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31 October 2018

Coastal Engineering Advice for Mona Vale SLSC Redevelopment

1. INTRODUCTION AND BACKGROUND

It is proposed to demolish and rebuild Mona Vale SLSC. Northern Beaches Council requires that a coastal engineering assessment is prepared as part of a Development Application (DA) for the works. Horton Coastal Engineering Pty Ltd has been engaged (as a subconsultant to Royal HaskoningDHV) to complete this assessment, as set out herein.

The report author, Peter Horton [BE (Hons 1) MEngSc MIEAust CPEng NER], is a professional Coastal Engineer with 26 years of coastal engineering experience. He has postgraduate qualifications in coastal engineering, and is a Member of Engineers Australia and Chartered Professional Engineer (CPEng) registered on the National Engineering Register. He 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.

In previous employment, Mr Horton was the main author of the *Coastal Zone Management Plan for Bilgola Beach (Bilgola) and Basin Beach (Mona Vale)* prepared for Pittwater Council in 2016, and the *Coastal Erosion Emergency Action Subplan for Bilgola Beach (Bilgola) and Basin Beach (Mona Vale)* prepared for Pittwater Council in 2012. He has also prepared coastal engineering assessments for DA's at numerous locations along the Northern Beaches over the last decade.

Mr Horton has inspected the area in the vicinity of the subject property on numerous occasions in the last decade, including specific recent inspections of the property on 2 April 2017, 24 May 2017, 13 August 2017, 10 September 2017 and 1 October 2018.

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 19 drawings (namely A.DA.00.001, 01.001, 02.001, 02.002, 02.003, 02.004, 10.001, 10.002, 11.001, 12.001, 20.001, 20.002, 30.001, 40.001, 50.001, 90.001, 90.002, 90.003, and 90.004) prepared by Warren and Mahoney, all Revision A and dated 15 October 2018 (issued 31 October 2018). A site survey completed by Total Surveying Solutions, Plan No. 171679_A and dated 25 August 2017, was also provided.

3. EXISTING SITE DESCRIPTION

The existing SLSC has a ground finished floor level of 7.4 to 7.5m AHD. A concrete path extends about 3m to 5m seaward of the building, with a level of about 7.3 to 7.6m AHD at its seaward edge. A sandy beach access walkway, about 16m wide at its narrowest point, extends seaward of the SLSC between fenced dune vegetation areas (which have patchy vegetation coverage).

The fenced dune area extends about 25m to 30m cross-shore, with the sandy beach seaward of the dune vegetation typically about 50m wide to the shoreline at mean sea level (0m AHD). Beach width varies over time, with erosion of the beach in response to large waves and elevated water levels, and subsequent recovery (accretion) in calmer periods. At the time of the survey, crest elevations in the fenced areas were about 8.3m AHD, with the accessway crest at about 7.7m AHD.

4. PROPOSED DEVELOPMENT

It is proposed to demolish and rebuild Mona Vale SLSC at a similar location to existing (see the proposed development outline in Figure 1). The proposed ground finished floor levels vary between 7.5m and 7.8m AHD, generally increasing moving north (consistent with the variation in natural ground levels). Specifically, ground floor levels are proposed to be as follows:

- gym, southern storage, canteen, public amenities, first aid, patrol and lifeguard rooms at 7.50m AHD;
- plant and central storage areas at 7.75m AHD;
- office, lift, lobby, switch, club rooms and boardriders room at 7.8m AHD; and
- café, bin room and kitchen at 7.65m AHD.

Due to *Disability Discrimination Act 1992* access requirements, most areas of building entry are ramped upwards at a slope of 1:20 (vertical:horizontal), with the only exception being a step into the lifeguard room.

Roller doors are proposed at the central storage areas and boardriders room, with glass doors on the lobby, glass bifold and sliding doors at the café, batten grill gates at the public amenities, and tilt up panels to the gym, southern storage, and canteen.

A concrete path is proposed seaward of the building (see Figure 1), with a generally similar cross-shore extent to the existing path (also shown in Figure 1), and extending up to about 1.2m further seaward (adjacent to the beach accessway) to facilitate pedestrian flow at times when boats are blocking the concrete path due to washdown. An area of pervious paving (including showers), about 1.5m wide cross-shore and seaward of the concrete path, is proposed at the SW end of the beach access walkway (see Figure 1).

Existing fenced dune vegetation areas are proposed to be retained without alteration. Additional vegetation planting is proposed between the concrete path and existing vegetation along the northern portion of the SLSC, as well as at the SW end of the beach access walkway (see Figure 1).

5. EROSION/RECESSION COASTLINE HAZARDS

Acceptable risk lines for erosion/recession at Mona Vale SLSC for a 100 year life (at 2117) have been developed in a previous report, namely Royal HaskoningDHV (2017), with Peter Horton the main author of this report. The acceptable risk lines are depicted in Figure 1.

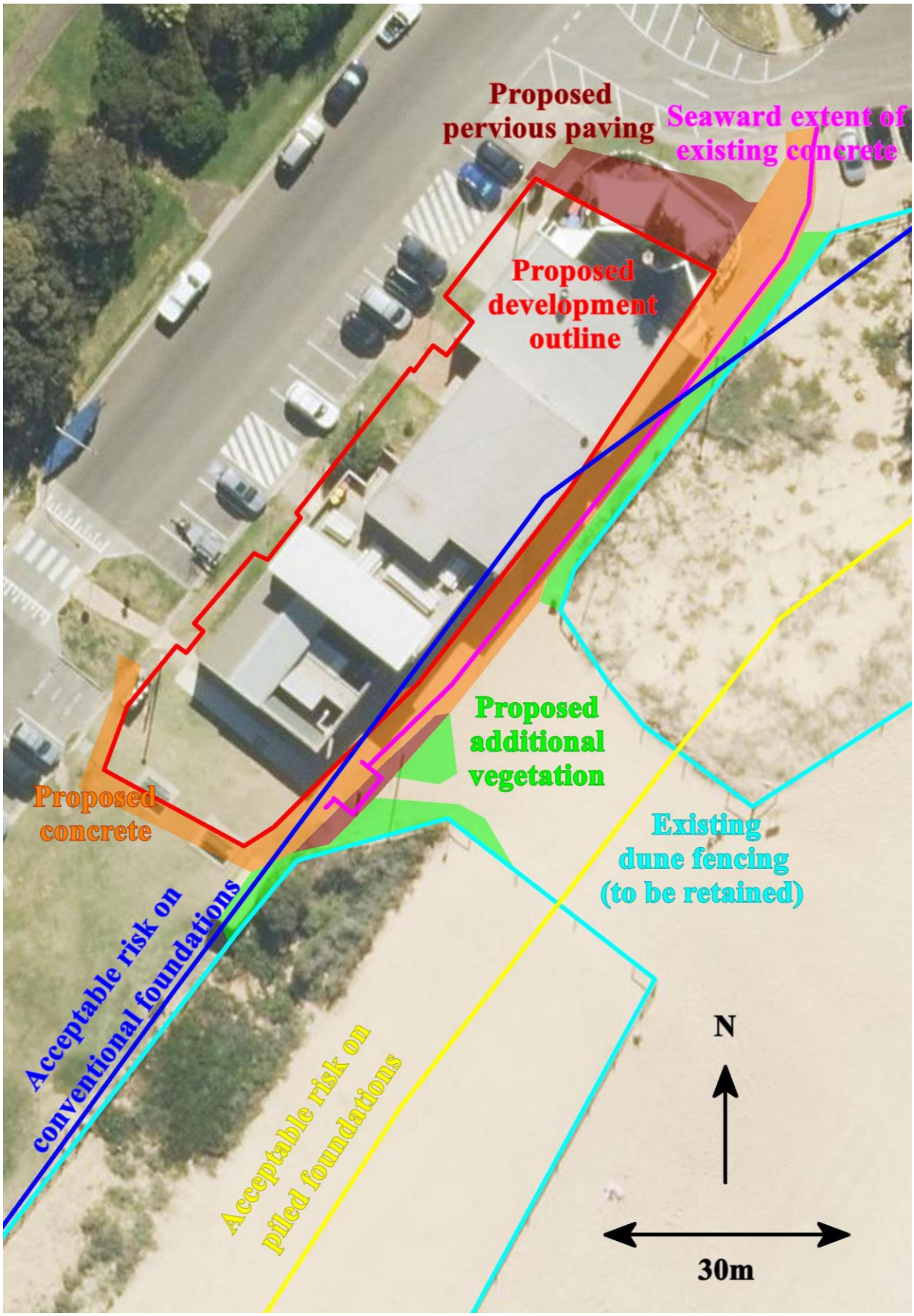


Figure 1: Acceptable risk lines at Mona Vale SLSC, with proposed development outline shown (aerial photograph taken 6 April 2016)

It is evident that the proposed building is landward of the acceptable risk line for development on conventional foundations (there is a slight encroachment of up to about 1.2m in the central portion, which is insignificant in terms of risk to development). Therefore, the building foundations can be designed without allowance for any undermining due to coastal erosion (that is, based on conventional structural and geotechnical considerations).

Although the concrete path extends seaward of the acceptable risk line for development on conventional foundations, it is unlikely to be economically justified to pile the path (that is, the cost of piling the path may be commensurate with its replacement cost). It would be particularly conservative to design a path for a 100 year design life anyhow, and with a slightly shorter design life (which is certainly reasonable) the path would be in an acceptable risk area with conventional foundations. The path should be designed to be structurally disconnected from the SLSC building, and segmented, such that undermining of a portion of the path would not affect the structural integrity of the building or entire path.

As noted in Section 4, an area of pervious paving is proposed at the SW corner of the beach accessway. It may be argued that this paving is preferential over a concrete path as it can be dismantled and removed prior to being undermined by coastal erosion, or easily recovered from the beach if undermined. A converse argument is that an undermined path would collapse at its origin, and so be locatable after a storm, while undermined pavers would be difficult to recover as they could be scattered widely and buried under sand (only to be found over the long-term as they are re-exposed by subsequent storms). Ultimately, either pervious paving or a concrete path is considered acceptable (from a coastal engineering perspective) at the location shown, again given the long design life before this area is likely to be impacted by coastal erosion. On-site detention requirements to offset impermeable areas may also be a consideration in the selection of pervious paving versus concrete path.

6. COASTAL INUNDATION COASTLINE HAZARDS

Theoretical present-day maximum wave runup levels of about 8m AHD would be expected at SLSC in a severe storm, say 100 year Average Recurrence Interval (ARI), assuming an infinite height foreshore. Talking sea level rise into account, these levels would increase further, to say around 9m AHD at the end of the design life (again assuming an infinite height foreshore, and with a sea level rise allowance towards the upper end of current Intergovernmental Panel on Climate Change projections).

In reality, any waves that overtopped the foreshore in the study area would 'fold over' the foreshore crest (at around 8m AHD) and travel as a sheet flow at shallow depth, spreading out and infiltrating over landward areas. A significant reduction in the velocity and depth of the runup would be expected within the order of 10m landward from the foreshore crest. That is, even if the SLSC floor level is below a predicted wave runup level, this does not necessarily imply there would be damage to the structure, as this would depend primarily on the depth of overtopping flow (or flow momentum in immediate foreshore areas), distance of the structure from the foreshore crest, nature of the construction, and relative difference between natural ground levels and ground floor levels at the structure.

That stated, some inundation of the SLSC should be expected for a severe storm over the design life.

For planning purposes consistent with the Pittwater 21 DCP, it is considered to be reasonable to adopt a Coastal Planning Level of 8.8m AHD (which is 1.0m above the highest proposed ground floor level) for areas facing seaward (public amenities entry, central storage area,

lobby, switch, boardriders room, and café). For other areas, a Coastal Planning Level of 8.3m AHD is considered to be reasonable (gym, southern storage, canteen, public amenities rooms, first aid room, patrol room, lifeguard room, office, club rooms, kitchen and bin room). The plant area can be at ground level as long as its eastern, southern and northern walls are impermeable to 8.8m AHD.

Measures to reduce the risk of inundation damage (where practical) on the ground floor would include:

- using floor finishes and wall materials (up to the relevant Coastal Planning Level) that would withstand inundation, such as concrete and tiles;
- allowing for wave forces on exposed elements of the building (note that roller doors cannot withstand wave forces, so have to be considered sacrificial);
- constructing glazing that faces seawards from toughened/laminated glass with appropriate fracture characteristics that present a low hazard when fractured, or such that it holds together when shattered;
- storing items that could be damaged by inundation, or become polluting due to inundation, above the relevant Coastal Planning Level;
- relocating items that could be damaged by inundation prior to a storm;
- placing electrical fittings and outlets that could be damaged by inundation above the relevant Coastal Planning Level, or waterproofing them below this;
- designing cross-falls on the pathway to ensure that inundation would drain away from the building;
- using sand bags as required to reduce the extent of inundation into the building; and
- designing the lift area such that it would not be damaged by inundation.

7. CONSENT MATTERS

7.1 Coastal Zone Management Plan or Coastal Management Program

No gazetted Coastal Zone Management Plan or Coastal Management Program applies at the subject property.

7.2 Pittwater Local Environmental Plan 2014

7.2.1 Clause 5.5 (Development within the Coastal Zone)

Clause 5.5 of the *Pittwater Local Environmental Plan 2014* (LEP)[1] was repealed on 2 April 2018, so no longer applies at the subject property. However, the Department of Planning and Environment has advised that this is still a relevant consideration as the full application of the replacing legislation is not yet in place.

Based on Clause 5.5(2) of the former LEP, "development consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority has considered:

(a) existing public access to and along the coastal foreshore for pedestrians (including persons with a disability) with a view to (i) maintaining existing public access and, where possible, improving that access, and (ii) identifying opportunities for new public access, and

[1] The version reviewed was last updated on 26 October 2018 and was current at 31 October 2018.

(b) the suitability of the proposed development, its relationship with the surrounding area and its impact on the natural scenic quality, taking into account (i) the type of the proposed development and any associated land uses or activities (including compatibility of any land-based and water-based coastal activities), and (ii) the location, and (iii) the bulk, scale, size and overall built form design of any building or work involved, and
(c) the impact of the proposed development on the amenity of the coastal foreshore including (i) any significant overshadowing of the coastal foreshore, and (ii) any loss of views from a public place to the coastal foreshore, and
(d) how the visual amenity and scenic qualities of the coast, including coastal headlands, can be protected, and
(e) how biodiversity and ecosystems, including: (i) native coastal vegetation and existing wildlife corridors, and (ii) rock platforms, and (iii) water quality of coastal waterbodies, and (iv) native fauna and native flora, and their habitats, can be conserved, and
(f) the cumulative impacts of the proposed development and other development on the coastal catchment".

Based on Clause 5.5(3) of the former LEP, "development consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority is satisfied that:

(a) the proposed development will not impede or diminish, where practicable, the physical, land-based right of access of the public to or along the coastal foreshore, and
(b) if effluent from the development is disposed of by a non-reticulated system, it will not have a negative effect on the water quality of the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and
(c) the proposed development will not discharge untreated stormwater into the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and
(d) the proposed development will not (i) be significantly affected by coastal hazards, or (ii) have a significant impact on coastal hazards, or (iii) increase the risk of coastal hazards in relation to any other land".

Clauses 5.5(2)(b), (c), (d), (e) and (f) are not coastal engineering matters and hence are not considered herein. Clause 5.5(3)(b) is not relevant as the existing and proposed development would be connected to the Sydney Water sewerage system. Clause 5.5(3)(c) is not a coastal engineering matter and hence is not considered herein, although it can be noted that treatment of stormwater from a public building adjacent to a beach would not be typical. It is understood that a stormwater concept plan has been developed such that post-development runoff volumes from the site will not exceed pre-development runoff volumes.

With regard to Clause 5.5(2)(a) and Clause 5.5(3)(a), the proposed development would not impact on public access to or along Mona Vale Beach, with the proposed SLSC having a similar seaward extent to the existing SLSC. Disabled access to the building would be enabled with the proposal.

With regard to Clause 5.5(3)(d), the SLSC building is at an acceptably low risk of damage from coastal erosion/recession over a conservative 100 year design life, on conventional foundations. The proposed concrete path seaward of the building does not satisfy this for a 100 year design life, but this is not considered to be warranted, with the path having a similar extent to the existing path and still being at acceptable risk for a suitably long design life.

The SLSC may be affected by oceanic inundation in a severe storm, but with adoption of the measures outlined in Section 6, the risk to property would be minimised. Note that risk to life is not significant, as coastal storms are foreseeable, and the building would not need to be occupied at the time of a storm (and is non-habitable).

The proposed development is unlikely to have a significant impact on coastal hazards or increase the risk of coastal hazards in relation to any other land over the design life and beyond.

7.2.2 Clause 7.5 (Coastal Risk Planning)

Clause 7.5 of the LEP does not apply at the subject building, as the land on which it sits is not identified on the Coastal Risk Planning Map.

7.3 Pittwater 21 DCP – 2014

The Pittwater 21 DCP version up to Amendment 23 (effective from 13 January 2018) was considered herein. Based on Chapter B3.3 of the DCP (numbered for convenience herein):

1. all development on land to which this control applies must comply with the requirements of the *Coastline Risk Management Policy for Development in Pittwater* (Part B, Appendix 6 of the DCP);
2. development must be designed and constructed to ensure that every reasonable and practical means available is used to remove risk to an acceptable level for the life of the development;
3. the development must not adversely affect or be adversely affected by coastal processes nor must it increase the level of risk for any people, assets and infrastructure in the vicinity due to coastal processes;
4. the Statement of Environmental Effects [is to include] a statement in relation to the proposed development outlining how it has been designed and will be constructed to address the Coastal (Beach) Hazard;
5. the application is to be accompanied by a report prepared by a NPER Engineer with coastal engineering as a core competency and having an appropriate level of professional indemnity insurance;
6. the report is to provide an assessment of the risk and should demonstrate that the proposal is designed and has been located to achieve the control requirements;
7. the report should also provide management procedures to be carried out during construction and over the life of the development to achieve an acceptable level of Risk Management.

With regard to Item 1, see Section 7.4.

For Item 2, the proposed development is at an acceptably low risk of damage from coastal erosion over a conservative 100 year design life, without requiring deep foundations. With regard to coastal inundation, *Disability Discrimination Act 1992* and equipment access requirements have limited the scope for raising floor levels. Recommendations for consideration to reduce the risks of inundation have been provided in Section 6, which are considered to be every reasonable and practical means available to reduce that risk while balancing the access requirements.

For Item 3, it was outlined in Section 7.2.1 how the proposed development is unlikely to have a significant impact on coastal hazards or increase the risk of coastal hazards in relation to any

other land. That is, it would not be expected to adversely affect coastal processes nor increase the level of risk for any people, assets and infrastructure in the vicinity due to coastal processes. The development is at an acceptably low risk of damage from coastal erosion/recession over a conservative 100 year design life, and with adoption of the measures outlined in Section 6, the risk of damage from inundation would be minimised.

For Item 4, the recommendations provided Section 6 are relevant considerations to address this item.

For Items 5 and 6, the report herein, and its author, meets these requirements. As required, completed Forms 1 and 1(a) as given in the *Coastline Risk Management Policy for Development in Pittwater* are attached.

For Item 7, there may be a need to undertake beach scraping or battering of slopes after erosive storms if sand levels drop (or form steep scarps) adjacent to the SLSC, to maintain access for people and equipment. Other management procedures have been outlined in Section 6 in relation to dealing with inundation.

7.4 Coastline Risk Management Policy for Development in Pittwater

Based on Section 8.2(i) of the *Coastline Risk Management Policy for Development in Pittwater*:

a) all structures below the Coastline Planning Level shall be constructed from flood compatible materials;
b) all development must be designed and constructed so that it will have a low risk of damage and instability due to wave action and/or oceanic inundation hazards;
c) all development and/or activities must be designed and constructed so that they will not adversely impact on surrounding properties, coastal processes or the amenity of public foreshore lands;
d) all uncontaminated dune sand excavated during construction operations shall be returned to the active beach zone as approved and as directed by Council;
e) wherever present, remnant foredune systems shall be appropriately rehabilitated and maintained for the life of the development to stabilise an adequate supply of sand (as determined by a coastal engineer) that is available to buffer erosion processes and/or minimise the likelihood of oceanic inundation;
f) all vegetated dunes, whether existing or created as part of coastal protection measures shall be managed and maintained so as to protect the dune system from damage both during construction of the development and as a result of subsequent use during the life of the development;
g) all electrical equipment, wiring, fuel lines or any other service pipes and connections must be waterproofed to the Coastline Planning Level;
h) the storage of toxic or potentially polluting goods, materials or other products, which may be hazardous or pollute waters during property inundation, will not be permitted below the Coastline Planning Level;
i) for existing structures, a tolerance of up to minus 100mm may be applied to the Coastline Planning Level in respect of compliance with these controls;
j) building heights must not exceed 8.0 metres above the Coastline Planning Level or 8.5 metres above existing ground level, whichever is higher; and,
k) where land is also subject to the provisions of the Flood Risk Management Policy for Development around Pittwater, the higher of the Coastline Planning Level and Flood Planning Level shall apply.

For Item (a), the Coastline Planning Level varies between 8.3m and 8.8m AHD at the SLSC building, as outlined in Section 6. It was recommended in Section 6 that floor finishes and wall materials that would withstand inundation be used up to that level.

For Item (b), the development is at an acceptably low risk of damage from coastal erosion/recession over a conservative 100 year design life, and with adoption of the measures outlined in Section 6, the risk of damage from inundation would be minimised.

For Item (c), it has been noted previously that the proposed development would not be expected to adversely impact on surrounding properties or coastal processes.

Item (d) would be achievable and appropriate during construction.

For Items (e) and (f), existing vegetated dune areas are to be maintained, with additional vegetation planting to enhance vegetation coverage.

For Item (g), a recommendation was provided in Section 6 that electrical fittings and outlets that could be damaged by inundation were placed above the Coastline Planning Level, or waterproofed below this, where practical.

For Item (h), a recommendation was provided in Section 6 that items that could be damaged by inundation, or become polluting due to inundation, be stored above the Coastline Planning Level.

Item (j) is not a coastal engineering matter and hence not addressed herein.

For Item (k), oceanic inundation dominates over catchment flooding, and has been appropriately considered.

In the *Coastline Risk Management Policy for Development in Pittwater*, it is noted that a Coastline Management Line must be defined. It is considered that this can correspond to the acceptable risk line for development on conventional foundations.

Based on 8.2(iii) of the Policy, "new development and major additions to existing development must be sited on the landward side of the 100 year Coastline Management Line". This has been achieved for the proposed development (the minor encroachment of up to 1.2m in the central portion is considered to be insignificant).

The proposed concrete path extends seaward of the acceptable risk line for development on conventional foundations (Coastline Management Line), but it is noted in the Policy that:

> "Relocatable or sacrificial, ancillary, non-habitable, detached, light weight structures associated with landscaping, storage or outdoor living areas may be permitted seaward of the 100 year Coastline Management Line where their destruction by coastal processes is unlikely to exacerbate property damage during a storm event".

It is considered that a design life less than 100 years can be applied to the path. Even if not, it would be designed to be detached from the building and unlikely to exacerbate property damage during a storm event, and can thus be accepted on merit in relation to the Policy.

7.5 State Environmental Planning Policy No 71 – Coastal Protection

State Environmental Planning Policy No 71 – Coastal Protection (SEPP71) was repealed on 2 April 2018. However, the Department of Planning and Environment has advised that this is still a relevant consideration as the full application of the replacing legislation is not yet in place. That stated, coastal engineering matters for consideration listed under Part 2 Clause 8 of SEPP71 have generally been addressed (in principle) in previous sections.

7.6 State Environmental Planning Policy (Coastal Management) 2018

Based on *State Environmental Planning Policy (Coastal Management) 2018* (SEPP Coastal) and its associated mapping, the subject building is within a "coastal use area". It may eventually be defined to be in a "coastal vulnerability area", but no such mapping has been adopted at this time, and on this basis it is understood that Councils are generally assessing DA's on the basis of the legislation prior to the April 2018 legislation changes.

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 14(1)(a)(i), the proposed development will not affect public access to and along the foreshore. Items (ii) to (v) are not coastal engineering matters and hence are not addressed herein.

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 7.2.1 and Section 7.3, the proposed development is unlikely to have a significant impact on coastal hazards or increase the risk of coastal hazards in relation to any other land.

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 building.

7.7 Coastal Management Act 2016

There are no sections of the *Coastal Management Act 2016* that directly apply to the proposed development.

8. CONCLUSIONS

The proposed SLSC building is landward of an acceptable risk line for development on conventional foundations over a conservative 100 year design life (a minor encroachment of up to 1.2m in the central portion is considered to be insignificant). Therefore, the development is at an acceptably low risk of damage from coastal erosion, and the building foundations can be designed without allowance for any undermining due to coastal erosion (that is, based on conventional structural and geotechnical considerations). The proposed concrete path seaward of the SLSC should be designed to be structurally disconnected from the SLSC building, and segmented, such that undermining of a portion of the path would not affect the structural integrity of the building or entire path.

With regard to coastal inundation, *Disability Discrimination Act 1992* and equipment access requirements have limited the scope for raising floor levels. Recommendations for consideration to reduce the risks of inundation have been provided in Section 6.

The proposed development may be considered on merit in relation to *Pittwater Local Environmental Plan 2014*, the Pittwater 21 DCP, the *Coastline Risk Management Policy for Development in Pittwater*, *State Environmental Planning Policy No 71 – Coastal Protection*, and *State Environmental Planning Policy (Coastal Management) 2018* as outlined.

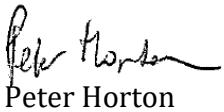
9. REFERENCES

Royal HaskoningDHV (2017), *Risk Assessment to Define Appropriate Beachfront Development Setback in Relation to Coastline Hazards for Redevelopment of Mona Vale SLSC*, 26 May

10. 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

Coastline Risk Management Policy for Pittwater Form No. 1 and Form No. 1(a) are attached overleaf

COASTLINE RISK MANAGEMENT POLICY FOR PITTWATER

FORM NO. 1 – To be submitted with Development Application

Development Application for Warren and Mahoney
Name of Applicant

Address of site 1 Surfview Road Mona Vale (Mona Vale SLSC)

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

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

on this the 31 October 2018 (date)

certify that I am a Coastal Engineer as defined by the Coastline Risk Management Policy for 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.

I have:

Please mark appropriate box

☑ Prepared the detailed Coastal Risk Management Report referenced below in accordance with the Pittwater Council Coastline Risk Management Policy

☐ Am willing to technically verify that the detailed Coastal Risk Management Report referenced below has been prepared in accordance with the Pittwater Council Coastline Risk Management Policy

☐ 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 coastal hazard analysis or risk assessment is not required.

☐ Provided the coastal hazard analysis for inclusion in the Coastal Risk Management Report

Coastal Risk Management Report Details:

Report Title: Coastal Engineering Advice for Mona Vale SLSC Redevelopment

Report Date: 31 October 2018

Author: Horton Coastal Engineering Pty Ltd

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

See Section 2 and Section 9 of report

I am aware that the above Coastal 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 Pittwater Council as the basis for ensuring that the coastal 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 Peter Horton

Chartered Professional Status MIEAust CPEng NER

Membership No. 452980

COASTLINE RISK MANAGEMENT POLICY FOR PITTWATER

FORM NO. 1(a) - Checklist of Requirements for Coastal Risk Management Report for Development Application or Part 5 Assessment

Development Application for Warren and Mahoney

Name of Applicant

Address of site 1 Surfview Road Mona Vale (Mona Vale SLSC)

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

Coastal Risk Management Report Details:

Report Title: Coastal Engineering Advice for Mona Vale SLSC Redevelopment

Report Date: 31 October 2018

Author: Horton Coastal Engineering Pty Ltd

Please mark appropriate box

☑ Comprehensive site mapping conducted Survey provided as per Section 2
(date)

☑ Mapping details presented on contoured site plan to a minimum scale of 1:200 (as appropriate)
Figure 1 is considered to be adequate

☐ Subsurface investigation required

☐ No Justification .....

☑ Yes Date conducted Discussed in RHDHV (2017)

☑ Impact by and upon coastal processes identified

☑ Coastal hazards identified

☑ Coastal hazards described and reported

☑ Risk assessment conducted in accordance with Council's Policy

☐ Adequacy of existing coastal protection measures assessed and certified N/A

☑ Opinion has been provided that the design can achieve the risk management criteria in accordance with Council's Policy provided that the specified conditions are achieved.

☑ Design Life Adopted:

☑ 100 years

☐ Other ……
specify

☑ Development Controls as described in the Pittwater Coastline Risk Management Policy have been specified

☑ Additional actions to remove risk where reasonable and practical have been identified and included in the Coastal Risk Management Report.

I am aware that Pittwater Council will rely on the Coastal Risk Management Report, to which this checklist applies, as the basis for ensuring that the coastal 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 specified, and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature ……

Name …… Peter Horton

Chartered Professional Status…… MIEAust CPEng NER

Membership No. …… 452980