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Gordon Cairns
c/- Tom Monahan
Casey Brown Architecture
Level 1, 63 William Street
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Date:	24 August 2022	Contact name:	Gary Blumberg
Your reference:	DA2022/0804	Telephone:	+61 416 037 336
Our reference:	PA3202-RHD-ZZ-XX-CO-Z-0001	Email:	gary.blumberg@rhdhv.com
Classification:	Project related		

337 Whale Beach Road, Palm Beach
Coastal Engineer's Report

We refer to our recent discussions in regard to the above. Mr Gordon Cairns, owner of the subject property, has engaged Royal HaskoningDHV (RHDHV) to provide specialist coastal engineering advice in this matter. This report is set out below under the following main headings:

- Background
- Information Provided
- Existing Site Description
- Proposed Development
- Coastal Engineering Assessment
- Merit Assessment
- Declaration and Certification by Coastal Engineer
- Summary
- References
- Salutation

Please note that all reference to the Reduced Level (RL) is to Australian Height Datum (AHD). 0 mAHD is approximately Mean Sea Level (MSL) at present. Completed Form 1 and Form 1(a) as given in the Geotechnical Risk Management Policy for Pittwater is attached at the end of the document herein.

1 Background

A Development Application (DA2022/0804) has been submitted to the Northern Beaches Council for a proposed first floor study addition to an existing dwelling at 337 Whale Beach Road, Palm Beach. The proposed development is indicated in architectural drawings (Project No C6608) prepared by Casey Brown Architecture in 2022. With respect to the drawings, the footprint of the ground floor is to remain unchanged on the subject property.

The Natural Environment Referral Response – Coastal prepared by Northern Beaches Council (Council) dated 11/07/2022 identifies the property is located within a "Bluff/Cliff Instability" area (Figure 1-1) on the Coastline Risk Planning Map of Pittwater Local Environmental Plan (LEP) 2014. Therefore, the development is subject to Clause B3.4 Coastline (Bluff) Hazard of Pittwater 21 DCP and the Geotechnical Risk Management Policy for Pittwater 2009 (Appendix 5, Pittwater 21 DCP). With respect to Pittwater 21DCP Appendix 5, Clause 6.5 (i), "For coastal bluff areas designated on Pittwater's Coastal Risk Planning Map, a coastal engineer's report on the impact of coastal processes on the site and the coastal forces prevailing on the bluff must be incorporated into the geotechnical assessment as an appendix and the Coastal Engineer's assessment must be addressed through the Geotechnical Report and structural specification.", accordingly this Coastal Engineer's Report is prepared to address the impact of coastal processes and the coastal forces prevailing on the bluff for DA2022/0804 herein.

Figure 1-1: Pittwater Coastal Risk Planning Management – 337 Whale Beach Road (Source: Northern Beaches Council <https://nb-icongis.azurewebsites.net/index.html>, accessed on 10/08/2022).

It is an objective of the *Geotechnical Risk Management Policy for Pittwater 2009* that developments are only carried out if geotechnical and related structural engineering risks, and where appropriate coastal process risks, are identified and can be effectively addressed and managed for the life of the development.

JK Geotechnics's *Geotechnical Opinion* (dated 06/06/2022) regarding this DA, confirms that the proposed first floor study addition will have no geotechnical impact on the site or on the existing house. It also noted that the Structural Statement (dated 13 April 2022 from Bond James Murtagh) advised "the existing structure has excess capacity to support the proposed addition without modification."

Geotechnical & Coastal Hazard Assessment (Jeffery and Katauskas, 2006) confirms the design of the existing dwelling can achieve "Acceptable Risk Management" criteria in accordance with the Geotechnical Risk Management Policy for Pittwater, provided the maintenance recommendations advised in the assessment report are implemented.

2 Information Provided

Casey Brown Architecture, who is in care of this DA, has provided RHDHV with:

- Architectural drawings (Project No C6608, Drawing No. DA3, DA2, DA4, DA6(G), DA5(G), DA8(D), DA7(C), DA10, DA9, and DA11) prepared by Casey Brown Architecture in 2022, namely '*337 WHALE BEACH ROAD REDUCED'*;
- *Geotechnical Opinion - Proposed First Floor Study Addition 337 Whale Beach Road, Palm Beach, NSW* prepared by JK Geotechnics dated 06/06/2022, namely '*JK Geotrechnics 060622 Opinion*';
- *Natural Environment Referral Response – Coastal,* prepared by Northern Beaches Council dated 11/07/2022; and
- Geotechnical & Coastal Hazard Assessment (Ref: 20264WZrpt) prepared by Jeffery and Katauskas, dated 05/05/2006.

3 Existing Site Description

An aerial photo (Figure 3-1) taken on 18/05/2022 by Nearmap shows the subject property is located on the landward side of a rocky cliff/bluff headland, which stretches between Whale Beach and Palm Beach. A rocky platform seaward of the subject area is situated within the Little Head Reserve. The proposed study is designed to be added above an existing subgrade TV room, which is set back some 30 m from the cliffline. Vegetation grows along the seaward fence line of the property. Talus/scree material is observed at the bottom of the cliff. Rock boulders, typically 0.5 and 3 m in diameter, occur at the back of the shore platform. This indicates the cliff face is subject to weathering. Rounding of the boulders indicates erosion by wave action. Wave loads could be expected to mobilise the smaller sized boulders, and, over time, lead to rock fracture and abrasion. There is no accumulation of shoreline sediments (beach) in the vicinity of the site, with Whale Beach, the closest sandy beach, approximately 350 m to the south.

Geotechnical & Coastal Hazard Assessment (Jeffery and Katauskas, 2006) advised that interbedded sandstone and shale bedrock was exposed on the face of the cliff elevated approximately 25 m high. A sloped buttress extends approximately one third the way down from the top to the base of the cliffline. The rock platform at the base of the cliff (the intertidal zone) is approximately 50 m wide perpendicular to the shoreline. The seaward property boundary is set back approximately 5 m from the cliffline. The slope between the rear yard to the cliffline is between 10° to 15°. No significant undercutting within the cliff face seaward of the subject site has been observed in recent times.

Figure 3-1: Latest aerial photo taken on 18/05/2022 by Nearmap (Courtesy: Nearmap).

4 Proposed Development

The proposed addition of a light-weight study to the existing dwelling is on the landward side of the property. Works will be undertaken approximately 33.5 m above mean sea level (extracted elevation date recorded between 2018 and 2019 on NSW Elevation Data Service, accessed on 24/08/2022) and approximately 80 m away from the sea. The proposed development is located within the existing footprint of the property, as shown in the architectural drawings prepared by Casey Brown Architecture dated 2022.

Council requires that the life of a structure considered under the Policy be designed for 100 years, unless otherwise justified by the applicant and accepted by Council. According to the Policy, the 100 year baseline broadly reflects the expectations of the community for the anticipated life of a residential structure, and hence the timeframe to be considered when undertaking the geotechnical risk assessment (Geotechnical Risk Management Policy for Pittwater - 2009, Clause 4, Life of Structure).

5 Coastal Engineering Assessment

The Coastal Management Act 2016 (CM Act) outlines a range of coastal hazards to be considered in a coastal engineering investigation. These include:

- beach erosion
- shoreline recession
- coastal lake or watercourse entrance instability
- coastal inundation
- slope and cliff instability
- tidal inundation
- erosion and inundation of foreshores caused by tidal waters and the action of waves, including the interaction of those waters with catchment floodwaters.

Beach erosion, shoreline recession and coastal lake or watercourse entrance instability can markedly alter the shape of the coastline. If not properly catered for, these hazards can imperil coastal developments and cause damage to the existing and proposed properties. Low-lying areas of the coast

may be threatened by coastal inundation caused by storm surges and the action of large waves. Slope and cliff instability problems are a threat to the structural integrity of buildings constructed on coastal bluffs and steep sand dunes. Erosion and inundation caused by tidal water or wave actions or their interactions with floodwaters will change the volume of sediment on the foreshore areas and likely damage the integrity of structures in the affected areas.

Sand drift should be also considered in this assessment, as this hazard that has previously been encountered at locations along the NSW coast.

Climate change attributed to the Greenhouse Effect should also be considered, as it can exacerbate all of the above hazards, but in particular shoreline recession and coastal inundation.

The above hazards are addressed below. A generalised coastal profile for the site showing key findings is presented in Figure 5-1.

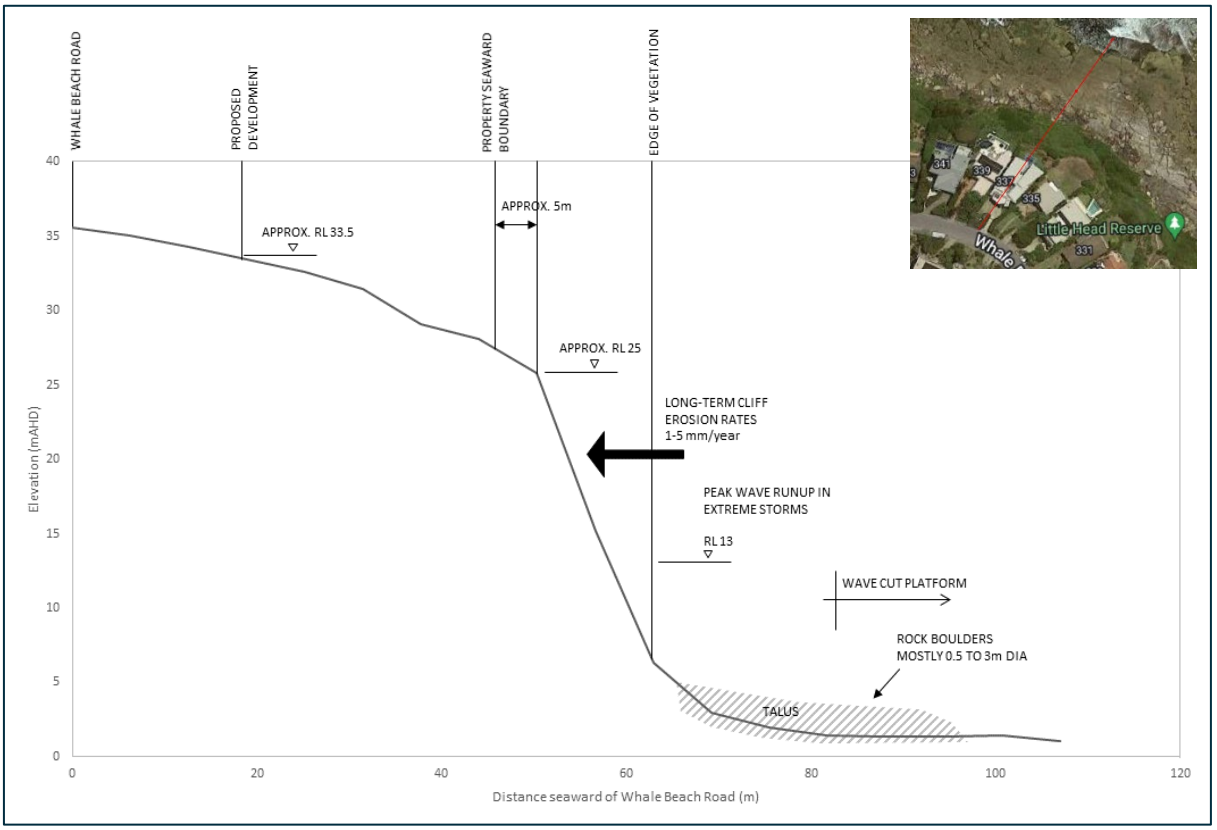


Figure 5-1: Coastal Profile of 337 Whale Beach Road, Palm Beach (Elevation is extracted from NSW Elevation Data Service on 24/08/2022).

5.1 Beach Erosion and Shoreline Recession

Beach erosion refers to the loss of beach and dune sand in a storm or closely-linked series of storms. Shoreline recession mainly refers to the long-term retreat of the shoreline due to incomplete beach recovery following erosion events. Sea level rise due to the Greenhouse Effect also contributes to shoreline recession (Section 5.7).

Since there is no beach fronting the site, beach erosion and scour are of no consequence. Shoreline recession, were it to occur, would be attributed to cliff instability and cliff erosion. These are considered in Section 5.4.

5.2 Coastal Lake or Watercourse Entrance Instability

Since no creek, lake or lagoon entrance exists within the vicinity of the site, no hazard would ensue in respect of coastal entrance stability.

5.3 Coastal Inundation

Coastal inundation is the flooding of coastal lands by ocean waters. Elevated coastal water levels during storms and wave runup and overtopping both contribute to coastal inundation.

Maximum runup levels observed along Sydney's beaches in the May 1974 (nominally a 50 to 100 year Average Recurrence Interval (ARI) event) storms reached RL 6.7. At Collaroy/Narrabeen Beach in the August 1986 storm (nominally say 20 year ARI), a peak runup level of RL 7.3 was recorded. Baird Australia (2016) observed wave run-up and overtopping reached between RL 5.5 and 8.0 at Collaroy due to the June 2016 East Coast Low (nominally say 20 - 30 year ARI).

Runup at a steep cliff will be greater than runup on a sandy beach. Based on methods set out in CERC (1984), it can be shown that for the subject site peak wave runup above the Still Water Level could be as high as 3 to 4 times the incident breaking wave height, or up to say RL 10 to RL 13. Spray could be expected to exceed these levels.

Since the dwelling to be altered is founded at a level which is about three times higher than the peak wave runup levels, it follows that wave runup and resultant coastal inundation is of no consequence for the subject property.

5.4 Slope and Cliff Instability

Given that erodible sediments are absent at the site, it is not appropriate to apply the Department of Environment Climate Change and Water's *(DECCW)* Wedge Failure Plane model for assessing foundation zones. However, cliff instability and erosion, both of which can give rise to shoreline recession, warrant further discussion. Cliff erosion includes both chemical and mechanical weathering. Chemical weathering includes hydration and solution, caused by the interaction between cliff material and sea water.

Cliff instability would be due to mechanical weathering, particularly due to wind erosion and wave action. The base of the cliff seaward of the subject property is at a level of about RL 3, which is well above the intertidal zone (ie. above RL 1), and it is protected from direct impact of general breaking waves by an approximately 50m wide rock platform with talus buttress at the back. Storm waves would mostly break offshore or at the edge of the platform. Smaller waves could penetrate across the platform, potentially breaking directly on the buttress. The cliff would occasionally be subject to wave runup (discussed in Section 5.3), particularly during extreme storms with large waves and elevated water level.

During an extreme storm event, it would be reasonable to expect maximum breaking wave pressures applied at the base of the cliff of up to about 100 kPa. These would apply between approximately RL 1 and RL 5 in the height of an extreme storm, sustained for periods up to approximately 5 s within a 10 to 15 s wave cycle. Penetration of extreme waves may last for many hours, ultimately governed by tide and storm passage. Within crevices between rocks or under rock overhangs, peak breaking wave pressures

could locally increase by up to an order of magnitude *(shock pressures)*, but would last for much shorter periods, generally less than around 0.5 s. The geotechnical engineer should consider and assess this rate while undertaking the geotechnical assessment.

Cliff erosion caused by marine abrasion and weathering would be highly dependent on rock type. Whereas soft sandstones may be easily eroded, fine grained shales and mudstones would not. Weathering may cause undercutting and toppling failure of overhanging blocks although Jeffery and Katauskas (2006) noted there is no obvious observed undercutting within the cliff face below the subject site.

Chapmen et al (1982) suggested a hypothetical long-term chemical and mechanical erosion rate of 5 mm/yr to assess the importance of cliff erosion in NSW to the production of marine sand. This rate was attributed to relatively erodible rocks *(basic igneous and fine grained metamorphic rocks were excluded).* We are aware of separate estimates for erosion of Sydney sandstone cliff, placed in the order of 1 - 5 mm/yr. Notwithstanding this uncertainty, it is clear that the long-term process is one which is very slow. Since the top of the cliff is at approximately RL 25 (well above peak wave runup level of RL13), the 5 m setback of the property boundary and 30 m setback of the proposed development from the cliff edge translates to thousands of years of protection from direct impact by cliff erosion.

Based on the above, it is apparent that cliff erosion is of no practical consequence to the subject property.

5.5 Tidal Inundation and Erosion and Inundation of Foreshores

Hazards related to tidal inundation and erosion and inundation of foreshores caused by tidal waters and the action of waves, including the interaction of those waters with catchment floodwaters are irrelevant to this DA, as the subject site is elevated at a level well above intertidal zone.

5.6 Sand Drift

Sand drift refers to beach sand which is blown landward from the beach and dune. Apart of the high elevation of the site, as there is no beach or dune in the immediate vicinity, sand drift also is not an issue.

5.7 Climate Change

Sea Level Rise (SLR) is a potential hazard of the Greenhouse Effect. It would occur in response to the thermal expansion of the upper layers of the world's oceans and melting of the polar ice sheet.

Design SLR for consideration in this assessment would be less than 1.0 m. This is consistent with the benchmark recommendations for SLR adopted in the NSW Sea Level Rise Policy Statement (NSW Government, 2009) and would readily align with the SLR policy adopted by Council.

SLR would lead to increased wave runup of comparable magnitude to the SLR increment. SLR impacts shoreline recession, but only on a sandy coast. Therefore impact induced by SLR is of no consequence for the site.

6 Merit Assessment

The subject property is located within the coastal zone of NSW and therefore it is subject to the provisions of the CM Act 2016 and SEPP (Resilience and Hazards) 2021. The SEPP (Resilience and Hazards) 2021 gives effect to the objectives of the Coastal Management Act 2016 from a land use

planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone. RHDHV understands the subject property falls within the ambit of the Coastal Environment Area and Coastal Use Area in the SEPP (Resilience and Hazards) 2021 (Figure 6-1).

The merit assessment has been undertaken based on the coastal engineering assessment (Section 5) and the geotechnical assessment by Jeffery and Katauskas in 2006 and the *Geotechnical Opinion* from JK Geotechnics (06/06/22).

Figure 6-1: Coastal management designations for the site (Source: NSW Department of Planning and Environment - State Environmental Planning Policy (Coastal Management) 2018 – maps, accessed on 10/08/2022)

6.1 SEPP (Resilience and Hazards) 2021

The proposed development would not cause any adversely increased risk of coastal hazards on the subject land or other land. The proposed development is designed to be added above the existing structure. The development would not change the construction footprint of the property.

6.2 Division 3 Coastal Environment Area

The provisions of Division 3 development on land within the coastal environment area are addressed as follows:

Based on Clause 2.10 (1) “Development consent must not be granted to development on land that is within the coastal environment area unless the consent authority is satisfied that the proposed development is unlikely to cause a significant adverse impact on the environment”: The subclause provisions and RHDHV responses are set out in Table 6-1.

Table 6-1: Response to Clause 2.10 (1)

No.	Subclause	Response
(a)	the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment	N/A. This is not a coastal engineering matter.
(b)	coastal environmental values and natural coastal processes	The proposed site is located on a cliff well above wave actions. The proposal would not be expected to have an adverse impact on the coastal environmental values or natural coastal processes.
(c)	the water quality of the marine estate (within the meaning of the Marine Estate Management Act 2014), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1	There is no coastal lake within the boundary of the proposed development, therefore the proposed development would not have an adverse impact.
(d)	marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms	The proposed site is located behind the face of a cliff, well above wave actions. The proposal could not impact on marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands or rock platforms.
(e)	existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability	The proposed works are wholly within the subject property boundary. They would not be expected to have adverse impact to any existing public open space or safe access.
(f)	Aboriginal cultural heritage, practices and places	N/A. This is not a coastal engineering matter.
(g)	the use of the surf zone	The proposed development would not interact with or interrupt the use of the surf zone.

Based on Clause 2.10 (2) “Development consent must not be granted to development on land to which this section applies unless the consent authority is satisfied that” (refer Table 6-2 inclusive of RHDHV responses):

Table 6-2: Response to Clause 2.10 (2)

No.	Subclauese	Response
(a)	the development is designed, sited and will be managed to avoid an adverse impact referred to in subsection (1), or	Responses have been made above in relation to the considerations within Clause 2.10 (1). Since the proposed development is not associated with any adverse impacts, no management or mitigation is required.
(b)	if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or	
(c)	if that impact cannot be minimised—the development will be managed to mitigate that impact.”	

6.3 Division 4 Coastal Use Area

The provisions of Division 4 development on land within the coastal environment area are addressed as follows:

Based on Clause 2.11 (1) “Development consent must not be granted to development on land that is within the coastal use area unless the consent authority” (refer Table 6-3inclusive of RHDHV responses):

Table 6-3: Response to Clause 2.11 (1)

No.	Subclause	Response
(a) has considered whether the proposed development is likely to cause an adverse impact on the following -		
(i)	existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability	The proposed works are wholly within the subject property boundary. It would not be expected to have adverse impact to any existing public open space or safe access.
(ii)	overshadowing, wind funnelling and the loss of views from public places to foreshores	N/A. This is not a coastal engineering matter.
(iii)	the visual amenity and scenic qualities of the coast, including coastal headlands,	N/A. This is not a coastal engineering matter.
(iv)	Aboriginal cultural heritage, practices and places	N/A. This is not a coastal engineering matter.
(v)	cultural and built environment heritage	N/A. This is not a coastal engineering matter.
(b) is satisfied that -		
(i)	the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or	The proposed development has been designed and sited to avoid any potential adverse impacts.
(ii)	if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or	
(iii)	if that impact cannot be minimised—the development will be managed to mitigate that impact, and	
(c)	has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.	N/A. This is not a coastal engineering matter.

6.4 Division 5 Clause 2.12

Based on Clause 2.12, “Development consent must not be granted to development on land within the coastal zone unless the consent authority is satisfied that the proposed development is not likely to cause increased risk of coastal hazards on that land or other land.” Given the proposed development for a design life of 100 years is assessed to be at an acceptably low risk in Section 5 and in the geotechnical assessment report prepared by JK Geotechnics, the proposed development would not interact with wave impact process or increase the risk of coastal hazards.

6.5 Division 5 Clause 2.13

Clause 2.13, “Development consent must not be granted to development on land within the coastal zone unless the consent authority has taken into consideration the relevant provisions of any certified coastal management program that applies to the land.” This is not applicable to the proposed development, as no current coastal management program applies at the subject site.

6.6 Pittwater Local Environmental Plan 2014

Based on Clause 7.5 (3), “Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development” (refer Table 6-4 inclusive of RHDHV responses):

Table 6-4: Response to Clause 7.5 (3)

No.	Subclause	Response
(a)	is not likely to cause detrimental increases in coastal risks to other development or properties, and	The proposed development would not interact with wave impact processes, and it is unlikely to increase the risk of coastal hazards.
(b)	is not likely to alter coastal processes and the impacts of coastal hazards to the detriment of the environment, and	The proposed development would not interact with wave impact processes, and it is unlikely to increase the risk of coastal hazards.
(c)	incorporates appropriate measures to manage risk to life from coastal risks, and	The proposed development has been designed and sited to mitigate the coastal risk and avoid any potential adverse impacts.
(d)	is likely to avoid or minimise adverse effects from the impact of coastal processes and the exposure to coastal hazards, particularly if the development is located seaward of the immediate hazard line, and	
(e)	provides for the relocation, modification or removal of the development to adapt to the impact of coastal processes and coastal hazards, and	N/A. The proposed design is at an acceptably low risk from coastal process over its design life.
(f)	has regard to the impacts of sea level rise, and	Impact induced by SLR is of no consequence for the site.
(g)	will have an acceptable level of risk to both property and life, in relation to all identifiable coastline hazards.	The proposed development has been designed and sited to mitigate the coastal risk and avoid any potential adverse impacts.

7 Declaration and Certification by Coastal Engineer

Within the terms of the Geotechnical Risk Management Policy for Pittwater - 2009, a Coastal Engineer means a specialist coastal engineer who is registered professional engineer with chartered professional status as a CPEng with coastal engineering as a core competency, and has an appropriate level of professional indemnity insurance. Mr Gary Blumberg from RHDHV satisfies the requirements of a Coastal Engineer.

Completed Forms 1 and 1(a) are attached.

8 Summary

The development proposal for the subject property involves an addition of a lightweight study room on the existing dwelling. The footprint of the dwelling is to remain unchanged. The life of the structure is designed to be100 years.

The existing site conditions shows the property located at the top of a substantial rocky cliff elevated some 25 m above sea level. The proposed study is designed to be added above an existing subgrade TV room, which is set back some 30 m from the cliffline. Talus material derived from weathering of the

cliff face occupies the bottom portion of the cliff. An approximately 50 m wide rock platform is located at the base of the cliff. There is no accumulation of beach sediments in the vicinity of the site.

A range of possible coastline hazards have been considered. Since there is no beach at the site, beach erosion and shoreline recession are of no consequence. Hazards related to coastal entrance stability and sand drift are irrelevant. Given the elevation of the cliff top, coastal inundation, tidal inundation and erosion and inundation of foreshores caused by tidal waters and the action of waves, including the interaction of those waters with catchment floodwaters are also of no consequence. Impact from sea level rise due to climate change is of no consequence for the site.

Maximum breaking wave pressures on the cliff are described. The geotechnical engineer should consider the estimated maximum breaking wave pressures in the geotechnical assessment report.

Cliff erosion would be due to marine abrasion and weathering, and would be highly dependent on rock type. Whereas soft sandstones may be easily eroded, fine grained shales and mudstones would not. Based on available information on cliff erosion rates due to mechanical and chemical weathering in NSW, the setback of the subject dwelling from the cliff edge translates to thousands of years of protection from direct impact by cliff erosion.

A generalised coastal profile for the site showing key findings is presented in Figure 5-1.

Completed Forms 1 and 1(a) from 21DCP Appendix 5 Geotechnical Risk management Policy for Pittwater – 2009 are attached.

This advice should be appended to the Geotechnical Report.

9 References

Baird Australia (2016) *Contextualising the Return Period of the June 2016 East Coast Low: Waves, Water Levels And Erosion*

CERC (1984), *Shore Protection Manual*, US Army Corps of Engineers, Vicksburg USA

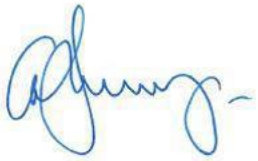
Chapman DM, Geary M, Roy PS and Thom BG (1982) *Coastal Evolution and Coastal Erosion in New South Wale*s Coastal Council of NSW, ISBN 0 7240 6582 2

See other references in Section 2.

10 Salutation

We trust that the above meets your requirements in this matter. Please do not hesitate to contact the undersigned should you require further information or clarification.

Yours faithfully



Gary Blumberg

Technical Director Coastal
Water & Maritime

GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER

FORM NO. 1 – To be submitted with Development Application

Development Application for Mr Gordon Cairns
Name of Applicant

Address of site 337 Whale Beach Road, Palm Beach

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

I, Gary Philip Blumberg *on behalf of* Royal HaskoningDHV
(Insert Name) (Trading or Company Name)

on this the 29/08/2022 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:

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: See below for geotechnical reports referred to in preparing the the coastal engineering advice

Report Date:
:

Author:

Author's Company/Organisation:

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

Main reference documents included Casey Brown Architecture drawings (2022), JK Geotechnics (20264WZrpt, 05/05/2006), JK Geotrechnics 060622 Opinion. Refer report for detailed references and full listings

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 Gary Blumberg ……..

Chartered Professional Status CP Eng, National Professional Engineering Register ……

Membership No. 390 230 ……

Company Royal HaskoningDHV ……

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

Development Application for Mr Gordon Cairns
Name of Applicant
Address of site 337 Whale Beach Road, Palm Beach

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:
Report Date: Refer to Form 1 to see geotechnical reports referred to in preparing the the coastal engineering advice
Author:
Author's Company/Organisation:

Please mark appropriate box

☐ Comprehensive site mapping conducted _____ (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 ……
☐ 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 ……
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