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20 December 2019

## **Estuarine Risk Management Report for 1772 Pittwater Road Bayview**

### **1. INTRODUCTION AND BACKGROUND**

At 1772 Pittwater Road Bayview, it is proposed to demolish and rebuild a dwelling house and swimming pool. A Development Application is to be submitted to Northern Beaches Council for these works. As the property is potentially affected by estuarine hazards, it is subject to the *Pittwater 21 Development Control Plan (DCP)*<sup>1</sup>, in particular Chapter B3.7, and the *Estuarine Risk Management Policy for Development in Pittwater* (Estuarine Policy, which is Appendix 7 of Part D of the DCP). *State Environmental Planning Policy (Coastal Management) 2018* (SEPP Coastal) should also be considered.

The report author is Peter Horton [BE (Hons 1) MEngSc MIEAust CPEng NER]. Peter has postgraduate qualifications in coastal engineering and 27 years of coastal engineering experience, including numerous studies along the Pittwater shoreline. He is a Member of Engineers Australia and Chartered Professional Engineer (CPEng) registered on the National Engineering Register. Peter is also a member of the National Committee on Coastal and Ocean Engineering (NCCOE) and NSW Coastal, Ocean and Port Engineering Panel (COPEP) of Engineers Australia. He has inspected the area in the vicinity of the subject property on several occasions in the last few years, including a specific recent inspection of the property on 25 November 2019.

Note that all levels given herein are to Australian Height Datum (AHD). Zero metres AHD is approximately equal to mean sea level at present.

### **2. INFORMATION PROVIDED**

Horton Coastal Engineering was provided with the following:

- 7 drawings of the proposed development prepared by GartnerTrovato Architects, namely Drawing Numbers DA-03 to 09, all dated 16 December 2019; and
- a site survey by C.M.S Surveyors, Reference 18660 and dated 15 July 2019 (Issue A).

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<sup>1</sup> The version up to Amendment 25 (effective from 1 December 2019) was considered herein.

### 3. EXISTING SITE DESCRIPTION

The subject property is located towards the southern end of the Pittwater waterway, with a broad aerial view depicted in Figure 1. The property is most exposed to a wind-wave fetch from the NNE, with a fetch length of over 8km. Photographs of and from the property (taken on 25 November 2019) are provided in Figure 2 and Figure 3 respectively.



**Figure 1: Aerial view of subject property at Bayview on 29 September 2017**





**Figure 2: View of subject property (at arrow) from foreshore, looking SW**



**Figure 3: View from subject property towards the NE**

Based on the survey, sand levels on the beach at the mean high water mark property boundary are about 1.3m AHD, increasing to about 1.4 to 1.5m AHD at the base of a landscaping wall that forms the sand/vegetation interface at the property (top of wall at about 1.7m to 1.8m AHD). A tidal flat extends about 70m offshore of the property.

Landward of the landscaping wall, a lawn area extends up to a level of about 1.8m AHD, with a raised pool having a coping level of about 3.1m AHD. The three-storey dwelling, located landward of the pool, has a ground floor level of 3.2m AHD. Levels increase moving landward to about 11m AHD at Pittwater Road.

Based on the hydrographic chart AUS 215, offshore seabed levels reduce to about -2.9m AHD at 130m offshore, and -5.9m AHD at 180m offshore of the property.

#### **4. PROPOSED DEVELOPMENT**

It is proposed to demolish and rebuild a dwelling house and pool at the subject property, over 3 levels. The proposed finished ground floor level is 3.5m AHD, with the pool coping at 3.0m AHD. The new pool is to be located about 2m further north of its current position. The existing landscaping wall at the sand/vegetation interface is not proposed to be modified.

#### **5. DESIGN LIFE**

In the Estuarine Policy, it is noted that a design project life of 100 years should be adopted, unless otherwise justified. A 60-year design life (that is, at 2079) has been adopted for the proposed development. This is the same design life as adopted in the "Coastal Zone Management Plan [CZMP] for Bilgola Beach (Bilgola) and Basin Beach (Mona Vale)" that was gazetted on 14 July 2017. Although this CZMP does not geographically apply at the subject property, it is the only gazetted CZMP in the former Pittwater Council area, and hence is relevant to consider in the selection of design life.

As justified in the CZMP, a 60 year life is considered to be appropriate for infill residential development as it is consistent with the design life used in various Australian Standards (eg AS 3600 – Concrete structures), tax legislation, and community expectations.

#### **6. ESTUARINE PROCESSES**

In Cardno (2015), the 100-year Average Recurrence Interval (ARI) present day water level in the region covering the subject property is reported as 1.53m AHD. This includes the effects of astronomical tide and storm surge (combined level of 1.44m AHD), plus local wind setup (0.09m). Wave action can temporarily and periodically increase water levels above this level, particularly in severe storms.

At present at the subject property, Mean High Water is approximately 0.5m AHD and Mean High Water Springs is about 0.6m AHD. The combined astronomical tide and storm surge level for a monthly and bi-annual event is about 1.0m and 1.2m AHD respectively. Corresponding water levels only increase slightly for rarer events, eg 1 year ARI level of 1.24m AHD, 10 year ARI level of 1.34m AHD and 50 year ARI water level of 1.41m AHD (Department of Environment, Climate Change and Water [DECCW] (2010).

In Cardno (2015), sea level rise values of 0.4m at 2050 and 0.9m at 2100 were applied relative to the present, which is not correct as those benchmarks were derived relative to 1990, and



historical sea level rise has not been discounted. Appropriate sea level rise values (relative to 2010) with discounting of historical sea level rise would be 0.34m at 2050 and 0.84m at 2100.

For the proposed design life of 60 years (at 2079), it would be possible to interpolate between the 2050 and 2100 benchmarks. However, given the non-linear rate of sea level rise, it is considered to be most appropriate to directly derive sea level rise values from IPCC (2013a, b), which is widely accepted by competent scientific opinion.

Using the same methodology as applied in the acceptable risk assessment in the *Coastal Zone Management Plan for Bilgola Beach (Bilgola) and Basin Beach (Mona Vale)* prepared by the author for Council in 2017, using a base year of 2010 as Cardno (2015) water levels were derived at 2010, the sea level rise values presented in Table 1 (at 2079) were determined for various emissions scenarios.

**Table 1: Global mean sea level rise (m) from 2010 to 2079 derived from IPCC (2013b)**

Emissions Scenario	Exceedance Probability		
	95% exceedance	Median	5% exceedance
SRES A1B	0.28	0.39	0.52
RCP2.6	0.21	0.31	0.42
RCP4.5	0.25	0.36	0.48
RCP6.0	0.25	0.35	0.47
RCP8.5	0.33	0.46	0.61
Average	0.26	0.38	0.50

Taking the median exceedance probability, and average of the 5 emissions scenarios, and adding 15% for local sea level rise variation based on IPCC (2013b), a sea level rise value of 0.43m at 2079 (relative to 2010) was derived. Therefore, the 100 year ARI still water level at 2079 is 1.96m AHD. This means that only landscaped areas seaward of the pool would be inundated by still water in the design event.

Cardno (2015) estimated that the 100 year ARI wave climate in the region covering the subject property was a significant wave height of 0.98m (average of the highest one-third of waves) and mean wave period of 2.4s (or peak spectral wave period of 3.4s assuming a 1.4 multiplier).

Based on stream function wave theory, at the northern pool edge (for a design still water level of 1.96m AHD, bed level of 0.86m AHD at a plunging distance from the wall to prevent wave breaking and hence local depth of 1.1m, and peak spectral wave period of 3.4s) the 100 year ARI wave height of 0.98m would have a crest elevation of 0.82m above the still water level, that is to 2.78m AHD.

Based on the Neural Network tool<sup>2</sup> that is part of the second edition of the EurOtop manual (van der Meer et al, 2018), average wave overtopping of the pool edge in the design event would be about 0.7L/s/m. This is well below the tolerable wave overtopping damage limit of 5L/s/m in EurOtop for a grass covered area (with the damage limit for a paved area likely to be higher). Wave overtopping of the pool edge would not be expected to be at a depth exceeding about 0.3m in the vicinity of the proposed dwelling. With the pool edge at a level of 3.0m AHD, an Estuarine Planning Level (EPL) of 3.3m AHD can be adopted herein. This is below the

<sup>2</sup> Formentin et al (2017) and Zanuttigh et al (2016),

proposed dwelling ground floor level of 3.5m AHD, as required. It is not appropriate to add 0.3m of freeboard as per Cardno (2015)<sup>3</sup>.

## **7. CONTROLS IN SECTION B3.7 OF THE PITTWATER 21 DCP**

Based on Section B3.7 of the DCP (numbering added herein for convenience):

1. All development or activities must be designed and constructed such that they will not increase the level of risk from estuarine processes for any people, assets or infrastructure in surrounding properties; they will not adversely affect estuarine processes; they will not be adversely affected by estuarine processes; and
2. All structural elements below the Estuarine Planning Level shall be constructed from flood compatible materials; and
3. All structures must be designed and constructed so that they will have a low risk of damage and instability due to wave action and tidal inundation; and
4. All electrical equipment, wiring, fuel lines or any other service pipes and connections must be waterproofed to the Estuarine Planning Level; and
5. The storage of toxic or potentially polluting goods, materials or other products, which may be hazardous or pollute the waterway, is not permitted to be stored below the Estuarine Planning Level; and
6. For existing structures, a tolerance of up to minus 100mm may be applied to the Estuarine Planning Level in respect of compliance with these controls.
7. To ensure Council's recommended flood evacuation strategy of 'shelter in place' it will need to be demonstrated that there is safe pedestrian access to a 'safe haven' above the Estuarine Planning Level.

With regard to Item 1, the proposed dwelling is above the EPL, so is at an acceptably low risk of being damaged by estuarine processes. The pool itself is tolerant of being inundated, so can be below the EPL, as long as the pool pump and related items that could be damaged by inundation are placed above 3.3m AHD or located landward of a barrier to prevent inundation exposure. The proposed development would not change estuarine processes nor increase the level of risk in surrounding areas for the design event, with ground levels generally unaltered at the property below about 1.8m AHD.

With regard to Item 2, the pool itself and paved or similar pool surrounds are tolerant of inundation.

With regard to Item 3, the proposed dwelling is above the EPL, so is considered to have a low risk of damage and instability due to wave action and tidal inundation.

With regard to Item 4, any electrical items below 3.3m AHD should be waterproofed, or should be placed landward of a barrier if located above 3.0m AHD.

With regard to Item 5, no toxic or potentially polluting items should be stored at the property below 3.3m AHD, or should be placed landward of a barrier if located above 3.0m AHD.

Items 6 is not applicable.

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<sup>3</sup> Use of a freeboard is not considered to be necessary. As defined in the Floodplain Development Manual (NSW Government, 2005), freeboard provides a factor of safety to compensate for uncertainties in the estimation of flood levels, such as wave action, localised hydraulic behaviour, and other effects such as climate change. Understanding the purpose of freeboard, it is evident that the estimates of still water levels and wave crest levels given herein generally take account of the components that (by definition) comprise freeboard.

With regard to Item 7, occupants are not at significant risk of injury on the site for the design coastal storm event, and can shelter-in-place in the dwelling without any need for evacuation. It is further noted that the largest component of elevated water level is astronomical tide, which is entirely predictable and independent of the storm event, so early warning is available. The inundation peak would also only have a duration of around 2 hours (at high tide).

No mitigation works are proposed that would modify the wave action or tidal inundation behaviour within the development site (including the filling of land, the construction of retaining structures and the construction of wave protection walls).

## **8. ESTUARINE RISK MANAGEMENT POLICY FOR DEVELOPMENT IN PITTWATER**

The requirements of the *Estuarine Risk Management Policy for Development in Pittwater* (Estuarine Policy) have been met herein by consideration of:

- estuarine processes and the Estuarine Planning Level in Section 6;
- the controls in Section B3.7 of the Pittwater 21 DCP in Section 7; and
- by the ground floor level of the dwelling being above the EPL.

Furthermore, although the current Estuarine Policy does not have a form that is required to be filled in, Council has in the past requested that a form provided in a former Estuarine Policy be filled in, as provided at the end of the document herein.

## **9. CLAUSE 7.8 OF PITTWATER LOCAL ENVIRONMENTAL PLAN 2014**

### **9.1 Clause 7.8(1)**

Based on Clause 7.8(1) of *Pittwater Local Environmental Plan 2014*, the “objectives of this clause are as follows:

- (a) to ensure that development in the foreshore area will not impact on natural foreshore processes or affect the significance and amenity of the area,
- (b) to ensure continuous public access along the foreshore area and to the waterway”.

The proposed pool is in the Foreshore Area. This will not significantly impact on natural foreshore processes, and will not affect public access as the works are entirely on private property.

### **9.2 Clause 7.8(2)**

Based on Clause 7.8(2) of *Pittwater Local Environmental Plan 2014*, “development consent must not be granted for development on land in the foreshore area except for the following purposes:

- (a) the extension, alteration or rebuilding of an existing building wholly or partly in the foreshore area, if the levels, depth or other exceptional features of the site make it appropriate to do so,
- (b) boat sheds, sea retaining walls, wharves, slipways, jetties, waterway access stairs, swimming pools, fences, cycleways, walking trails, picnic facilities or other recreation facilities (outdoors)”.

The proposed pool satisfies Clause 7.8(2)(b).

### **9.3 Clause 7.8(3)**

Based on Clause 7.8(3) of *Pittwater Local Environmental Plan 2014*, “development consent must not be granted under this clause unless the consent authority is satisfied that:

- (a) the development will contribute to achieving the objectives for the zone in which the land is located, and
- (b) the appearance of any proposed structure, from both the waterway and adjacent foreshore areas, will be compatible with the surrounding area, and
- (c) the development will not cause environmental harm such as:
  - i) pollution or siltation of the waterway, or
  - ii) an adverse effect on surrounding uses, marine habitat, wetland areas, fauna and flora habitats, or
  - iii) an adverse effect on drainage patterns, or
  - iv) the removal or disturbance of remnant riparian vegetation, and
- (d) the development will not cause congestion or generate conflict between people using open space areas or the waterway, and
- (e) opportunities to provide continuous public access along the foreshore and to the waterway will not be compromised, and
- (f) any historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the land on which the development is to be carried out and of surrounding land will be maintained, and
- (g) in the case of development for the alteration or rebuilding of an existing building wholly or partly in the foreshore area, the alteration or rebuilding will not have an adverse impact on the amenity or aesthetic appearance of the foreshore, and
- (h) sea level rise, coastal erosion and recession, or change of flooding patterns as a result of climate change, have been considered”.

For Item (a), the objectives were listed above (in Section 9.1, in relation to Clause 7.8(1)), where it was noted that the proposed pool satisfied these objectives, and hence Item (a) is satisfied.

For Item (b), the proposed pool would match the general appearance and levels of the current site.

For Item (c), with appropriate connection of pool backwash water to the sewerage system and the use of appropriate construction environmental controls, the proposed pool would not cause any significant pollution or siltation of the waterway. It would not adversely impact on adjacent areas. No remnant riparian vegetation is to be removed as part of the proposed works.

For Item (d), the proposed works would not affect public use of the foreshore and would not cause any conflict with waterway uses.

For Item (e), the proposed works would not affect public access along the foreshore area.

For Item (f), there is no known historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the land on which the development is to be carried out.

Item (g) is not applicable.



For Item (h), sea level rise was considered in Section 6.

#### **9.4 Clause 7.8(4)**

Based on Clause 7.8(4) of *Pittwater Local Environmental Plan 2014*, “in deciding whether to grant consent for development in the foreshore area, the consent authority must consider whether and to what extent the development would encourage the following:

- (a) continuous public access to and along the foreshore through or adjacent to the proposed development,
- (b) public access to link with existing or proposed open space,
- (c) public access to be secured by appropriate covenants, agreements or other instruments registered on the title to land,
- (d) public access to be located above mean high water mark,
- (e) the reinforcing of the foreshore character and respect for existing environmental conditions”.

As stated above, the proposed works are entirely on private land and would not affect public access along the foreshore.

### **10. STATE ENVIRONMENTAL PLANNING POLICY (COASTAL MANAGEMENT) 2018**

#### **10.1 Preamble**

Based on *State Environmental Planning Policy (Coastal Management) 2018* (SEPP Coastal) and its associated mapping, the subject property is within a “coastal environment area” (see Section 10.2) and a “coastal use area” (see Section 10.3).

#### **10.2 Clause 13**

Based on Clause 13(1) of SEPP Coastal, “development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:

- (a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,
- (b) coastal environmental values and 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,
- (d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and 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,
- (f) Aboriginal cultural heritage, practices and places,
- (g) the use of the surf zone”.

With regard to (a), the proposed works are in a developed residential area, with the proposed development replacing an existing development. The works would not be expected to adversely affect the biophysical, hydrological (surface and groundwater) and ecological

environments. The proposed works would not be a source of pollution as long as appropriate construction environmental controls are applied.

With regard to (b), the proposed works would not be expected to adversely affect estuarine processes in Pittwater.

With regard to (c), the proposed works would not adversely impact on water quality as long as appropriate construction environmental controls are applied.

With regard to (d), this is not a coastal engineering matter so is not definitively considered herein. That stated, there are no undeveloped headlands or rock platforms in proximity to the proposed development, and no marine vegetation in the area to be developed. If there is no native vegetation and fauna and their habitats of significance at the site, this clause has been satisfied.

With regard to (e), the proposed works would not impact on public open space and access to and along the foreshore, being entirely within private property.

With regard to (f), a search of the (former) Office of Environment and Heritage “Aboriginal Heritage Information Management System” (AHIMS) was undertaken on 20 December 2019. This resulted in no Aboriginal sites being recorded nor Aboriginal places being declared within at least 200m of the subject property.

With regard to (g), there is no significant or practical surf zone offshore of the subject property, so this is not applicable. That stated, the proposed works would not be expected to alter wave and water level processes seaward of the property.

Based on Clause 13(2) of SEPP Coastal, “development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

- (a) the development is designed, sited and will be managed to avoid an adverse impact referred to in subclause (1), or
- (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”.

The proposed development has been designed and sited to avoid the adverse impacts referred to in Clause 13(1).

### **10.3 Clause 14**

Based on Clause 14(1) of SEPP Coastal, “development consent must not be granted to development on land that is within the coastal use area unless the consent authority:

- (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,
  - (ii) overshadowing, wind funnelling and the loss of views from public places to foreshores,
  - (iii) the visual amenity and scenic qualities of the coast, including coastal headlands,

- (iv) Aboriginal cultural heritage, practices and places,
  - (v) cultural and built environment heritage, and
- (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
  - (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”.

With regard to (a)(i), the proposed works would not impact on foreshore access, as discussed previously.

With regard to (a)(ii), (a)(iii), and (c), these are not coastal engineering matters so are not considered herein.

With regard to (a)(iv), there are no Aboriginal sites recorded nor Aboriginal places declared within 200m of the subject property, as noted in Section 10.2.

With regard to (a)(v), the nearest environmental heritage item to the subject property listed in Schedule 5 of *Pittwater Local Environmental Plan 2014* is the Bayview Yacht Racing Association boatshed at 1836 and 1852 Pittwater Road, which is located about 360m from the subject property. The proposed development would not be expected to impact on this location from a coastal engineering perspective.

With regard to (b), the proposed development has been designed and sited to avoid any potential adverse impacts referred to in Clause 14(1).

#### **10.4 Clause 15**

Based on Clause 15 of SEPP Coastal, “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”.

As discussed in Section 7, the proposed development is unlikely to have a significant impact on estuarine (coastal) hazards nor increase the risk of estuarine (coastal) hazards in relation to any other land.

#### **10.5 Clause 16**

Based on Clause 16 of SEPP Coastal, “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”.

No certified coastal management program applies at the subject property.



## 11. CONCLUSIONS

At 1772 Pittwater Road Bayview, it is proposed to demolish and rebuild a dwelling house and swimming pool. An Estuarine Planning Level (EPL) of 3.3m AHD has been adopted. This is below the proposed dwelling ground floor level of 3.5m AHD, as required.

If the recommendations in Section 7 are followed, the risks of the proposed development being adversely affected by estuarine processes would be suitably mitigated.

The proposed development satisfies the requirements of Section B3.7 of the Pittwater 21 DCP, the *Estuarine Risk Management Policy for Development in Pittwater*, Clause 7.8 of *Pittwater Local Environmental Plan 2014*, and *State Environmental Planning Policy (Coastal Management) 2018*, for the matters outlined herein.

## 12. REFERENCES

Cardno (2015), *Pittwater Estuary Mapping of Sea Level Rise Impacts*, LJ2882/R2658v7, Revised Draft, for Pittwater Council, February

Department of Environment, Climate Change and Water [DECCW] (2010), *Coastal Risk Management Guide: Incorporating sea level rise benchmarks in coastal risk assessments*, DECCW 2010/760, August, ISBN 978 1 74232 922 2

Formentin, Sara Mizar; Zanuttigh, Barbara and Jentsje W van der Meer (2017), "A Neural Network Tool for Predicting Wave Reflection, Overtopping and Transmission", *Coastal Engineering Journal*, Vol. 59, No. 1, 1750006, 31 pp.

Intergovernmental Panel on Climate Change (2013a), "Summary for Policymakers", in: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, [Stocker, TF; Qin, D; Plattner, G-K; Tignor, M; Allen, SK; Boschung, J; Nauels, A; Xia, Y; Bex, V and PM Midgley (editors)], Cambridge University Press, Cambridge, United Kingdom and New York, New York, USA

Intergovernmental Panel on Climate Change (2013b), *Climate Change 2013, The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Final Draft, 30 September

NSW Government (2005), *Floodplain Development Manual, the management of flood liable land*, Department of Infrastructure, Planning and Natural Resources, DIPNR 05\_020, ISBN 0 7347 5476 0, April

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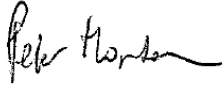
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### **13. SALUTATION**

If you have any further queries, please do not hesitate to contact Peter Horton via email at peter@hortoncoastal.com.au or via mobile on 0407 012 538.

Yours faithfully

HORTON COASTAL ENGINEERING PTY LTD



Peter Horton

Director and Principal Coastal Engineer

This report has been prepared by Horton Coastal Engineering Pty Ltd on behalf of and for the exclusive use of Andrew Bursill and GartnerTrovato Architects (the client), and is subject to and issued in accordance with an agreement between the client and Horton Coastal Engineering Pty Ltd. Horton Coastal Engineering Pty Ltd accepts no liability or responsibility whatsoever for the report in respect of any use of or reliance upon it by any third party. Copying this report without the permission of the client or Horton Coastal Engineering Pty Ltd is not permitted.

*Estuarine Risk Management Policy for Pittwater Form No. 1 is provided overleaf*

FORM NO. 1

**To be submitted with Estuarine Risk Management Report**

**Development Application for** Andrew Bursill and GartnerTrovato Architects

Name of Applicant

**Address of site** 1772 Pittwater Road Bayview

***Declaration made by a Coastal Engineer as part of an Estuarine Risk Management Report***

I, Peter Horton on behalf of Horton Coastal Engineering Pty Ltd  
(Insert Name) (Trading or Company Name)

on this the 20<sup>th</sup> August 2019 (date)

certify that I am a Coastal Engineer as defined by the Estuarine Risk Management Policy for Development in Pittwater 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 \$2 million.

**Please mark appropriate box**

- ☒ I have prepared the detailed Estuarine Risk Management Report referenced below in accordance with the Estuarine Risk Management Policy for Development in Pittwater
- ☐ I am willing to technically verify that the detailed Estuarine Risk Management Report referenced below has been prepared in accordance with the Estuarine Risk Management Policy for Development in Pittwater
- ☐ I have examined the site and the proposed development/alteration in detail and, as detailed in my report, am of the opinion that the Development Application only involves Minor Development/Alterations or is sited such that a detailed Estuarine Risk Management Report is not required.

**Estuarine Risk Management Report Details:**

Report Title:

Estuarine Risk Management Report for 1772 Pittwater Road Bayview

Report Date:

20 December 2019

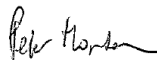
Author: Horton Coastal Engineering Pty Ltd

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

See Section 2 and Section 12 of report

I am aware that the above Estuarine Risk Management Report, prepared for the above mentioned site is to be submitted in support of a Development Application for this site and will be relied on by Northern Beaches Council as the basis for ensuring that the estuarine 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 all reasonable and practical measures have been identified to remove foreseeable risk.

Signature



Name

Peter Horton

Chartered Professional Status

MIEAust CPEng

Membership No.

452980