

**IN THE MATTER** of the Resource Management Act 1991 (**RMA**)

**AND**

**IN THE MATTER** of **Private Plan Change 85** – 48 Esmonde Road,  
Takapuna to the Auckland Unitary Plan

**HEARING DIRECTION #3 FROM THE HEARING PANEL**

1. Pursuant to section 34A of the RMA, Auckland Council (the Council) has appointed a Hearing Panel consisting of three independent hearing commissioners – Peter Reaburn (Chairperson), Lisa Mein and Mark Farnsworth. The Hearing Panel’s function is to hear the application and submissions and make a decision on the Plan Change proposal, including any changes to it that are within scope of the notified Plan Change. It is also to deal with any procedural matters.
2. Plan Change 85, in summary, aims to rezone the land around the coastal edge of 48 Esmonde Road, Takapuna to Open Space – Conservation Zone, but retain the existing Residential – Terrace Housing and Apartment Building Zone for the remainder of the land. PC85 also introduces the Takapuna 2 Precinct, which contains site specific development provisions for the land at 48 Esmonde Road, into the Auckland Unitary Plan.
3. The council reporting planner will be providing a S42A report on this application. As part of the preparation of that report, the reporting planner receives comments from experts on the proposal. In this case, the hearing panel has been advised that a memorandum has been provided by the Senior Coastal Specialist commenting on the potential effects arising from the proposed plan change, with a particular focus on the impacts of coastal hazards and climate change.
4. The Senior Coastal Specialist has recommended the applicant carry out further investigations and reporting. The hearing panel agrees that information will be reasonably fundamental to the consideration of Plan Change 85.
5. To ensure the applicant has sufficient time to address these recommendations prior to the hearing, the hearing panel directs the applicant to address the information requested in paragraph 5.2 of the attached memorandum from Matt Rivers, Senior Coastal Specialist dated 23 February 2023 as part of their evidence that is due with the Senior Hearings Advisor by 14 April 2023.

6. Any enquiries regarding these Directions or related matters should be directed to the Council's Senior Hearings Advisor, Patrice Baillargeon by email at [patrice.baillargeon@aucklandcouncil.govt.nz](mailto:patrice.baillargeon@aucklandcouncil.govt.nz).

A handwritten signature in blue ink, appearing to read "Peter Reaburn". The signature is stylized with large, flowing letters.

Peter Reaburn  
Chairperson  
7 March 2023

# Technical Memo

23<sup>rd</sup> February 2023

To: **Vanessa Wilkinson**, Planning Consultant  
 cc: **Natasha Carpenter**, Coastal Management Practice Lead, Resilient Land & Coasts  
 From: **Matt Rivers**, Senior Coastal Specialist, Resilient Land & Coasts  
 Subject: **Private Plan Change PC85: 48 Esmonde Road, Takapuna Coastal Hazards Review**

## 1.0 Introduction

- 1.1 I have undertaken a review of the private plan change 85 (PC85) on behalf of Auckland Council in relation to coastal hazards and climate change (including sea-level rise) at the site, their potential effects and proposed management.
- 1.2 PC85 seeks to introduce a new Precinct, the Takapuna 2 Precinct, which contains site-specific development provisions, and to re-zone the land around the coastal edge of 48 Esmonde Road, Takapuna to Open Space – Conservation Zone, while retaining the existing Residential – Terrace Housing and Apartment Building zone for the remainder of the land (Figure 1).

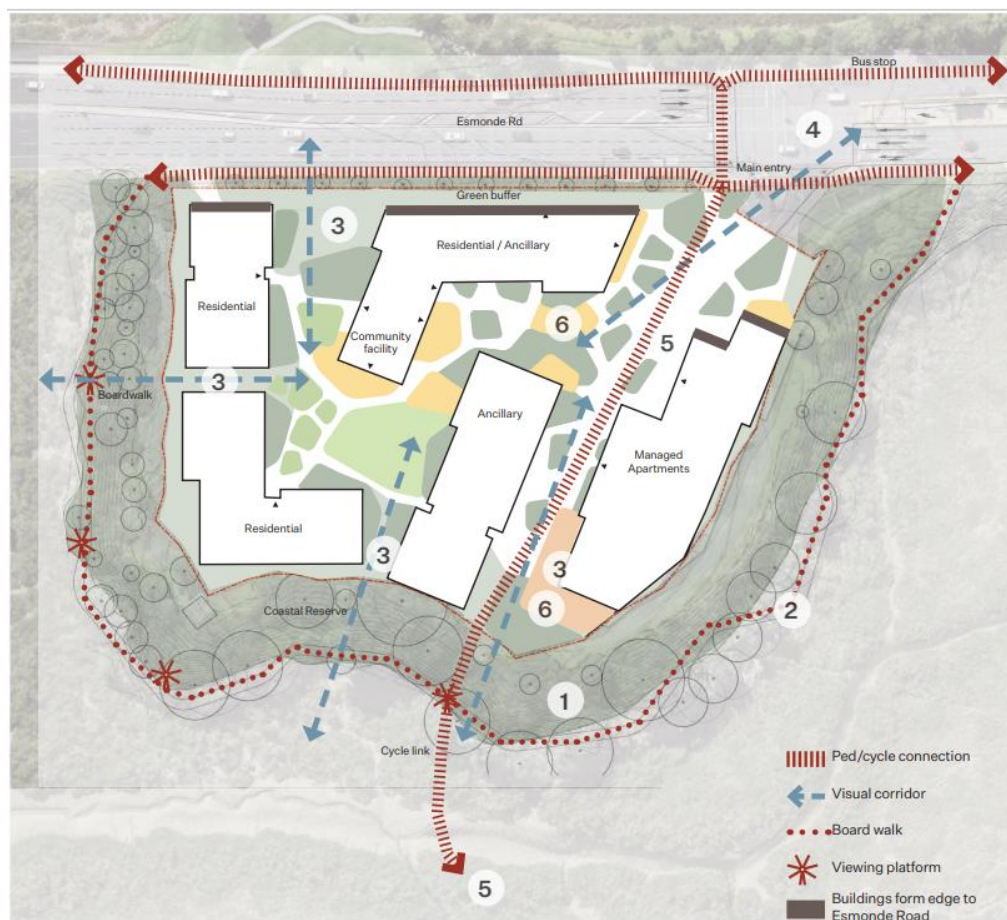


Figure 1: Proposed Masterplan for 48 Esmonde Road (Source: JASMAX)

- 1.4 The private plan change includes proposals for a 'generally 20m wide' Open Space – Conservation zone (Figure 2) which may then be vested to Auckland Council as esplanade reserve (Figure 3). The private plan change would enable the development of 5 multi-storey buildings, proposed to be up to 16 storeys high, as outlined in Figure 4.

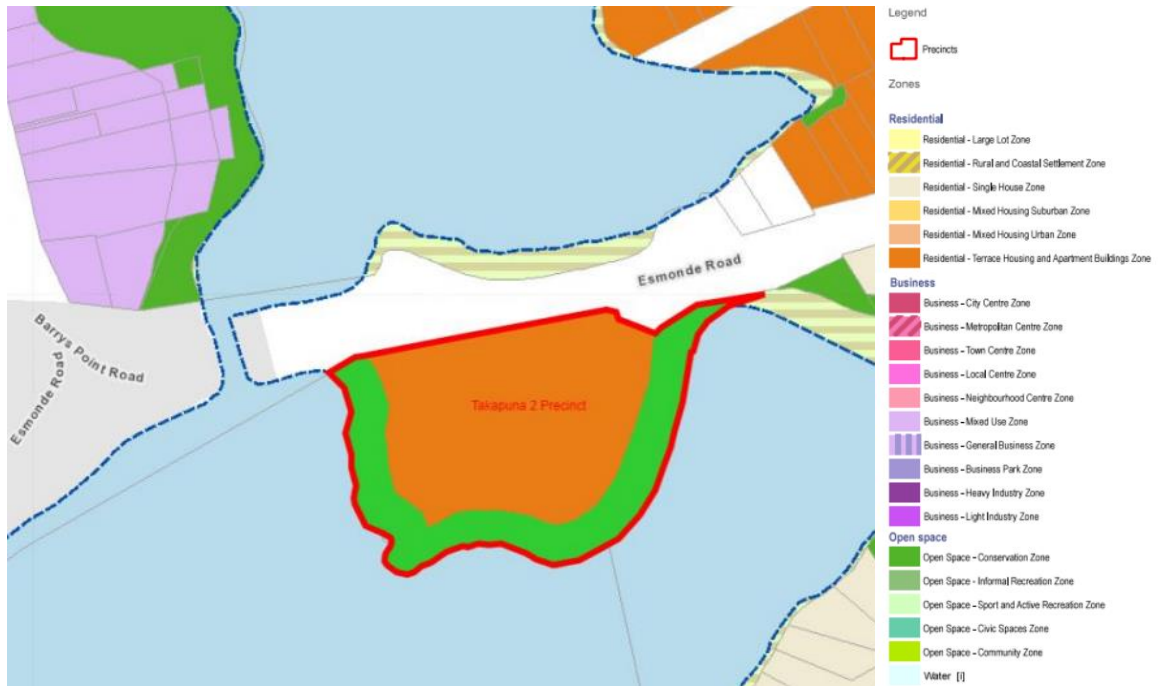


Figure 2: Proposed Zoning for 48 Esmonde Road

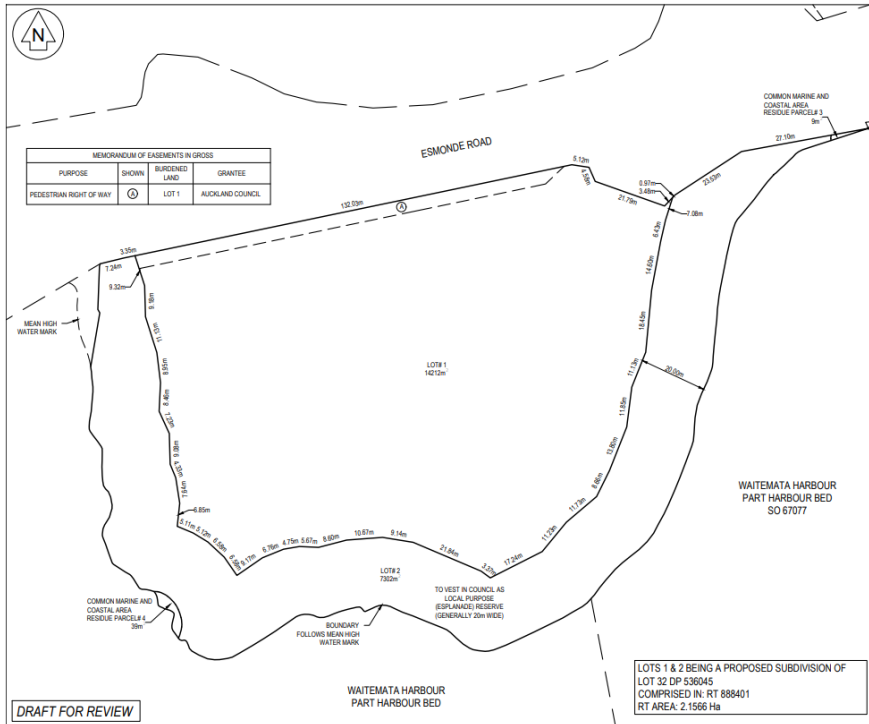


Figure 3: Draft scheme plan (Source: Maven Associates)

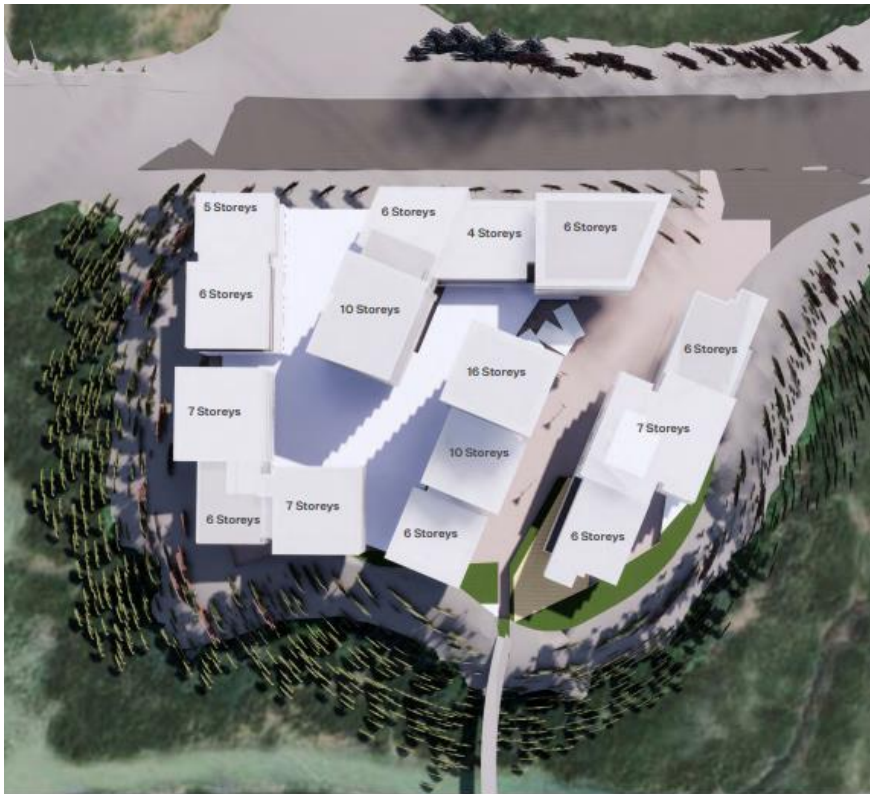


Figure 4: Proposed massing response for 48 Esmonde Road (Source: JASMAX)

- 1.5 This Technical Memo has been drafted to consider the potential effects arising from the proposed plan change 85 and associated activities, with a particular focus on the impacts of coastal hazards and climate change. In writing this memo, my review has focussed on the following documents:
- PC85 Plan Change Request (2022)
  - Appendix B: Proposed Plan Change Precinct and Zone Map (n.d.)
  - Appendix N: Geotechnical Report (Tonkin and Taylor, 2020)
  - Appendix O: Coastal Hazards Assessment (Tonkin and Taylor, 2020)
  - Appendix P: Topographic Survey Plan Survey (Maven Associates, 2019)
  - Appendix V: Scheme Plan with Esplanade Reserve (Maven Associates, 2021)
- 1.6 To further understand the site context I undertook a site visit on 21/02/2023. From my observations I note that the mangroves in the intertidal zone currently dissipate incoming wave energy and support subsequent retention of sediment around the site (Figure 12). The site's cliff slopes are heavily vegetated. The composition of the slope toe during my site visit was predominantly a vegetated but eroding soft bank (Figure 13).
- 1.7 The underlying East Coast Bays Formation (ECBF) geology (of the Waitematā Group) was visible in a few locations with bioerosion occurring (Figure 14). The Waitematā Group are extremely weak to very weak mudstones, siltstones and sandstones, particularly the East Coast Bays Formation (ECBF) with typical strengths ranging from 500 kPa to 5 MPa<sup>1</sup>. GNS's geological mapping describes this site's geology as 'alternating sandstone and mudstone with variable volcanic content and interbedded volcanoclastic grits'<sup>2</sup>.
- 1.8 Section 2 of this memo discusses the key issues at the site in relation to coastal hazards and climate change. Section 3 briefly discusses public access considerations noting key roles of esplanade reserves as both providing a buffer against natural hazards and enabling public access along the coast. Section 4 outlines relevant statutory and policy considerations regarding the approach to coastal hazards. Section 5 provides my recommendations.

<sup>1</sup> Roberts, R., N Carpenter and P Klinac (2020). Predicting Auckland's exposure to coastal instability and erosion, Auckland Council, technical report, TR2020/021, [Predicting Auckland's exposure to coastal instability and erosion \(knowledgeauckland.org.nz\)](https://knowledgeauckland.org.nz).

<sup>2</sup> Heron, D.W. (custodian) 2014: Geological Map of New Zealand 1:250 000. GNS Science Geological Map 1. Lower Hutt, New Zealand. GNS Science.

## 2.0 Key Coastal Issues

2.1 The key issues with respect to coastal hazards and sea-level rise are summarised below.

### **Coastal Flooding/Inundation**

- 2.2 Coastal flooding or inundation is the flooding of normally dry, low lying coastal land due to elevated sea levels. Elevated sea levels can result from a number of processes including astronomical tides, storm surges, monthly-decadal mean sea level fluctuations and sea-level rise. The frequency and severity of high coastal water level events will continue to increase in the future owing to climate change effects including sea-level rise.
- 2.3 The site at 48 Esmonde Road, Takapuna is bound to the north by Esmonde Road. The coastal marine area boundary of Mean High Water Springs (MHWS) bounds the rest of the site's perimeter.
- 2.4 Due to the relatively steep topography of the site, the coastal inundation risk is limited to the perimeter of the site. Figure 5 shows Auckland Council's regional coastal inundation mapping for up to 2m of relative sea level rise (RSLR) combined with a 1% Annual Exceedance Probability storm event. The basis for these coastal water levels is set out within Technical Report 2020/024.<sup>3</sup> "Auckland's exposure to coastal inundation by storm-tides and waves" (2020). Table 1 provides the vertical elevations of the coastal high water levels for different AEP events, based on the same dataset. The proposed finished floor levels of the proposed buildings are 5.20m AVD-46, 2.81m above the present day 1% AEP level (2.39m AVD-46). This gives a reasonable allowance for future sea-level rise and freeboard, which can be assessed in further detail during the resource consenting stage. However, it can be noted that coastal inundation will impact the site's northern edge as coastal inundation over Esmonde Road is possible with longer term sea-level rise combined with storm events (as indicated on Figure 5). Consideration should be given during design to safe use of the pedestrian right of way, and safe access in, out and around the development, during an extreme coastal inundation event.

Coastal Point	Waitemata Harbour WH14
2yr ARI (50% AEP)	2.07
5yr ARI (20% AEP)	2.15
10yr ARI (10% AEP)	2.21
20yr ARI (5% AEP)	2.26
50yr ARI (2% AEP)	2.33
100yr ARI (1%AEP)	2.39
100yr ARI (1%AEP) + 1m SLR	3.39
200yr ARI (0.5%AEP)	2.44

**Table 1: Coastal high water level elevations (Source: Technical Report 2020/024<sup>3</sup>)**

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<sup>3</sup> Carpenter, N., R Roberts and P Klinac (2020). Auckland's exposure to coastal inundation by storm-tides and waves. Auckland Council technical report, TR2020/24, [Auckland's exposure to coastal inundation by storm-tides and waves \(knowledgeauckland.org.nz\)](https://knowledgeauckland.org.nz)





Figure 5: Coastal inundation risk to 48 Esmonde Road (Source: Auckland Council Geomaps<sup>3</sup>)

- 2.5 The mapped coastal inundation extent is within the proposed 20m open space zone on the western, southern and eastern sides. Considering the maintenance and enhancement of public access to and along the coast as a matter of national importance, it would be prudent to increase the width of the public easement to the north to allow space for future inundation from extreme weather events and future sea-level rise.
- 2.6 The Coastal Hazard Assessment supporting Plan Change 85 (Tonkin and Taylor, 2020) has selected the 1% AEP water level + 0.2m wave setup + 1m of sea level rise, to obtain a water elevation of 3.59m AVD-46 for their assessment of future coastal inundation.
- 2.7 The Ministry for the Environment’s (MfE) latest Interim guidance<sup>4</sup> on the use of new sea level rise projections requires consideration of vertical land movement (VLM) and updated global projections. For plan changes, MfE’s interim guidance recommends assessing against ‘the updated suite of five “medium confidence” RSLR scenarios (including VLM) to 2150’. It also recommends that risk sensitive projects check ‘using additional “low confidence” median scenarios beyond 2150’.
- 2.8 Information on Vertical Land Movement rates across New Zealand has been presented by the NZ SeaRise project and is published through the Takiwa website. Its application is recommended by the MfE Interim Guidance. The nearby Takiwa sites for this area give a vertical land movement of approximately -1.7mm/yr. This gives a relative sea-level rise range of 0.96m – 2.34m by 2150 for the site. This range increases further when checking against the ‘low confidence’ beyond 2150 scenarios.

<sup>4</sup> Ministry for the Environment. 2022. Interim guidance on the use of new sea-level rise projections. Wellington: Ministry for the Environment. [Interim-guidance-on-the-use-of-new-sea-level-rise-projections-august-2022.pdf](https://www.mfe.govt.nz/publications/interim-guidance-on-the-use-of-new-sea-level-rise-projections-august-2022.pdf) ([environment.govt.nz](https://www.environment.govt.nz))

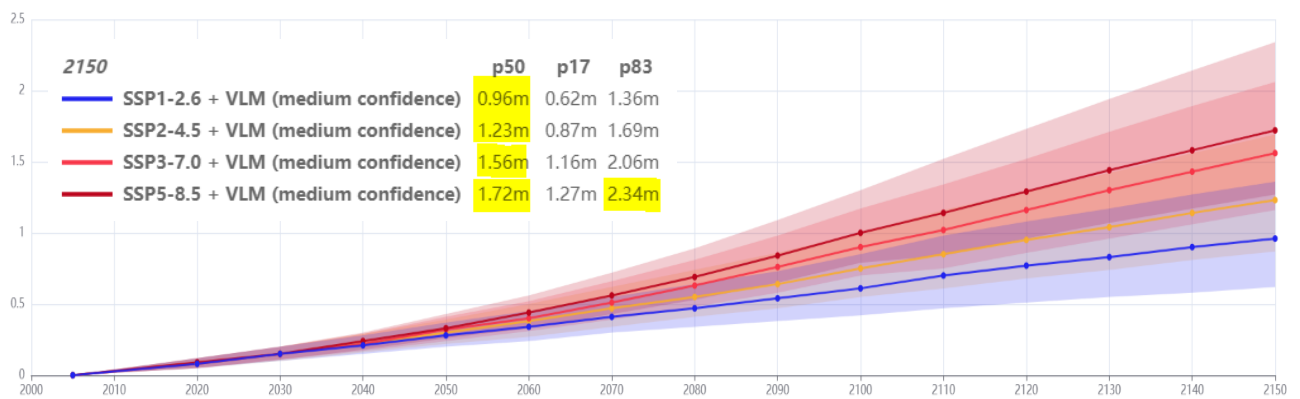


Figure 6: Medium confidence sea level rise scenarios including VLM (Source: Takiwa, NZ Sea Rise)

2.9 To inform future planning and design for the site, the site-specific coastal hazard assessment should be updated to align with the above MfE guidance<sup>4</sup>.

2.10 In establishing Finished Floor Levels, a freeboard component is also recommended during design. This should be applied on top of the determined water level (including storm tide and sea-level rise) to allow for additional factors not otherwise provided for e.g. wave (and wake) runup and overtopping as well as uncertainty in the calculations, and the potential for rarer AEP events to occur.

#### **Area Susceptible to Coastal Instability and Erosion (ASCIE)**

2.11 The 'area susceptible to coastal instability and erosion' is the area landward of the current coastline that is at risk because of coastal erosion or coastal slope instability. A regional assessment of the area susceptible to coastal instability and erosion (ASCIE) is set out within Auckland Council's Technical Report 2020/021 'Predicting Auckland's Exposure to Coastal Instability and Erosion'<sup>5</sup>. (Note that the regional ASCIE assessment establishes coastal erosion and instability distances to the top of the future cliff from the cliff/dune toe, in contrast to the Open Space zoning and Esplanade reserve which is relative to the (at times) more seaward boundary of Mean High Water Springs (MHWS)).

2.12 From my assessment, the ASCIE is the predominant concern from a coastal hazards perspective for the site. Figure 7 shows the regional ASCIE lines for 48 Esmonde Road which shows the ASCIE risk zone as generally around 20m from the MHWS boundary but reaching up to 45m in some areas for this site. The regional ASCIE assessment notes that site-specific assessments are recommended and would supersede the regional assessment provided that more accurate site-specific data is applied and an appropriate methodology is adopted.

<sup>5</sup> Roberts, R., N Carpenter and P Klinac (2020). Predicting Auckland's exposure to coastal instability and erosion, Auckland Council, technical report, TR2020/021, [Predicting Auckland's exposure to coastal instability and erosion \(knowledgeauckland.org.nz\)](https://knowledgeauckland.org.nz).



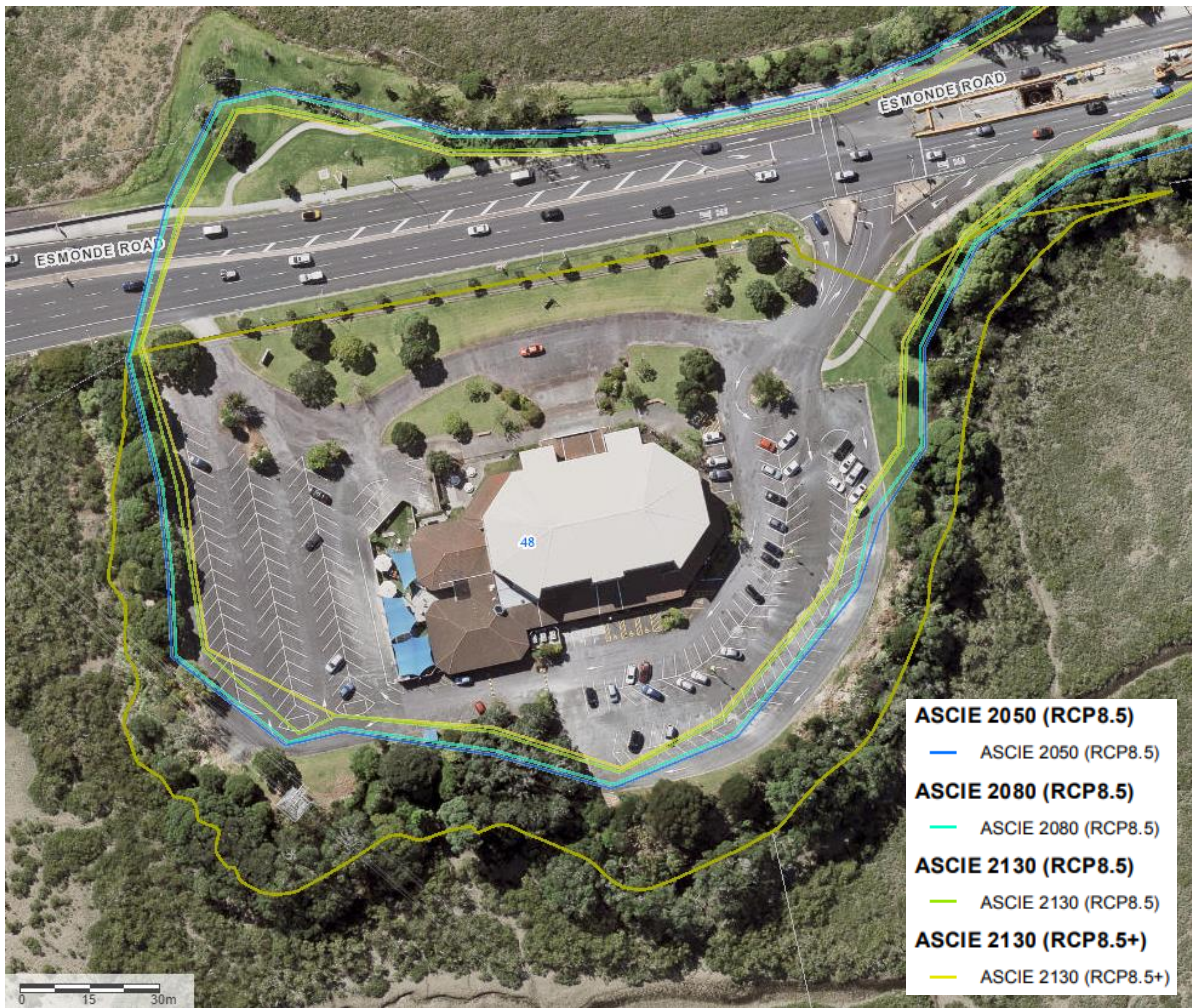


Figure 7: Regional ASCIE lines for 48 Esmonde Road (Source: Auckland Council Geomaps<sup>5</sup>)

2.13 The site-specific Coastal Hazard Assessment (Tonkin & Taylor) broadly follows the recommended methodology within Auckland Council's Guidance Document 2021/010 ([Coastal Hazard Assessment Guidance 2022 \(aucklanddesignmanual.co.nz\)](https://www.aucklanddesignmanual.co.nz)) illustrated schematically in Figure 8. This site-specific CHA for 48 Esmonde Road's proposed development determines the ASCIE to be between 7.2m and 11.4m from the current cliff toe, increasing to 10.9m to 17.1m when allowing 50% for uncertainty. Based on Appendix P, which suggests that the Mean High Water Mark aligns with the cliff toe, this ASCIE area should be contained within the proposed open space zone. However, a topographic survey is required to accurately establish the MHWS boundary, and the cliff toe.

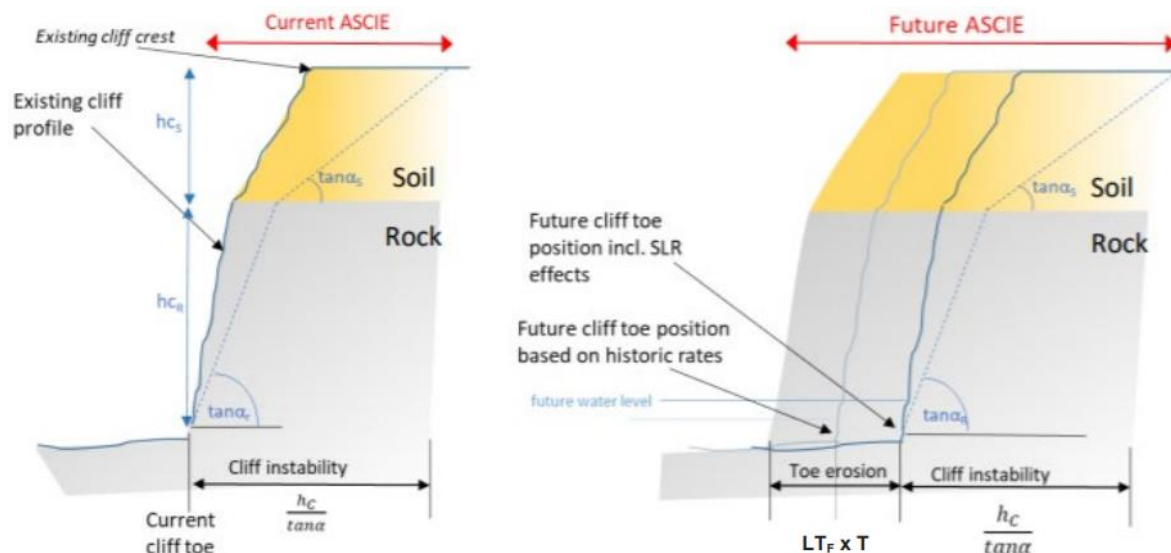


Figure 8: Schematic illustration of area susceptible to coastal instability and erosion (Source: Coastal Hazard Assessment Guidance, 2022<sup>6</sup>)

2.14 There are a number of parameters identified within the site-specific Coastal Hazard Assessment that do not align with the Ministry for Environment guidance<sup>4,7</sup>, Auckland Council guidance<sup>6</sup> or subsequent regional ASCIE studies<sup>5</sup>. While some of these documents<sup>3,7</sup> predated the site-specific CHA, many have been released more recently. Therefore, this is not a criticism of the original CHA but does require it to be updated for relevance and alignment with best-available data including relative sea-level rise predictions.

2.14.1 The Coastal Hazard Assessment has assessed coastal hazards based on 1m of sea level rise. While the MfE guidance at the time<sup>7</sup> recommended 1.5m, this has now increased to approximately 2.34m for this site based on the latest guidance<sup>4</sup> to 'use the updated suite of five "medium confidence" RSLR scenarios (including VLM) to 2150' (as discussed within sections 2.7-2.8).

2.14.2 The applicant's coastal hazard assessment considered ASCIE over 100 years, however latest guidance<sup>4</sup> recommends using the updated suite of five "medium confidence" RSLR scenarios (including VLM) to **2150** for 'new or early stages of a project or plan (including plan reviews and changes)'.

2.14.3 The sea level response ('m') value factors in the degree to which increasing rates of sea-level rise might be expected to increase the rate of coastal erosion of the cliff toe. The applicant's CHA used a sea level response value of 0 for their two primary scenarios (and 0.3 for the sensitivity). Using a value of 0 suggests that sea level rise will have no impact on the future erosion rate. Since mangroves currently provide good wave dissipation and sediment retention (Figure 12), the site can be considered to be a low exposure site. However, it is unlikely that historic coastal erosion rates would remain constant as several processes including greater exposure to bioerosion, wave energy and other erosive processes could increase the cliff toe's erosion rate with sea-level rise. As such, for this type of geology it is widely accepted that rates of future erosion will increase with sea level rise<sup>8</sup>. Within Auckland's Regional Assessment of Areas Susceptible to Coastal Instability and Erosion (Tonkin & Taylor, 2020<sup>5</sup>) sea level response factors for ECBF for a low exposure site were set as between 0.1-0.3, unlike the site-specific CHA's value of 0. The applicant's site-specific CHA also stated that soft soils would not be exposed to the tidal cycle based on 1m

<sup>6</sup> Carpenter, N (2021). Coastal hazard assessment in the Auckland region. Auckland Council guideline document, GD2021/010. [Coastal Hazard Assessment Guidance 2022 \(aucklanddesignmanual.co.nz\)](https://www.aucklanddesignmanual.co.nz/)

<sup>7</sup> Ministry for the Environment. 2017. Coastal Hazards and Climate Change: Guidance for Local Government. Bell RG, Lawrence J, Allan S, Blackett P, Stephens SA (eds). Wellington: Ministry for the Environment. [Coastal hazards and climate change: Guidance for local government | Ministry for the Environment](https://www.mfe.govt.nz/publications/coastal-hazards-and-climate-change-guidance-for-local-government/)

<sup>8</sup> Ashton, A.D., Walkden, M.J. and Dickson, M.E. (2011). Equilibrium responses of cliffed coasts to changes in the rate of SLR. Marine Geology. 284 (2011) 217-229.



of sea level rise. This should be re-assessed based on both the greater estimates of future sea-level rise, as well as the site visit observations that a significant proportion of the cliff toe was composed of soft sediments.

- 2.14.4 The slope stability component of the ASCIE calculation establishes an angle, or range of angles, at which the slope is assumed to be stable over the long term. This angle is established based on the site's geology. For the Regional Assessment of Areas Susceptible to Coastal Instability and Erosion (Tonkin & Taylor, 2021), the slope angles for different geologies around the region were studied to establish the likely range of stable angles for each geology. For ECBF lithology (as present at 48 Esmonde Road) T&T assumed slope profiles between 24° and 45°. For this site-specific assessment the applicant selects an angle of 55°-75° based on assuming the current slope angles are stable. The assumption that the current slope angles will be stable over the next 100+ years is not supported by the recent site observations that there were several areas of active instability, including one area where several metres of land has slipped in the last few weeks (Figure 9 & Figure 10).



Figure 9: Slope instability visible during site visit



Figure 10: At least 2m of land has been lost from the top of the slope

To provide greater confidence that the site-specific CHA has been sufficiently precautionary, an assessment should be provided incorporating the range of slope angles established from the regional study, or providing strong justification why the slope angles selected can be expected to be stable over the next 125+ years.

Based on the above, there is reason to expect that the ASCIE area has been underestimated in the site-specific CHA and could require a larger coastal hazard buffer.

### ***Tsunami***

2.15 The majority of the site is safely above the Tsunami evacuation areas for all scenarios (Figure 11). The at-risk areas are around the perimeter and contained within the proposed Open Space – Conservation area. Access along Esmonde Road would be at risk during medium-large scale tsunamis and residents should be made aware of the tsunami risk to the low-lying perimeter but the proposed buildings within the development would be outside of the tsunami risk zone. Tsunamis, as a high magnitude but low frequency hazard are not directly managed through the AUP but predominantly through emergency management provisions. Therefore tsunami risk is not considered to be an obstacle for the proposed plan change. Additionally tsunami risk will be further mitigated through mitigation of the coastal flooding and coastal erosion risks set out previously.



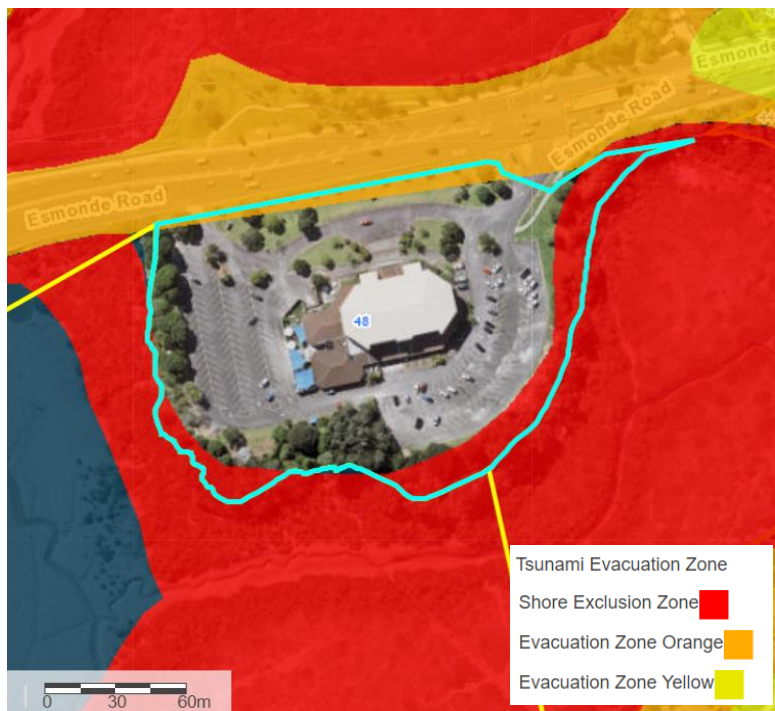


Figure 11: Tsunami Evacuation Zones (Source: Auckland Council Geomaps)

### 3.0 Public Access

- 3.1 Another consideration for the extent of the Open Space – Conservation Zone is the statutory requirement and matter of national importance to enable public access to and along the coast within the RMA and NZCPS.
- 3.2 The proposed development appears to be reliant on the Local board's aspirations for a coastal boardwalk for this purpose. However, it is noted that, as well as the ecological concerns regarding constructing this through a Significant Ecological Area<sup>9,10</sup>, there will be significant financial feasibility challenges for the coastal boardwalk when considering the large capital costs, as well as the significant maintenance and renewal requirements for the continued provision of a coastal boardwalk.
- 3.3 An on-land shared path for public access around the perimeter of the development would be significantly more cost-effective and practical when considering whole of life costs and risks posed from landslides, marine borers, sea level rise, funding constraints, impacts on mangroves and the significant ecological area. My recommendation is to allocate sufficient space on land for the shared path within the Open Space – Conservation zone.
- 3.4 Without this allocation I share the Devonport-Takapuna Local Board's concerns around the lack of certainty of the provision for public access<sup>11</sup>.

### 4.0 Coastal hazards and management methods

- 4.1 While I am broadly supportive of the proposed development, I am concerned that proposed plan change 85 would enable increased intensification within a potential coastal hazard risk area. There is a risk that the Open Space – Conservation zone will be too narrow to sufficiently accommodate the coastal hazard area, and coastal hazards could impact on the perimeter of the proposed new Takapuna 2 Precinct and may impact building platforms. The 20m width of the Open Space – Conservation zone is also unlikely to leave sufficient space for public access. The site-specific CHA is not currently sufficient to reliably inform decisions around the extent of the coastal hazard area.

<sup>9</sup> Wildland Consultants Ltd 2019: Ecological assessment of the proposed Francis Street to Esmonde Road link, Takapuna. Wildland Consultants Lt Contract Report No. 5006. Prepared for Bespoke Landscape Architects.

<sup>10</sup> Wildland Consultants Ltd 2022: Assessment of Ecological Effects of a Proposed Plan Change for 48 Esmonde Road, Takapuna, Contract Report No. 5000c, Prepared for: KBS Capital Ltd.

<sup>11</sup> Devonport-Takapuna Local Board, n.d., Private Plane Change 85, 48 Esmonde Road Devonport-Takapuna Local Board Feedback



*Proposed development and likely effects on the receiving environment*

- 4.2 In my opinion the proposed rezoning presents a higher degree of risk than currently provided for by increasing the number of people living within the potential area susceptible to coastal instability and erosion.
- 4.3 While it is technically feasible for the risks of PC85 to be managed through engineering interventions, this goes against national policy, and ranks lower in the risk management hierarchy in terms of desirability and effectiveness. Engineering methods could fail for a variety of reasons, and the consequences of this failure could be greater. Engineering options are also unlikely to provide the same level of multi-disciplinary benefits. Therefore the potential future adverse effects of natural hazards at the site, make rezoning for a 20m Open Space Conservation zone and otherwise intensifying residential development, based on the current site-specific CHA inappropriate in my opinion.

*Relevant statutory considerations on assessing the effects on the environment*

- 4.4 The Resource Management Act (1991), New Zealand Coastal Policy Statement (2010) and the Auckland Unitary Plan (Operative in Part) are key statutory documents when assessing the effects of coastal hazards and ensuring sustainable future development.
- 4.5 The NZCPS (2010) recognises the diverse issues facing the coastal environment of Aotearoa and sets out a range of objectives and policies to safeguard its future. Therefore, in the context of PC85, in my view Policy 25 should be given regard to.

*Policy 25 Subdivision, use and development in areas of coastal hazard risk*

*In areas potentially affected by coastal hazards over at least the next 100 years:*

- (a) avoid increasing the risk of social, environmental and economic harm from coastal hazards;*
- (b) avoid redevelopment, or change in land use, that would increase the risk of adverse effects from coastal hazards;*
- (c) encourage redevelopment, or change in land use, where that would reduce the risk of adverse effects from coastal hazards, including managed retreat by relocation or removal of existing structures or their abandonment in extreme circumstances, and designing for relocatability or recoverability from hazard events;*
- (d) encourage the location of infrastructure away from areas of hazard risk where practicable;*
- (e) discourage hard protection structures and promote the use of alternatives to them, including natural defences; and*
- (f) consider the potential effects of tsunami and how to avoid or mitigate them.*

- 4.6 Within Auckland's Unitary Plan the Identification and Risk Assessment Policies under B10.2.2 also relate to natural hazards and seek to ensure that the risks of natural hazards have been adequately assessed and that subdivision does not contribute to or is affected by natural hazards.
- 4.7 Overall, the RPS presents a hierarchy of 'avoid, remedy, mitigate' adverse effects. In my view, the upzoning of land that has not been adequately assessed and set back from the ASCIE, as proposed by PC85 is not consistent with this policy direction.
- 4.8 Chapter E36 Natural hazards and flooding of the AUP contains objectives, policies and rules which relate to development within land that is subject to natural hazards and flooding. Policy 7 Coastal Hazards specifically directs to:

*Ensure that buildings in areas subject to coastal hazards are located and designed to minimise the need for hard protection structures.*

## **5.0 Recommendations**

- 5.1 While I am broadly supportive of the proposed development, I am not currently comfortable with:
- the restriction of the proposed open space - conservation / esplanade reserve to 20m width from MHWS only,
  - The alignment of the site-specific CHA with best available data and best practice, and national and regional guidance,
  - and the lack of surety of public access around the coastal perimeter of the development.

- 5.2 My recommendations in order to make informed decisions regarding the plan change and open space widths is to undertake:
- 5.2.1 A topographic survey of the MHWS boundary and cliff toe. The topographic survey should also note recent landslip debris, which could result in temporary seaward shifts of MHWS but would be expected to erode relatively rapidly so should be considered appropriately with the ASCIE assessment.
  - 5.2.2 Update the site-specific CHA in line with best available information and latest guidance.
  - 5.2.3 Review the open space zone to encompass the full, revised coastal hazard buffer (informed by the updated CHA) and the space required for a shared path (without overlap between the two).
  - 5.2.4 Provide for a cliff top shared path sufficiently set back from the coastal hazard area

# Appendix A: Site visit photos



Figure 12: Mangroves currently provide wave dissipation and sediment retention



Figure 13: The typical toe of the slope observed onsite consisted of a vegetated bank composed of soft sediments with bioerosion evident.





Figure 14: A couple of areas had ECBF visible. Bioerosion was also evident.