ground conditions in this report vary from those encountered during excavations. See the appended "Important information about your report" for a more comprehensive explanation. The results are as follows:

DCP TEST RESULTS – Dynamic Cone Penetrometer		
Equipment: 9kg hammer, 510mm drop, conical tip.		Standard: AS1289.6.3.2 - 1997
Depth(m) Blows/0.3m	DCP 1 (~RL10.9)	DCP 2 (~RL10.8)
0.0 to 0.3	3	6
0.3 to 0.6	13	17
0.6 to 0.9	17	25
0.9 to 1.2	30	30
1.2 to 1.5	#	#
	End of Test @ 1.2m	End of Test @ 1.2m

#refusal/end of test. F=DCP fell after being struck showing little resistance through all or part of the interval.

DCP Notes:

DCP1 – End of test @ 1.2m, DCP still very slowly going down, orange and maroon shale on dry tip.

DCP2 – End of test @ 1.2m, DCP still very slowly going down, clean dry tip, maroon clay in collar above tip.

5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. In the location of the proposed works they consist of a thin topsoil over silty clays. In the test locations, the clays merge into the weathered zone of the underlying shale at an average depth of ~0.9m below the current surface. The weathered zone is interpreted as Extremely Low Strength Shale. It is to be noted that this material can appear as a mottled stiff clay when it is cut up by excavation equipment. See Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

Normal ground water seepage is expected to move over the buried surface of the clay and rock and through the cracks in the rock. Due to the slope and elevation of the block, the water table in the location is expected to be many metres below the base of the proposed works.

7. Surface Water

No evidence of surface flows were observed on the property during the inspection. It is expected that normal sheet wash will move onto the site from above the property during heavy down pours. Robertson Road above will provide only limited drainage diversion from surface flows as the road is not guttered above the subject property.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed below or beside the property. The moderate to steep land surface that falls across the property and continues above is a potential hazard (**Hazard One**). Further movement of the failed slope at the waterfront is a potential hazard (**Hazard Two**).

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The moderate to steep land surface that falls across the property and continues above failing and impacting on the house and proposed development.	Further movement of the failed slope at the waterfront impacting on the property and stabilisation works.
LIKELIHOOD	'Unlikely' (10^{-4})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (15%)	'Medium' (15%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Moderate' (2×10^{-4})
RISK TO LIFE	9.6×10^{-7} /annum	9.6×10^{-7} /annum
COMMENTS	This level of risk is 'ACCEPTABLE' provided the recommendations in Section 13 are carried out	This level of risk is 'TOLERABLE'. On completion of the stabilisation works, this will become an Acceptable level of risk.

(See Aust. Geomech. Jnl. Mar 2007 Vol. 42 No 1, for full explanation of terms)

9. Suitability of the Proposed Development for the Site

The proposed development is suitable for the site. No geotechnical hazards will be created by the completion of the proposed development provided it is carried out in accordance with the requirements of this report and good engineering and building practice.

10. Stormwater

No significant additional stormwater runoff will be created by the proposed development.

11. Excavations

Apart from those for footings, no excavations are required.

12. Foundations

The proposed lower ground floor addition is to be supported entirely off the existing structure so no new foundations will be required.

Upon inspection of the site it was apparent the proposed deck on the downhill side of the house had already been constructed. The owner informed us it was supported on 300mm diameter piers taken to a depth of 0.6m. Our ground testing around the deck indicates these foundations are on stiff to hard natural clays with an adequate bearing capacity to support the structure. From a geotechnical perspective, the as-built deck appears adequate.

13. Site Maintenance/Remedial Works

Where slopes approach or exceed 30°, such as on the downhill side of the property (Photo 8), it is prudent for the owners to occasionally inspect the slope (say annually or after heavy rainfall events, whichever occurs first). Should any of the following be observed: movement or cracking in retaining walls, cracking in any structures, cracking or movement in the slope surface, tilting or movement in established trees, leaking pipes, or newly observed flowing water, or changes in the erosional process or drainage regime, then a geotechnical consultant should be engaged to re-assess the slope. We can carry out these inspections upon request. The risk assessment in **Section 8** is subject to this site maintenance being carried out.

14. Inspections

As the proposed deck has already been constructed and the proposed lower ground floor addition does not require any new footings, no additional inspections are required.

White Geotechnical Group Pty Ltd.



Ben White M.Sc. Geol.,
AusIMM., CP GEOL.
No. 222757
Engineering Geologist



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9: This portion of the slope is under construction as part of a separate DA.



Photo 10: This photo was taken prior to the construction works to show the outcropping sandstone.

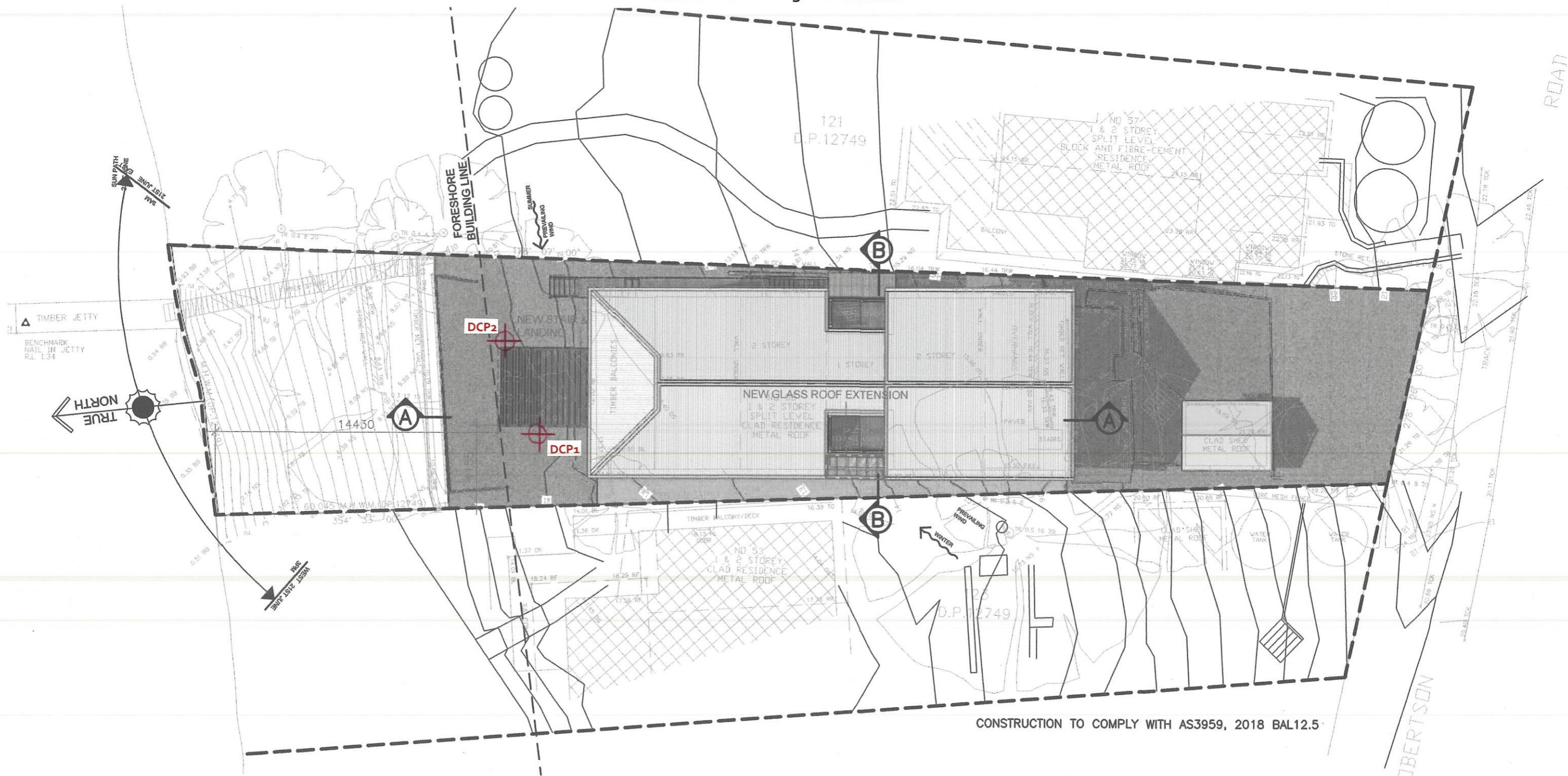
Important Information about Your Report

It should be noted that Geotechnical Reports are documents that build a picture of the subsurface conditions from the observation of surface features and testing carried out at specific points on the site. The spacing and location of the test points can be limited by the location of existing structures on the site or by budget and time constraints of the client. Additionally, the test themselves, although chosen for their suitability for the particular project, have their own limiting factors. The testing gives accurate information at the location of the test, within the confines of the test's capability. A geological interpretation or model is developed by joining these test points using all available data and drawing on previous experience of the geotechnical consultant. Even the most experienced practitioners cannot determine every possible feature or change that may lie below the earth. All of the subsurface features can only be known when they are revealed by excavation. As such, a Geotechnical report can be considered an interpretive document. It is based on factual data but also on opinion and judgement that comes with a level of uncertainty. This information is provided to help explain the nature and limitations of your report.

With this in mind, the following points are to be noted:

- If upon the commencement of the works the subsurface ground or ground water conditions prove different from those described in this report, it is advisable to contact White Geotechnical Group immediately, as problems relating to the ground works phase of construction are far easier and less costly to overcome if they are addressed early.
- If this report is used by other professionals during the design or construction process, any questions should be directed to White Geotechnical Group as only we understand the full methodology behind the report's conclusions.
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.
- This report should not be applied to any other project other than that outlined in section 1.0.
- This report is to be read in full and should not have sections removed or included in other documents as this can result in misinterpretation of the data by others.
- It is common for the design and construction process to be adapted as it progresses (sometimes to suit the previous experience of the contractors involved). If alternative design and construction processes are required to those described in this report, contact White Geotechnical Group. We are familiar with a variety of techniques to reduce risk and can advise if your proposed methods are suitable for the site conditions.

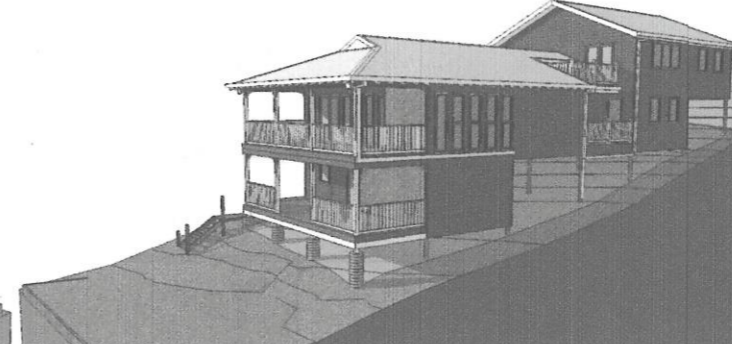
SITE PLAN – showing test locations



EXISTING VIEW #1



PROPOSED VIEW #1



EXISTING VIEW #2



PROPOSED VIEW #2



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admin@hao.com.au

A	DEVELOPMENT APPLICATION	06JUL20
REVISION	AMENDMENT	DATE

PROJECT:

ALTERATIONS & ADDITIONS

LOT 122, DP 12749
55 ROBERTSON ROAD
SCOTLAND ISLAND NSW 2105



DRAWING TITLE:

SITE PLAN, SITE ANALYSIS & PERSPECTIVE VIEWS

DRAWING STATUS:

DEVELOPMENT APPLICATION

SCALE:

1:200

CAD FILE:

DA01_Plan_Site.dwg

SIZE:

A3

DESIGN:

DL

CAD:

DL

DATE:

8 JULY 2020

PROJECT No:

1808141

DRAWING No:

01

REVISION:

A

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

RL 22.86
RIDGE

RL 20.36
RIDGE

RL 15.96
UPPER GROUND

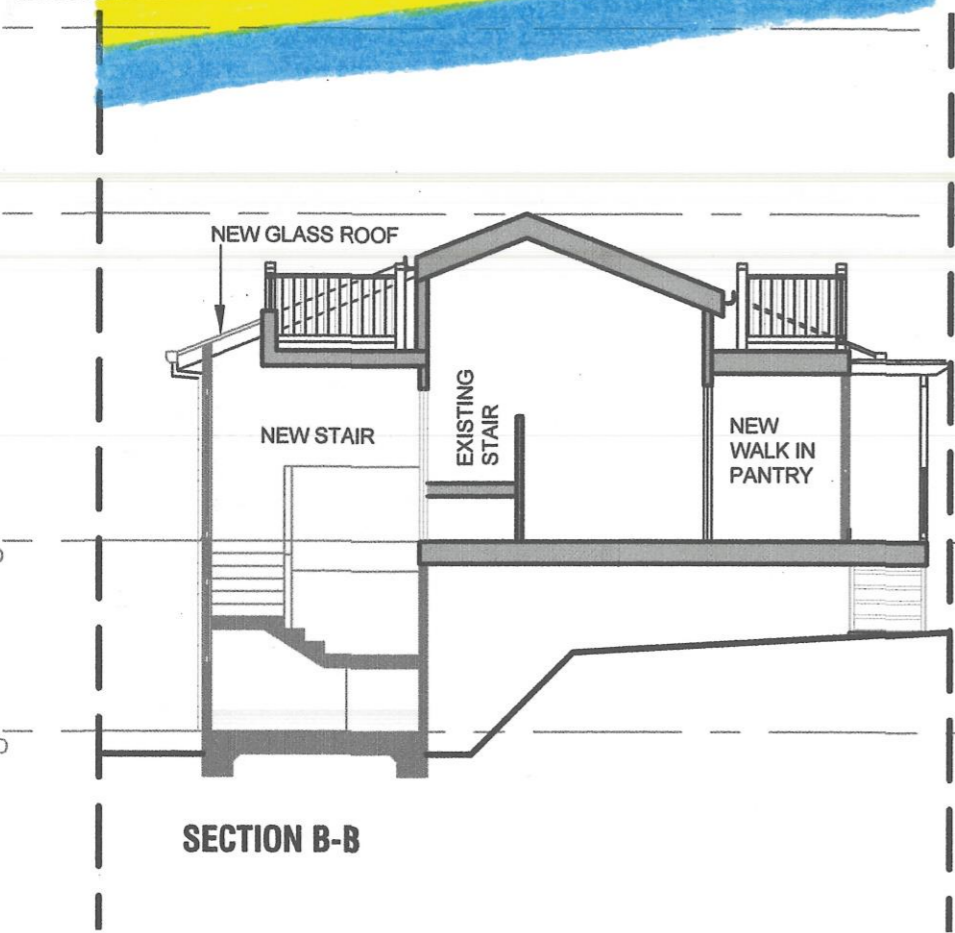
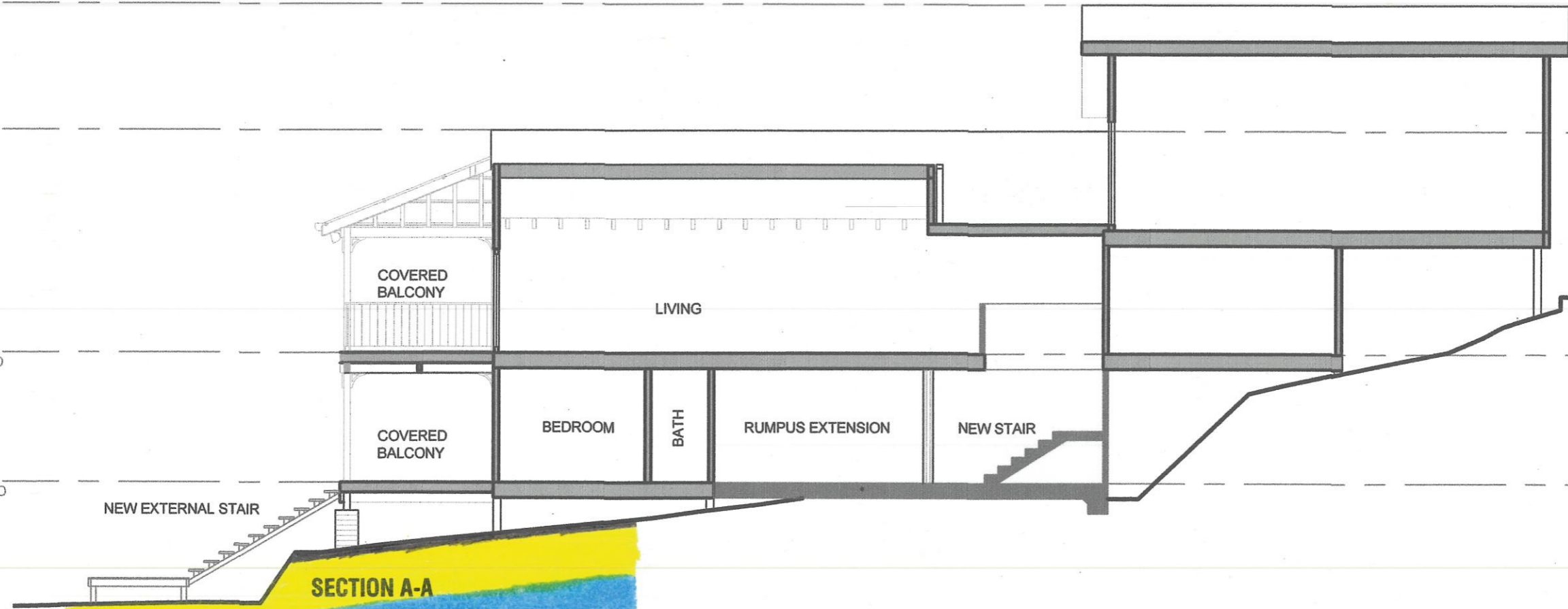
RL 13.40
LOWER GROUND

RL 22.86
RIDGE

RL 20.36
RIDGE

RL 15.96
UPPER GROUND

RL 13.40
LOWER GROUND




- Fill
- Topsoil
- Silty Clay – Firm to Stiff
- Narrabeen Group Rocks – Extremely Low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.

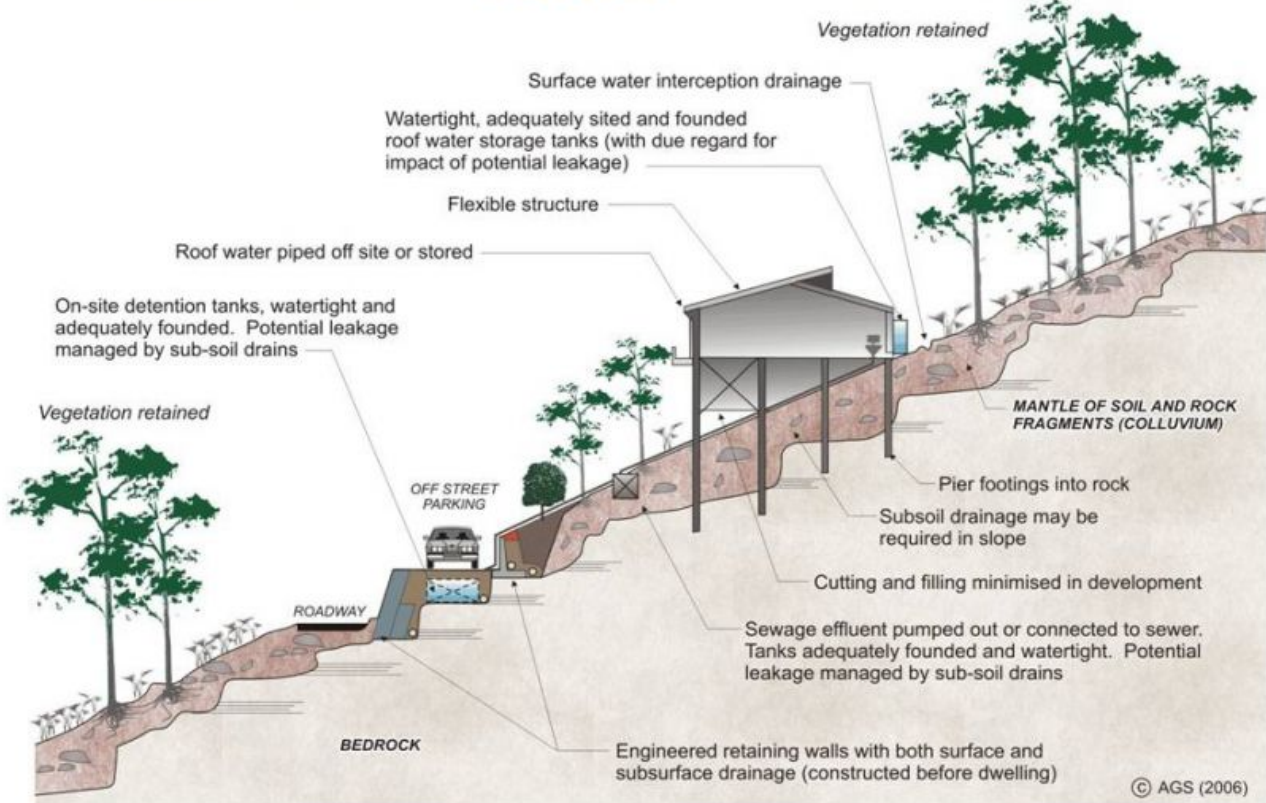
LEGEND:

- NEW
- EXISTING

CONSTRUCTION TO COMPLY WITH AS3959, 2018 BAL12.5

 <p>www.hao.com.au M: 0403 263 365 admin@hao.com.au</p>	<p>PROJECT: ALTERATIONS & ADDITIONS</p> <p>LOT 122, DP 12749 55 ROBERTSON ROAD SCOTLAND ISLAND NSW 2105</p>	<p>DRAWING TITLE: SECTIONS</p> <p>DRAWING STATUS: DEVELOPMENT APPLICATION</p>	<p>SCALE: 1:100</p> <p>SIZE: A3</p> <p>DATE: 8 JULY 2020</p>	<p>CAD FILE: Elev-Sec.dwg</p> <p>DESIGN: DL</p> <p>CAD: DL</p>	<p>PROJECT No: 1808141</p> <p>DRAWING No: 07</p> <p>REVISION: A</p>				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">REVISION</th> <th style="width: 10%;">AMENDMENT</th> <th style="width: 10%;">DATE</th> </tr> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">DEVELOPMENT APPLICATION</td> <td style="text-align: center;">08JUL20</td> </tr> </table>	REVISION	AMENDMENT	DATE	A	DEVELOPMENT APPLICATION	08JUL20		
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A	DEVELOPMENT APPLICATION	08JUL20							

EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE

