

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

Development Application for _____ Peta Crafter _____
Name of Applicant
Address of site _____ 41 Robertson Road, Scotland Island, NSW

Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report

I, Troy Crozier on behalf of Crozier Geotechnical Consultants 13 December 2023 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 \$2million.

- I:
- ☐ 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:

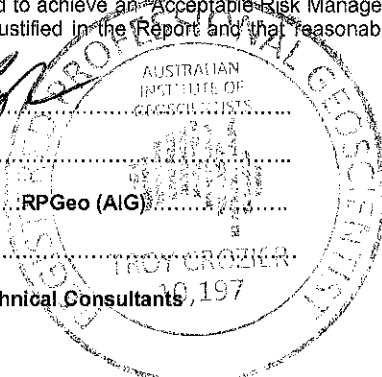
Report Title: Geotechnical Report for Proposed Alterations and Additions
Report Date: 13 December 2023 Project No.: 2012-074.1
Author: Ben Taylor
Author's Company/Organisation: Crozier Geotechnical Consultants

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

Architectural Drawings – James de Soyres & Associates, Project No.: 1108, Drawing No.: DC-11, DC-12, DC-20, DC-21, DC-30, DC-31, Dated: 30/10/2023
Survey Plan – H & S Land Surveyors, Reference No.: 23082, Sheets 1 to 2 of 2, Rev A, Dated: 242/08/2023

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 Troy Crozier
Name Troy Crozier
Chartered Professional Status RPGeo (AIG)
Membership No.: 10197
Company Crozier Geotechnical Consultants



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

Development Application for _____	Peta Crafter
Name of Applicant	
Address of site 41 Robertson Road, Scotland Island, NSW, NSW	

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:

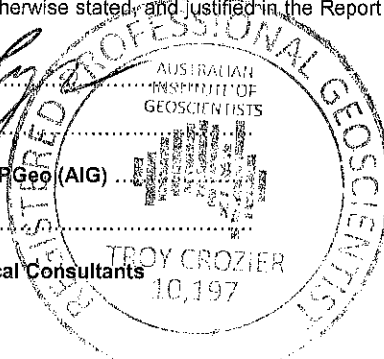
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Author: Ben Taylor	
Author's Company/Organisation: Crozier Geotechnical Consultants	

Please mark appropriate box

- ☒ Comprehensive site mapping conducted 30 November 2023
- ☐ 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 conducted10th May 2012.....
- ☐ 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 ...50 years for remnant structure post renovations.
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 ...Troy Crozier.....
 Chartered Professional Status...RPGeo (AIG).....
 Membership No. ...10197.....
 Company... Crozier Geotechnical Consultants



REPORT ON GEOTECHNICAL ASSESSMENT

for

PROPOSED NEW ALTERATIONS AND ADDITIONS

at

41 ROBERTSON ROAD, SCOTLAND ISLAND, NSW

Prepared For

Peta Crafter

Project No.: 2012-074.1

Document Revision Record

Issue No	Date	Details of Revisions
0	13 December 2023	Original issue

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Date: 13th December 2023

Project No: 2012-074.1

Page: 1 of 8

**GEOTECHNICAL REPORT FOR PROPOSED NEW ALTERATIONS AND ADDITIONS AT
41 ROBERTSON ROAD, SCOTLAND ISLAND, NSW**

1. INTRODUCTION:

This report details the results of a landslip assessment required by Northern Beaches Council for proposed alterations and additions at 41 Robertson Road, Scotland Island, NSW. The assessment was undertaken by Crozier Geotechnical Consultants (CGC) at the written request of James de Soyres Architects on behalf of the client, Peta Crafter. CGC previously undertook a geotechnical investigation at the site prior to the construction of the existing dwelling (Report 2012-074 Dated May 2012).

It is understood that the proposed works involve the construction of an additional level on the existing dwelling. It is further understood that no excavation will be required as part of the works.

The site is located within the H1 (highest category) landslip hazard zone as identified within Northern Beaches Councils precinct (Geotechnical Risk Management Policy for Pittwater – 2009). This report has been prepared to meet the Council Policy Requirements of Paragraph 6.5. This geotechnical report is provided in support of the Development Application (DA) and assesses the landslip risk to ensure ‘Acceptable’ risk levels are achieved and can be maintained for the remnant design life of the existing structure.

The investigation comprised:

- a) A detailed geotechnical inspection and mapping of the site and adjacent properties by a Senior Geotechnical Engineer.
- b) Review of CGC database on local geotechnical conditions as well as previous works undertaken on the site

The following plans were supplied and relied upon for the work:

- Architectural Drawings – James de Soyres & Associates, Project No.: 1108, Drawing No.: DC-11, DC-12, DC-20, DC-21, DC-30, DC-31, Dated: 30/10/2023
- Survey Drawing – H & S Land Surveyors, Reference No.: 23082, Sheets 1 to 2 of 2, Rev A, Dated: 242/08/2023

2. SITE FEATURES:

2.1. Description:

The site is located on the low north side of Robertson Road on the waterfront on the northern side of Scotland Island. The site extends out along a low ridge line that forms a point on the north-west corner of Scotland Island, Sydney, NSW.

It is an elongated triangular shaped block with long western side boundary of 76.3m, curved front southern boundary to Robertson Road of 10.2m and eastern side boundary of 57.86m. The northern property boundary is irregular and formed by the Mean High-Water Mark. The site can be separated into two separate geomorphological units:

- an upper gently sloping portion which occupies the majority of the site at the southern end and contains the existing house
- a narrow steeply sloping area at the northern end of the site which extends down to the foreshore and Mean High Water Mark.

The upper portion of the site has an average surface slope of -10° towards 330° magnetic north whilst the northern end has slope segments of up to 40° .

2.2. Geology:

Reference to the Sydney 1:100,000 Geological Series sheet (9130) indicates that the site is underlain by Newport Formation (Upper Narrabeen Group) rock (Rnn) which is of middle Triassic Age. The Newport Formation typically comprises interbedded laminite, shale and quartz to lithic quartz sandstones and pink clay pellet sandstones. The rock unit was identified and mapped on the present and adjacent sites.

Narrabeen Group rocks are dominated by shales and thin siltstone beds and often form rounded convex ridge tops with moderate angle ($<20^{\circ}$) side slopes. These side slopes can be either concave or convex depending on geology, internally they comprise shale beds with close spaced bedding partings that have either close spaced vertical joints or in extreme cases large space convex joints. The shale often forms deeply weathered silty clay soil profiles (medium to high plasticity) with thin silty colluvial cover.

3. FIELD WORK:

3.1. Methods:

The field investigation for the proposed works comprised a walk over inspection and mapping of the site and limited inspection of adjacent properties on the 30th November 2023 by a Senior Geotechnical Engineer which included a photographic record of site conditions as well as geological/geomorphological mapping of the site and adjacent land.

A previous investigation had been conducted on 10th May 2012 which included the drilling of three hand auger boreholes (BH1 to BH3) to investigate sub-surface geology. Penetrometer testing (DCP1 to DCP4) was conducted in accordance with AS1289.6.3.2 – 1997, “Determination of the penetration resistance of a soil – 9kg dynamic cone penetrometer” to estimate soil properties and confirm depths to bedrock.

Explanatory notes are included in Appendix: 1.

3.2. Field Observations:

The site is situated on the northern side of the island with access via Robertson Road to the south and water access via a pier extending from the northern site boundary into Pittwater. Robertson Road comprises a sealed road in poor condition which slopes gently down from both the southwest and the east towards a drain at the front of the site. The site is located at the base of a slope which is gently (<10°) north dipping across the majority of the site, with a narrow section of very steeply (~30°) north dipping slope at the northern end of the site near the waterfront below the existing dwelling.

The southern portion of the site comprises gently north sloping lawn, with water tanks near the front, southern boundary. The area contains some mature trees, with sandstone block retaining walls up to 1.0m in height and in good condition, with ground level garden beds along the western site boundary.

The site dwelling comprises one and two-storey sandstone and weatherboard structure, with timber decking to the north. An inspection of the subfloor indicated the structure is founded on concrete piers founded at unknown depth, however based on previous work on the site is understood to be on competent bedrock. The structure appears to be in good condition with no visible cracking or signs of excessive settlement visible.

Below the house to the site slopes very steeply down to the waterfront, with an elevated timber staircase leading down. The slope is vegetated with sandstone block retaining walls up to 1.0m in height each and in good condition, while sandstone boulders are visible to the east. A 2.30m high rendered retaining wall which appeared in good condition supports the lower portion of the slope.

At the waterfront the site contains a weatherboard boathouse studio structure built against the rendered retaining wall. The structure appears to be in good condition, with a stone sea wall supporting this area. Sandstone bedrock outcrops were exposed below the base of both sea walls as a low rock platform.

There were no indications of excess deterioration, erosion or deformation to suggest underlying slope instability or geotechnical hazards.

General views of the site at the time of investigation are provided in Photograph-1 to Photograph-5.



Photograph: 1 – Southern side of site showing lawn area, looking north



Photograph: 2 – Southern side of existing weatherboard dwelling



Photograph: 3 – Concrete piers below existing dwelling as viewed from subfloor access



Photograph: 4 – Slope below existing house with vegetation and sandstone block retaining walls



Photograph 5 – Site as viewed from pier, showing boathouse and main dwelling structure, looking south

The neighbouring property to the east (No. 43) is similarly formed to the site with a partly raised timber house located on the front half and lawns and gardens extending to the rear. A steep natural slope occupies the rear edge of this block, similar to that of the site.

The neighbouring property to the west (No. 39) contains gently sloping lawns and gardens across the front half of the block with a single storey timber house located at the rear, adjacent to the sites house and the crest of the steep natural slope to the north. The steep slope within this site is generally devoid of soil and contains only low sparse vegetation exposing a natural cliff line of up to 5.0m height. This cliff contains a thick sandstone unit near its crest underlain by closely bedded, interbedded sandstone and shale bedrock. At the base of this cliff is a gently sloping lawn terrace supported on its northern edge by a sandstone rock sea wall.

The neighbouring buildings and properties were only inspected from within the site or from the road reserve however the visible aspects did not show any signs of large-scale slope instability or other major geotechnical concerns which would impact the site.

4. COMMENTS:

4.1. Geotechnical Model:

Based on conditions exposed within the site and from the previous investigation at the site, the sub-surface conditions within the site are expected to comprise minor fill soils of variable composition over silty clay to sandy clayey soils containing ironstone bands with very low to low strength siltstone/sandstone bedrock (including iron rich bands) generally within 1.0m depth of surface. The bedrock is expected to grade to medium strength by approximately 3.0m depth, however variability can be high within the local geological sequence.

4.2. Geotechnical Assessment:

The geotechnical inspection did not identify any signs of previous or impending large scale or deep-seated landslide instability within the site or adjacent properties. The existing main residential structure is understood to be ~10 years of age and shows no signs of slope movement whilst there are no indications of excess surface stormwater flow, groundwater seepage or erosion within the site.

The proposed works involve the construction of an additional level on the existing dwelling. It is further understood that no new footings or excavation will be required as part of the works.

It is considered that the additional level may be added to the existing dwelling without introducing any instability or hazards to the site. However, assessment of settlement induced by the extra load has not been undertaken and any increased loading has potential to induce cracking within the existing structure, although this will not impact stability or increase landslide risk levels.

The recommendations and conclusions in this report are based on an assessment utilizing only surface observations and a limited inspection of neighbouring properties. However, based on the site geological and topographical conditions, along with existing structures. It is considered that the updated/modernized residential structure will have a design life of 50 years from completion of the proposed works.

4.3. Slope Stability & Risk Assessment:

Based on our site mapping and understanding of the proposed works no credible geological/geotechnical landslide hazards were identified which need to be considered in relation to the existing site and proposed development works. As such a risk assessment is not required as the works are considered separate from, and not affected by a geotechnical landslide hazard.

4.4. Conditions Relating to Design and Construction Monitoring:

If requested by Council to complete Forms: 2b and 3 as part of construction, building and post-construction certificate requirements of the Councils Geotechnical Risk Management Policy 2009, it will be necessary for Crozier Geotechnical Consultants to:

1. Review and approve the structural drawings for compliance with the recommendations of this report,

The client and builder should make themselves familiar with the Councils Geotechnical Policy. Crozier Geotechnical Consultants can not sign Form: 3 of the policy for an occupation certificate if it has not reviewed structural designs.

4.5. Design Life of Structure:

We have interpreted the design life requirements specified within Council's Risk Management Policy to refer to structural elements designed to support the existing structures, control stormwater and maintain the risk of instability within acceptable limits. Specific structures and features that may affect the maintenance and stability of the site in relation to the proposed and existing development are considered to comprise:

- stormwater and subsoil drainage systems,
- retaining walls and instability,
- maintenance of trees/vegetation on this and adjacent properties.

Man-made features should be designed and maintained for a design life consistent with surrounding structures (as per AS2870 – 2011 (100 years)). It will be necessary for the structural and geotechnical engineers to incorporate appropriate design and inspection procedures during the construction period. Additionally, the property owner should adopt and implement a maintenance and inspection program.

If this maintenance and inspection schedule are not maintained the design life of the property cannot be attained. A recommended program is given in Table: C in Appendix: 3 and should also include the following guidelines.

- The conditions on the block don't change from those present at the time this report was prepared, except for the changes due to this development.
- There is no change to the property due to an extraordinary event external to this site
- The property is maintained in good order and in accordance with the guidelines set out in;
 - a) CSIRO sheet BTF 18
 - b) Australian Geomechanics "Landslide Risk Management" Volume 42, March 2007.
 - c) AS 2870 – 2011, Australian Standard for Residential Slabs and Footings

Where changes to site conditions are identified during the maintenance and inspection program, reference should be made to relevant professionals (e.g. structural engineer, geotechnical engineer or Council). Where the property owner has any lack of understanding or concerns about the implementation of any component of the maintenance and inspection program the relevant engineer should be contacted for advice or to complete the component. It is assumed that Council will control development on neighbouring properties, carry out regular inspections and maintenance of the road verge, stormwater systems and large trees on public land adjacent to the site so as to ensure that stability conditions do not deteriorate with potential increase in risk level to the site.

Also, individual Government Departments will maintain public utilities in the form of power lines, water, and sewer mains to ensure they don't leak and increase either the local groundwater level or landslide potential.

5. CONCLUSION:

The inspection and assessment identified no obvious slope movement, excess surface stormwater flow or seepage, erosion or instability within the site or adjacent properties. The entire site and surrounding slopes have been assessed as per the Northern Beaches Council - Geotechnical Risk Management Policy for Pittwater and no credible landslip hazards were identified whilst the proposed works are relatively minor from a geotechnical perspective and should not create any landslip hazards. Therefore, the proposed works are separate from and not affected by a geotechnical hazard, and no further reporting is required as part of this DA.

It is considered that the site will meet the 'Acceptable' risk management criteria for the design life of the development, taken as 100 years, provided the property is maintained as per the recommendations of this report.

Prepared by:



Ben Taylor
Senior Geotechnical Engineer

Reviewed by:



Troy Crozier
Principal
MAIG. RPGeo: Geotechnical and Engineering

6.0. REFERENCES:

1. Australian Geomechanics Society 2007, "Landslide Risk Assessment and Management", Australian Geomechanics Journal Vol 42, No 1, March 2007.
2. Geotechnical Risk Management Policy for Pittwater, 2009.