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14 June 2024

Estuarine and Coastal Risk Management Report on 1744 Pittwater Road Bayview

1. INTRODUCTION AND BACKGROUND

It is proposed to construct a boat skid ramp and raise a seawall at 1744 Pittwater Road Bayview, hereafter denoted as the 'site'. A Development Application (DA2024/0168) has been submitted to Northern Beaches Council for these works.

As the site is potentially affected by estuarine hazards, it is subject to the *Pittwater 21 Development Control Plan (DCP)*¹, in particular Chapter B3.9. It is also subject to the *Estuarine Risk Management Policy for Development in Pittwater* (hereafter denoted as the 'Estuarine Policy', which is Appendix 7 of the DCP). As works on a seawall are proposed, Chapter D15.18 of the DCP should be considered. *State Environmental Planning Policy (Resilience and Hazards) 2021* should also be considered.

Horton Coastal Engineering Pty Ltd was engaged to complete the estuarine and coastal risk management report required by Council, as set out herein. The report author is Peter Horton [BE (Hons 1) MEngSc MIEAust CPEng NER]. Peter has postgraduate qualifications in coastal engineering and 32 years of coastal engineering experience, including numerous studies along the Pittwater shoreline and particularly at Bayview. 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 site on several occasions in the last two decades or so, including a specific recent inspection of the site on 20 May 2024.

All levels given herein are to Australian Height Datum (AHD). Zero metres AHD is approximately equal to mean sea level at present in the ocean immediately adjacent to the NSW mainland, and within the Pittwater waterway.

2. INFORMATION PROVIDED

Horton Coastal Engineering was provided with three drawings of the proposed works prepared by SDG (Ref 6966_B, Sheets 1 to 3), all dated 15 January 2024 and Issue B. These drawings incorporated survey information.

¹ The version up to Amendment 27 (effective from 18 January 2021) was considered herein.

3. EXISTING SITE DESCRIPTION

The site is located towards the southern end of the Pittwater waterway, with a broad aerial view in Figure 1, zoomed aerial view in Figure 2, and oblique aerial view in Figure 3. The site is most exposed to a wind-wave fetch from the NNE, with a fetch length of over 8km. Photographs of and from the site are provided in Figure 4 and Figure 5 respectively.



Figure 1: Aerial view of site (red outline) on 16 February 2022



Figure 2: Zoomed aerial view of site (approximate red outline) on 12 March 2024



Figure 3: Oblique aerial view of site (at arrow) on 7 April 2024, facing west



Figure 4: View of foreshore at site (between arrows) on 20 May 2024, facing SW



Figure 5: View from site towards Pittwater on 20 May 2024, facing NE

Based on the survey and site observations, the sandstone and concrete seawall at the site has a crest level of about 1.6m AHD, with a lawn area landward of the seawall at the same level. Cobbles are located immediately adjacent to the seawall, generally at a level of about 0.8m AHD. These cobbles extend about 3m offshore to a bed elevation of about -0.2m AHD, with tidal flats extending about 220m offshore. Based on the hydrographic chart AUS 215, the seabed elevation is about -4m AHD at 250m offshore.

A boatshed is located about 7.5m landward of the seawall, with a floor level of 3.0m AHD, with ground levels rising to near the underside of the boatshed.

4. PROPOSED DEVELOPMENT

It is proposed to raise the seawall (and land located landward of it) to 2.1m AHD, with the existing seawall and cobbles not otherwise altered.

Based on structural drawings prepared by Jones Nicholson Pty Limited, it is evident that the seawall raising is to be achieved by supporting a 500mm deep and 650mm wide reinforced concrete capping beam on discrete 300mm diameter piles. Sandstone blocks (understood to be 2m long, 500mm high and 500mm wide) are to be placed over (sit on) the capping beam. Horton Coastal Engineering had been advised that this means that the proposed works to raise the seawall will not place any additional load on the existing seawall. The capping beam is to sit landward of the existing seawall, and thus the raised crest level of 500mm is entirely formed by the sandstone blocks.

A concrete and stone ramp is proposed extending in the offshore direction from the boatshed, and then continuing offshore of the seawall as a 10m long and 3m wide mesh ramp/skid to an elevation of about 0m AHD. The skid is to have a slope of about 1:4.8 (vertical:horizontal) or 12°. Stone steps are also proposed to the SE of the boatshed.

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 2084) 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 prepared by the author for Council and gazetted on 14 July 2017. Although this CZMP does not geographically apply at the site, 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. It is considered to be conservative for foreshore works unrelated to habitable development.

Based on *Australian Standard AS 4997 - Guidelines for the Design of Maritime Structures*, and classifying the works as a 'normal structure', the required design event for a 60 year life is 600 year Average Recurrence Interval (ARI). Therefore, a 600 year ARI design event has been adopted herein, which has a 9.5% probability of occurring over the 60 year life.

6. ESTUARINE PROCESSES

6.1 Design Still Water Level at End of Design Life

In Cardno (2015), the 100-year Average Recurrence Interval (ARI) present day water level in the region covering the site 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 if they generate wind-waves that propagate towards the site.

Based on Department of Environment, Climate Change and Water [DECCW] (2010) and using linear-log extrapolation, the 600 year ARI elevated still water level at the site is 1.52m AHD, ignoring local wind setup. It is considered unlikely that 0.09m of local wind setup would be realised at the site, as extreme water levels are expected to be caused by meteorological events that generate winds from the south to east quadrant, which the site is not particularly exposed to. Nonetheless, local wind setup has been conservatively included in the design 600 year ARI water level, which is thus 1.61m AHD.

Cardno (2015) estimated a 2050 Estuarine Planning Level (EPL) of 2.76m AHD, and 3.22m AHD at 2100, at the foreshore². These EPL's include wave runup and overtopping effects and a freeboard of 0.3m³, and do not include any reduction with distance landward of the foreshore.

At present at the site, 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 2010 (based on DECCW, 2010), which is not correct as those values 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 2084), it would be possible to interpolate between the 2050 and 2100 sea level rise values. 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 Intergovernmental Panel on Climate Change [IPCC] (2021), which is widely accepted by competent scientific opinion.

Using the same methodology applied in the acceptable risk assessment in the *CZMP for Bilgola Beach (Bilgola) and Basin Beach (Mona Vale)*, and 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 2084) were determined for the five illustrative scenarios (shared socioeconomic pathways, SSP's⁴) considered in IPCC (2021)⁵.

² Assuming that the seawall had a crest level of 2.0m AHD.

³ Use of a freeboard is not necessarily considered to be appropriate in a wave runup scenario.

⁴ Known as representative concentration pathways in the previous IPCC (2013) assessment.

⁵ The five illustrative scenarios represent varying projected greenhouse gas emissions, land use changes and air pollutant controls in the future.

This includes regional sea level rise variations at Sydney as reported by the Physical Oceanography Distributed Active Archive Center (PO.DAAC), a NASA Earth Observing System Data and Information System data centre operated by the Jet Propulsion Laboratory in Pasadena, California. The sea level rise values were determined at 2084, relative to the average sea level from a 1995-2014 baseline (taken to be at 2005).

Table 1: Mean sea level rise (m) at Sydney from a 1995-2014 average level (taken at 2005) to 2084 derived from IPCC (2021) and PO.DAAC

Emissions Scenario (Shared Socioeconomic Pathway)	Exceedance Probability		
	95% exceedance	Median	5% exceedance
SSP1-1.9	0.12	0.27	0.53
SSP1-2.6	0.16	0.32	0.61
SSP2-4.5	0.24	0.42	0.72
SSP3-7.0	0.31	0.50	0.83
SSP5-8.5	0.36	0.57	0.94
Average	0.24	0.41	0.73

Taking the median exceedance probability and average of the 5 SSP's, a sea level rise value of 0.41m at 2084 (relative to 2005) was derived. Given that Cardno (2015) water levels were derived at 2010, the sea level rise should be determined relative to 2010. Watson (2020) found that the rate of sea level rise from satellite altimetry in the SE Australia region was 3.5mm/year from 1992-2019. Applying this rate from 2005 to 2010, the projected sea level rise from 2010 to 2083 at Sydney is 0.39m.

Therefore, the design 600 year ARI estuarine still water level at 2084 is 2.00m AHD. This still water level is just (0.1m) below the proposed seawall crest level of 2.1m AHD.

6.2 Wave Action

Cardno (2015) estimated that the 100 year ARI wave climate in the region covering the site 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). Boat wakes with significant wave heights in the order of 0.8m are also possible.

In the design event, waves would break at and overtop the crest of the seawall, propagating landward. Using the methodology outlined in Cardno (2015), with the adopted still water level of 2.0m AHD, the design wave runup level is 2.49m AHD at the foreshore. This can be adopted as the Estuarine Planning Level (EPL) for the proposed development.

7. RISKS OF DAMAGE TO PROPOSED DEVELOPMENT AND MITIGATION OF THOSE RISKS

The piles supporting the proposed capping beam of the seawall, and the skid, should extend to bedrock. If not, the piles will need to be designed considering a scour level as advised by a coastal engineer as part of detailed design, and extend to a sufficient depth to not place a load on the existing seawall.

There is evidence that the existing seawall to be retained has inadequate filter layers at some locations, leading to washout of soil through the seawall and the formation of sinkholes. Filter

layers should be reinstated as required to reduce the risk of fine materials being washed out from landward of the wall.

Note that it is not necessarily appropriate to prevent migration of fine material by infilling gaps in the face of the seawall by repointing (mortaring), as this can lead to buildup of groundwater pressures that adversely affects the stability of the seawall. Either way, there should be consideration of the provision of drainage outlets (weepholes) through the wall to relieve groundwater pressures, with geotextile socks on the inlets to reduce the risk of soil migration through the weepholes.

Filter layers should be placed landward of the sandstone blocks to reduce the risk of migration of fine material between or below the blocks. With the sandstone blocks backed by soil, wave loads on the blocks do not need to be considered as part of detailed design, as long as the blocks do not overhang the existing seawall on the seaward side.

Detailed structural design of the seawall should include consideration of a surcharge load of 5kPa above the seawall from wave overtopping.

The supporting piles for the skid should be designed to resist wave forces as advised by a coastal engineer as part of detailed design. Being open (mesh), the potential for wave forces along the skid, and wave uplift forces up into the skid, would be reduced. However, as part of detailed design, there should be consideration of potential wave and buoyancy forces on the skid by a coastal engineer.

Any concrete structures or components should be generally designed in accordance with the requirements of *Australian Standard AS3600 – Concrete Structures*, and the requirements of *Australian Standard AS4997 - Guidelines for the Design of Maritime Structures* should also be considered.

Any timber used in the structures should be suitable for the marine environment. Examples of suitable species include tallowwood, white mahogany, grey box, blackbutt, yellow stringybark and turpentine (NSW Maritime, 2005). Timber of Class 1 or 2 natural durability should be used as per AS 4997. Timber structures should generally be designed in accordance with the requirements of *Australian Standard AS1720.1 - Timber Structures*. The materials used for construction should not be deleterious to marine life, for example antifouling paints or treated woods must not be used.

Based on *Australian Standard AS 1657 – Fixed platforms, walkways, stairways and ladders - Design, construction and installation*, cleats are required on the skid if the slope is steeper than 10°, with the proposed 12° slope being steeper. Use of a non-slip mesh may obviate this requirement (note that slip resistance is tested in accordance with AS 4586).

If the advice within this Section 7 is followed, the risks of damage to the seawall and skid would be suitably mitigated, and they would have an adequately low risk of failure.

8. MERIT ASSESSMENT

8.1 Chapter B3.9 of the Pittwater 21 DCP

Based on 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 development would not significantly change estuarine processes nor increase the level of risk in surrounding areas for the design event, as the movement of water and waves over the area seaward of the seawall and around the skid (being open and supported on piles) would not be significantly altered. The raising of the seawall only affects wave overtopping during occasional rare events.

If the advice in Section 7 is followed, the risk of the proposed development being adversely affected by estuarine processes would be suitably mitigated. The development is at an acceptably low risk of being adversely affected by estuarine processes with the measures outlined in Section 7 adopted. Therefore, Item 1 is satisfied.

Item 2 is satisfied with the measures outlined in Section 7 adopted.

If the advice in Section 7 is followed, the risk of the proposed development being adversely affected by estuarine processes would be suitably mitigated, satisfying Item 3.

With regard to Items 4 and 5, this is not generally relevant to the proposed development, but can be noted by the owner.

Item 6 is not applicable.

With regard to Item 7, occupants are not at significant risk of injury at 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).

With regard to another item in Chapter B3.9 of the DCP, no mitigation works are proposed that would significantly modify the wave action or tidal inundation behaviour within the development site, with the raising of land landward of the seawall not significantly affecting estuarine processes.

8.2 Chapter D15.18 of the Pittwater 21 DCP

As a raised seawall is proposed, Chapter D15.18 of the Pittwater 21 DCP applies to these works. The DCP is impractical to apply literally along the Pittwater foreshore where seawalls, particularly vertical walls, are prevalent. In D15.18 of the DCP, it is stated that “seawalls shall not be permitted”, with a variation that “Council may consider the construction of seawalls where there is potential for erosion from coastal processes and protection of property is necessary”.

In response, it can be noted that seawalls are permissible with consent based on NSW legislation, namely Clause 2.16 of *State Environmental Planning Policy (Resilience and Hazards) 2021*, that prevails over D15.18. At the site, there is an existing vertical seawall, with vertical seawalls at adjacent properties. If there was not a seawall, the foreshore would be subject to erosion. A seawall is thus necessary, and also beneficial in reducing the landward extent of wave action into the site, along with being an existing use.

The criteria to consider in D15.18 are listed below:

- i. where possible, maintain the curvature of the existing shoreline;
- ii. incorporate low profile walls, battered or stepped back from the foreshore wherever practicable, with a maximum recommended height of 1 metre above mean high water mark. (1.5 metres AHD);
- iii. constructed of or faced in rectangular shaped sandstone, being either dressed or rough-cut in order to promote a uniform treatment along the foreshore. Alternative building materials, such as reconstructed sandstone concrete blocks or similar, which reflect a sandstone character shall also be suitable, particularly where greater structural strength may be required. Materials such as timber, concrete (including nylon mattress structures) gabions or other materials not in keeping with the character of the area shall not be permitted. Concrete/nylon mattress structures may be suitable for public drainage and associated bank stabilisation works where it can be demonstrated that such structures will not detract from the visual amenity of the locality.
- iv. only clean fill is to be used behind sea walls.
- v. where practicable, sandy beach areas should be incorporated in front of seawalls.
- vi. be designed so that the existing footprint is maintained (i.e. does not encroach any further into the intertidal zone) and the seawall is sloped back towards the site. There must be no additional reclamation of water land (requires a permit from the Department of Primary Industries) or replacement of the existing wall with a vertical seawall;
- vii. that there is no mortaring of the seawall and a geotextile fabric is used behind the seawall to prevent loss of sediment through the seawall;
- viii. should be rock rip rap, boulders or similar complex structures, and where possible incorporate further vertical and horizontal complexity.
- ix. maximise the incorporation of native riparian and estuarine vegetation;
- x. create low sloping seawalls and/or incorporate changes of slope; and
- xi. it is recommended that proponents consult with both the Coasts & Estuaries section of the Office of Environment and Heritage, and with the Aquatic Habitat Protection unit of the Department of Primary Industries.
- xii. compliance with Environmentally Friendly Seawalls - A Guide to Improving the Environmental Value of Seawalls and Seawall-lined Foreshores in Estuaries (Sydney Metropolitan Catchment Management Authority 2009).

For Item (i), the proposed seawall alignment is the same as the existing seawall.

For Item (ii), the proposed seawall at 2.1m AHD has a similar crest level to the existing seawall at 1.6m AHD, and similar crest level as the adjacent property to the south (which is at 2.2m AHD). The proposed crest level is appropriate with consideration of sea level rise over the design life.

For Item (iii), the existing seawall is concrete and sandstone, and the raised seawall portion is to comprise sandstone blocks.

For Item (iv), a requirement to import fill is not expected, and it is for the owner to note this requirement.

For Item (v), no modification to the existing cobble area offshore of the seawall is proposed.

For Item (vi), the proposed seawall does not alter the footprint or slope of the existing seawall. The existing seawall is vertical, and it is appropriate to use a vertical wall at this site, matching adjacent properties.

For Item (vii), it was noted in Section 7 that filter layers are required landward of the seawall. No mortaring of the sandstone blocks is required.

For Item (viii), as outlined above it is most appropriate to use a vertical wall at this site, the same as existing.

For Item (ix), the raised area of the seawall is well above the intertidal zone and no estuarine vegetation can be incorporated. It is not strictly forming a riparian zone as it is not adjacent to a river, and with the immediately adjacent waterway dry for most of the time.

For Item (x), see Item (vi).

For Item (xi), this is not applicable, as the works are rebuilding an existing seawall, and would not affect aquatic vegetation.

For Item (xii), the raised area of the seawall is well above the intertidal zone and environmentally friendly seawall features are not relevant at this level.

8.3 *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; and
- the controls in Chapter B3.9 of the Pittwater 21 DCP in Section 8.1.

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.

8.4 Clause 7.8 of Pittwater Local Environmental Plan 2014

8.4.1 Clauses 7.8(1) and 7.8(2)

The proposed development is located in the Foreshore Area that extends offshore of the Foreshore Building Line. Being in the Foreshore Area, Clause 7.8 of *Pittwater Local Environmental Plan 2014* (LEP 2014) should be considered.

Based on Clause 7.8(2)(b) of LEP 2014, 'sea retaining walls' (seawalls) are permissible in the foreshore area, and the seawall is an existing use here. Wharves, slipways, jetties, and waterway access stairs are also permissible here, for which a skid is consistent.

The raised seawall (with the raised seawall along the same alignment as existing) and the skid (being open and piled) would not significantly impact on natural foreshore processes, satisfying Clause 7.8(1)(a) of LEP 2014. The raised seawall would not affect public access (being on the same alignment) and the skid is in an area with many waterway access structures extending offshore (thus not significantly affecting essentially non-existing public foreshore access), thus satisfying Clause 7.8(1)(b) of LEP 2014.

8.4.2 Clause 7.8(3)

Based on Clause 7.8(3) of LEP 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 site is zoned as C4 Environmental Living, for which the objectives in LEP 2014 are as follows:

- to provide for low-impact residential development in areas with special ecological, scientific or aesthetic values;

- to ensure that residential development does not have an adverse effect on those values;
- to provide for residential development of a low density and scale integrated with the landform and landscape; and
- to encourage development that retains and enhances riparian and foreshore vegetation and wildlife corridors.

The proposed development does not impact on any of these objectives from a coastal engineering perspective.

For Item (b), this is not a coastal engineering matter so is not definitively addressed herein, but it can be noted that the proposed seawall is a raising of an existing use and matches the seawall crest level at the property to the south. The skid is a subtle waterway access item in an area dominated by many more extensive access features, and note that there is a proposal for a shared 125m long timber jetty at the site and adjacent property to the south.

For Item (c), the proposed development would not cause any significant pollution or siltation of the waterway and would not adversely impact on adjacent areas, if appropriate construction environmental controls are applied. Also, no remnant riparian vegetation is to be removed as part of the proposed works. Therefore, this item is satisfied.

For Item (d), the proposed works would not affect public use of the foreshore and would not cause any conflict with waterway uses, as noted in Section 8.4.1.

For Item (e), the proposed works would not significantly affect public access along the foreshore, as noted in Section 8.4.1.

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. Furthermore, coastal erosion and recession are not significant issues at the site over the design life with the seawall in place, and the site is not mapped as being flood affected in relation to rainfall-runoff and associated overland flow processes.

8.4.3 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 would not significantly affect public access along the foreshore.

8.5 State Environmental Planning Policy (Resilience and Hazards) 2021

8.5.1 Preamble

Based on *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP Resilience) and its associated mapping, the site is within a “coastal environment area” (see Section 8.5.2) and a “coastal use area” (see Section 8.5.3).

8.5.2 Clause 2.10

Based on Clause 2.10(1) of SEPP Resilience, “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. The works would not be expected to adversely affect the biophysical or hydrological (surface and groundwater) environments. Stormwater will discharge to the waterway as at present, and it was noted in Section 7 that weepholes are required through the seawall. The proposed works would not be a source of pollution as long as appropriate construction environmental controls are applied.

The works would not be expected to adversely affect the ecological environment based on an aquatic ecology assessment of the proposed works prepared by Marine Pollution Research Pty Ltd on 23 February 2022, provided that the construction and demolition safeguards noted in that report are implemented.

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 significantly impact on public open space and access to and along the foreshore, as discussed in Section 8.4.1.

With regard to (f), a search of the Heritage NSW “Aboriginal Heritage Information Management System” (AHIMS) was undertaken on 14 June 2024. This resulted in no Aboriginal sites being recorded nor Aboriginal places being declared within at least 200m of the site.

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

Based on Clause 2.10(2) of SEPP Resilience, “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 2.10(1).

8.5.3 Clause 2.11

Based on Clause 2.11(1) of SEPP Resilience, “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 at least 200m of the site, as noted in Section 8.5.2.

With regard to (a)(v), the closest environmental heritage items as per Schedule 5 of *Pittwater Local Environmental Plan 2014* to the site are the World War II tank traps (below mean high water mark) adjacent to 1734 Pittwater Road Bayview, which are located at least about 150m from the site. The proposed development would not be expected to impact on these or more distant items 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 2.11(1).

8.5.4 Clause 2.12

Based on Clause 2.12 of SEPP Resilience, “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 8.1, 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.

8.5.5 Clause 2.13

Based on Clause 2.13 of SEPP Resilience, “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 site.

8.6 Coastal Management Act 2016

Based on Section 27 of the *Coastal Management Act 2016*, “development consent must not be granted under the *Environmental Planning and Assessment Act 1979* to development for the purpose of coastal protection works, unless the consent authority is satisfied that:

- (a) the works will not, over the life of the works:
 - (i) unreasonably limit or be likely to unreasonably limit public access to or the use of a beach or headland, or
 - (ii) pose or be likely to pose a threat to public safety, and
- (b) satisfactory arrangements have been made (by conditions imposed on the consent) for the following for the life of the works:
 - (i) the restoration of a beach, or land adjacent to the beach, if any increased erosion of the beach or adjacent land is caused by the presence of the works,

- (ii) the maintenance of the works”.

With regard to Section 27(a), the works will not ever unreasonably limit public access to or the use of a beach or headland compared to the existing situation. The proposed seawall is on the same alignment as the existing seawall, and the area seaward of the site is not an area generally used by the public anyhow, with numerous jetties and the like promoting an extension of use of property owners into the waterway. The works have been designed to have an acceptably low risk of damage, and therefore pose an acceptably low threat to public safety, if the measures outlined in Section 7 are implemented.

The area seaward of the seawall is not generally used by the public, and is of soft sediment and rocks such that it is not a practical beach area. With regard to Section 27(b), this area seaward of the proposed works would not be affected by the works significantly differently to the existing situation. It is therefore not appropriate or relevant to be applying a requirement for beach restoration at the site. Given the relatively low value of the proposed works and low consequence of any damage to the works, and the fact that adjacent works do not rely on the proposed works for their integrity (already being in place), it may be unnecessary to be applying a maintenance condition as per Section 27(b)(ii) in this case.

9. CONCLUSIONS

It is proposed to construct a boat skid ramp and raise a seawall at 1744 Pittwater Road Bayview. For a design life of 60 years, the adopted Estuarine Planning Level (EPL) is 2.49m AHD.

If the advice in Section 7 is followed, the risks of the proposed development being adversely affected by estuarine processes would be suitably mitigated. The development is at an acceptably low risk of being adversely affected by estuarine processes with the measures outlined in Section 7 adopted.

The proposed development satisfies the requirements of Chapter B3.9 and Chapter D15.18 of the Pittwater 21 DCP, the *Estuarine Risk Management Policy for Development in Pittwater*, Clause 7.8 of *Pittwater Local Environmental Plan 2014*, *State Environmental Planning Policy (Resilience and Hazards) 2021*, and Section 27 of the *Coastal Management Act 2016*, for the matters outlined herein.

10. 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

Intergovernmental Panel on Climate Change [IPCC] (2013), *Climate Change 2013, The Physical Science Basis, Working Group I Contribution 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 [IPCC] (2021), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, [V Masson-Delmotte, P Zhai, A Pirani, SL Connors, C Péan, S Berger, N Caud, Y Chen, L Goldfarb, MI Gomis, M Huang, K Leitzell, E Lonnoy, JBR Matthews, TK Maycock, T Waterfield, O Yelekçi, R Yu and B Zhou (editors)], Cambridge University Press, in press

NSW Maritime (2005), *Engineering Standards & Guidelines for Maritime Structures*, First Edition, March

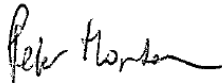
Watson, Phil J (2020), "Updated Mean Sea-Level Analysis: Australia", *Journal of Coastal Research*, Volume 36, Issue 5, September, pp. 915-931

11. 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 Clint Bragg (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 Clint Bragg

Name of Applicant

Address of site 1744 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 14th June 2024 (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 and Coastal Risk Management Report on 1744 Pittwater Road Bayview

Report Date:

14 June 2024

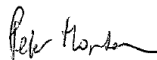
Author: Horton Coastal Engineering Pty Ltd

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

See Section 2 and Section 10 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