

**BEFORE A PANEL OF INDEPENDENT HEARING COMMISSIONERS
APPOINTED BY ENVIRONMENT CANTERBURY AND CHRISTCHURCH
CITY COUNCIL**

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

AND

IN THE MATTER of Resource Consent applications CRC242267,
CRC242268, CRC242269, CRC242269 and
RMA/2023/3243 by Christchurch City Council (**the
Applicant**) for Southshore and South New Brighton Park
Estuary Edge Project

**STATEMENT OF EVIDENCE OF RICHARD ANTHONY REINEN-HAMILL
ON BEHALF OF CHRISTCHURCH CITY COUNCIL
(COASTAL ENGINEERING)
Dated: 18 November 2025**

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1. SUMMARY OF EVIDENCE

- 1.1 My evidence has addressed the proposed 20-year consent term and design life for the coastal protection works, the adequacy of the monitoring plan, and the implications of the proposed reclamation and declamation areas from a coastal hazard and process perspective. I have also considered the feasibility of the decommissioning and restoration plan and assessed the alternative “soft edge” natural beach design compared to the cobble beach proposal.
- 1.2 The proposed design will reduce erosion risk and minimise overtopping over the 20-year consent duration. The monitoring plan, with the additional detail I have recommended, will enable robust assessment of the structures’ performance and their influence on estuarine processes. This information will be useful for setting trigger points and informing future adaptation options.
- 1.3 The “soft edge” natural beach design offers benefits by reducing CMA occupation and promoting more natural shoreline processes. While some sediment movement and adjustment are expected, these changes are consistent with the dynamic nature of the estuary and can be managed through ongoing monitoring and adaptive management.
- 1.4 In my opinion, the proposed works, together with the recommended enhancements to monitoring and adaptation planning, represent a balanced approach that addresses immediate erosion and inundation risks while maintaining flexibility for future change.

2. INTRODUCTION

- 2.1 My full name is Richard Anthony Reinen-Hamill.
- 2.2 My evidence is given on behalf of the Applicant.
- 2.3 My evidence relates to my assessment of the proposed 20 year consent duration and the 20 year design life for the proposed coastal works and the proposed monitoring plan that is proposed to support future adaptation option timing as well as my review of the proposed Decommissioning and Reclamation Plan and the consequences of removal of the reclamations identified in the Jacobs consent level design. I also discuss the potential of a “soft edge” natural beach as an alternative to the proposed cobble beach and the difference in effects of that proposal.

3. QUALIFICATIONS AND EXPERIENCE

- 3.1 I am a Technical Director: Coastal Engineering at Tonkin + Taylor where I have worked for more than 30 years. I am a Chartered Professional Engineer (CPEng) and a Fellow of Engineering New Zealand (FEngNZ). I hold the degree of Bachelor of Engineering (Civil) and a Master of Engineering (Civil) from the University of Auckland. I have also completed a post graduate paper on Multi Hazard Risk Assessment from the University of Twente in the Netherlands by distance learning in 2014.
- 3.2 I have worked as a coastal engineer and coastal hazard specialist since 1990 both at the coastal research institute Delft Hydraulics (now Deltares) in the Netherlands for nearly four years and from 1994 at Tonkin + Taylor (T+T). I have extensive experience in coastal edge design and have contributed to guidance notes both in New Zealand and internationally on coastal protection design. I am also skilled in coastal nature-based design and relevant projects includes:
- (a) Taumana Reserve in Auckland comprised a 7-hectare reclamation and nature based coastal edge to provide an improved recreational amenity and access to the community of Onehunga
 - (b) Oriental Bay beach restoration in Wellington from concept design through to detailed design of a headland-controlled beach in an Urban Setting
 - (c) Huia Domain foreshore protection in Auckland comprising groynes and beach nourishment to protect a reserve that was significantly valued by the community.
 - (d) A formed reef protected planting area of saltmarsh instead of rock armour seawalls to protect an extent of shoreline along Pahurehure Inlet in Auckland.
- 3.3 Due to my experience in nature-based design I was invited to participate in the preparation of the international guideline on Natural and Nature Based Features for flood risk management published by USACE in 2021, contributing both to the overall guidance framework and more specifically on the chapter on beaches and dunes.

- 3.4 I have led numerous regional and district coastal hazard assessment around New Zealand including the 2017 coastal hazard assessment for Christchurch City Council that included a best practice and internationally peer reviewed assessment for the estuary and open coast including sea level rise effects using probabilistic methods and the latest guidance on sea level rise. This included assessments of Southshore within the Avon/Heathcote estuary.
- 3.5 I have also worked on the Clifton to Tangoio Coastal Strategy, which was New Zealand's first community led adaptation plan for a 22 km long stretch of coastline in the Hawke's Bay and am currently assisting Auckland Council in their Shoreline Adaptation Planning for their region.

4. CODE OF CONDUCT

- 4.1 Although this matter is not before the Environment Court, I confirm that I have read the Code of Conduct for Expert Witnesses outlined in the Environment Court's Practice Note (2023) (**Code**) and have complied with it in preparing this evidence. I also agree to follow the Code when presenting evidence to the Panel. I confirm that the issues addressed in this brief of evidence are within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses. I also confirm that I have not omitted to consider material facts known to me that might alter or detract from my opinions.

5. SCOPE OF EVIDENCE

- 5.1 This statement of evidence covers the following:
- (a) A summary of my evidence (see **Section 1** above)
 - (b) **Section 6:** My assessment of the proposed 20-year consent term for the proposed coastal works and the proposed monitoring plan that is proposed to support future adaptation option timing.
 - (c) **Section 7:** My assessment of the potential consequences of removal of all reclamations identified in the Jacobs consent level design and the removal of the Heron Street access point and provide commentary on how removing the reclamation in the revised alignment is consistent with NZCPS Policy 10.
 - (d) **Section 8:** My opinion of the feasibility of enabling the proposed decommissioning and reclamation plan and how the plan addresses

the long-term effects of coastal squeeze and whether this approach avoids adverse effects.

- (e) **Section 9:** The potential of a “soft edge” natural beach as an alternative to the proposed cobble beach and the difference in effects of that proposal.
- (f) **Section 10:** My comments on the issues raised in submissions that fall within my area of expertise;
- (g) **Section 11:** My comments on the issues raised in the Section 42A Report that fall within my area of expertise;
- (h) **Section 12:** Conclusions.

6. **20-YEAR CONSENT TERM**

- 6.1 The proposed consent term for the occupation of the proposed works is 20 years. This term is a reduction of the originally proposed 35 years and was reduced to match the proposed design life of the structures. The purpose of the 20-year period is to protect the reserve areas against coastal inundation and erosion while a long-term strategy is formulated for adaptation.
- 6.2 Based on my experience of community adaptation planning, I am aware that the process can take a significant time, including setting up the appropriate framework for stakeholder engagement, the testing and development of adaptation options, discussing and setting appropriate signals and triggers and gaining approvals for any short-term options that may be required. However, I am aware that Christchurch City Council is actively growing their capability and capacity to undertake this type of adaptation planning work, and the timescale should be sufficient to enable an adaptation plan to be developed and implemented during this 20-year period, including the consideration of the in-situ coastal protection structures.
- 6.3 Long term effects of the proposed protection works are proposed to be monitored post construction with an annual walk-over assessment of the structures including observations of toe scour and estuary bed lowering in proximity to the structure as well as monitoring of the erosion protection works following large coastal storm events, tsunamis or earthquakes to assess any damage or changes to the structures (Section 7.3 of the Coastal Processes and Natural Hazards Assessment report by Jacobs, 4 December

2023). An assessment of estuary bed level changes using LiDAR is also proposed in the AEE (Section 8.5.6).

6.4 The monitoring could be enhanced with additional detail included in a more detailed monitoring plan, including:

- (a) Defining earthquake, tsunami and storm events to provide certainty of what will trigger a post event survey.
- (b) Reporting on changes to sea level within the estuary using Bridge Street and Lyttelton Tide Gauges and recording wind/storm conditions over the year (i.e. presenting physical data on the likely drivers of shoreline change).
- (c) Reporting on overtopping and scour damage of wave action landward of the crest of the protection, including the extent of both scour damage and inundation works both during annual inspections as well as following major storm events.
- (d) Confirming frequency of future LiDAR surveys, as these are not regularly scheduled, and it may be years between surveys.
- (e) Identification of local markers, such as piles, timber poles etc that could be used to measure and communicate local changes, enabling monitoring by local community or citizen science representatives.
- (f) Including reporting timelines and a distribution list to include appropriate stakeholders/interested parties

6.5 With the inclusion of this additional detail, the proposed monitoring plan should provide information on both the effectiveness of the proposed structures on preventing erosion and damage to land, as well as information on any effects the works may have on physical coastal processes within the estuary. This monitoring information can be used to inform the trigger points and future adaptation options.

7. RECLAMATION/DECLAMATION

7.1 The overall project seeks to restore the damaged estuary edge through removing multiple existing failed structures, creating engineered rock revetment, replacing failed gabion baskets and implementing a natural edge

shoreline Jacobs (2023)¹. In order to practically facilitate the placement of these structures some reclamation was proposed. The new rock revetment structures occupy some areas of estuary bed/mudflat while overall more areas are proposed to become available for new mudflat as a result of removing existing failed structures.

- 7.2 While reclamation is more frequently referred to the formation of land suitable for land use activities, and in my opinion, the works proposed here are more suitably classified as an occupation of the CMA by a physical structure, particularly if no change in land use title is proposed. However, as technically the seaward movement of the current Mean High Water Springs (MHWS) line by engineered works increases the occupation of the CMA and as the land boundary is defined by the MHWS, the seaward change could be classified as a reclamation, and similarly the landward movement of the MHWS could be classified as a declamation.
- 7.3 I have reviewed the original Mudflat Reclamation and Declamation Plan drawings (CCC Drawing CP503768, Issue C, 09/04/24), the updated design (CCC Drawing CP503768, Issue D, 17/10/24) and the design which replaces the cobble beach with a soft edge design (CCC Drawing CP503768, Issue E, 6/11/2025) to identify the proposed areas of reclamation and declamation.
- 7.4 The original consent design included a total of 1,824 m² of reclamation and 2,706 m² of declamation with a net total mudflat declamation of 882 m² (Table 7.1). The updated design (Issue D) had an adjusted alignment along Southshore which reduces the overall CMA reclamation. The total reclamation area for the Issue D design is 1,455 m². The total declamation area is the same as the original design at 2,706 m² which gives a net declamation of 1,251 m² (Table 7.1).

The consent level design which replaces the cobble beach with a soft edge design further reduces the total CMA occupation area by 181 m² and increases the declamation by 583 m² (see Section 9).

¹ Jacobs (2023). Southshore and South New Brighton Park Erosion Protection and Inundation Works Resource Consent Application. 4 December 2023.

Table 7.1: Summary of the changes in proposed reclamation and declamation areas

Version	Location	Total occupation/ reclamation area (m ²)	Total declamation area (m ²)	Net (m ²)
Original consent level design ¹	<i>SNBP</i>	1,346	566	780 (reclamation)
	<i>Southshore</i>	478	2,140	1,662 (declamation)
	Total project area	1,824	2,706	882 (declamation)
Updated consent level design ²	<i>SNBP</i>	1,345	566	780 (reclamation)
	<i>Southshore</i>	109	2,140	2,031 (declamation)
	Total project area	1,455	2,706	1,251 (declamation)
Consent level design (replaces cobble beach with soft edge) ³	<i>SNBP</i>	1335	646	689 (reclamation)
	<i>Southshore</i>	109	2144	2035 (declamation)
	Total project area	1444	2790	1346 (declamation)

¹ Southshore and South New Brighton Estuary Edge Red Zone Regeneration. Mudflat Reclamation and Declamation Plan 1 to 6. Drawing CP503768. Issue C (RFI Response). 09/04/24.

² Southshore and South New Brighton Estuary Edge Red Zone Regeneration. Mudflat Reclamation and Declamation: Plan 1 to 6. Drawing CP503768. Issue D (Hearing). 17/10/24.

³ Southshore and South New Brighton Estuary Edge Red Zone Regeneration. Mudflat Reclamation and Declamation: Plan 1 to 6. Drawing CP503768. Issue E (Hearing). 6/11/24.

- 7.5 The NZCPS 2010 Policy 10 relates to reclamation and declamation. The policy requires an avoidance of reclamation of land in the CMA and provides matters to have regard to if reclamation is considered suitable. It also supports the declamation of redundant reclaimed land.
- 7.6 As I discuss in para 7.2 the works are a structural protection of the coastal edge, with some additional occupation of the CMA that moves the present MHWS line seaward. However, it is not done with the purpose of reclaiming land, but to protect the existing coastal edge. Similarly, there is no identified historic reclaimed areas along this coastal edge, so declamation of previously reclaimed land is not occurring, rather there is a retreat of natural ground.
- 7.7 In my opinion assessing the proposal against NZCPS Policy 10 is not entirely appropriate, but the areas of increased occupation do conform to some aspects of the policy in terms of its form and design, while the declamation provides for more resources of the CMA.

8. REVETMENT DECOMMISSIONING AND RESTORATION PLAN

- 8.1 Coastal squeeze is the loss of coastal habitat due to shoreline migration (due to sea level rise) being blocked by the presence of a hard structure. The proposed rock revetment is a hard engineering structure which may result in an element of coastal squeeze over the 20-year period although there is already the presence of protection works that have a similar effect. Based on projected sea level rise values, including for vertical land movement (VLM) from the SeaRise website, site 4314 situated along Southshore ([Maps - NZ SeaRise | Our Changing Coast](#)) the anticipated change in sea level rise is in the order of 0.1 m to 0.16 m from 2030, taken to be the approximate start date for the works, to 2050, 20-years from the start date. This is an order of magnitude less change than experienced due to the CES.
- 8.2 Erosion predictions presented by Jacobs in Section 4.2.6 of the Coastal Process and Hazards report, based on work done by T+T in an earlier study that did not include vertical land movement, suggest 5 to 11 m of erosion could occur as a result of this increase in sea level rise as well as extrapolating existing erosion trends.
- 8.3 CCC have developed an initial concept for the decommissioning the proposed rock revetment structure at the end of the consent period (i.e. 20-years). The concept is to be refined at a later stage as part of the longer-term adaptation plan developed over the next 20 years. However, I understand the concept generally involves removing all of the rock from the revetment and placing it along the seaward edge of the inundation bund (Figure 8.1). The land on the seaward side of the bund would be left as a soft coastal edge to allow for some natural migration under future sea level rise.

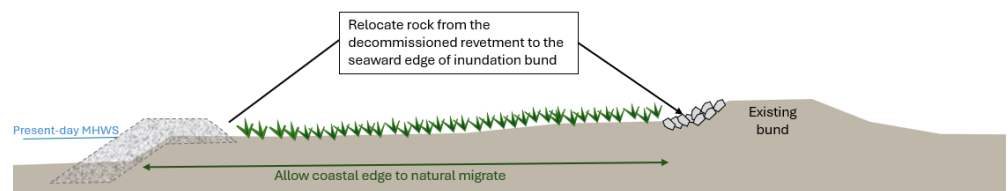


Figure 8.1 Conceptual sketch for the proposed revetment decommissioning and restoration plan

- 8.4 The existing inundation bund ranges in location from at the present shoreline where there are residential properties in close proximity to the CMA, to around 20 m landward. With anticipated shoreline adjustments in the order of 5 to 11 m some of the flood bund will be exposed sooner. There also needs

to be a plan to deal with existing organic materials and unsuitables that may be present on land that are not desirable to allow to erode into the CMA.

- 8.5 The decommissioning and restoration plan needs to have this additional information, and a include programme and staging for the decommissioning agreed during the 20-year consent period for the existing structures. I am assuming this will form part of the adaptation planning process.
- 8.6 This decommissioning plan aims to mitigate some potential coastal squeeze that could occur with up to 0.5 m of sea level rise induced erosion, while still providing some level of protection to the existing inundation bund and some protection of private properties.

9. SOFT EDGE NATURAL BEACH

- 9.1 The consent level design² included a section of cobble beach extending along CH 235 to CH 405 at South New Brighton Park generally aligned to the existing eroded shoreline. An alternative nature based “soft edge” natural beach design has been developed for this section of shoreline that seeks to create a softer edge.
- 9.2 Attachment A includes details on the preliminary concept design. The nature-based design is seeking to align the shoreline as close as possible to the incident wave direction between the proposed rock armour at the north and the existing stormwater outlet to the south to enable natural coastal processes to occur, but to limit alongshore loss of sediments. This includes four rock groynes spaced along the shoreline with sandy beach established between the structures and removal of the existing gabion basket from the CMA.
- 9.3 The overall CMA occupation for “soft edge” natural beach design is 700 m² (300 m² rock groyne occupation and 400 m² nourished sand occupation). The overall declamation is 895 m² (312 m² from removal of gabion baskets and 583 m² from reprofiling the land along the coastal edge). In comparison the proposed cobble beach design included 881 m² of occupation, with 312 m² declamation through removal of the existing failed gabion baskets (CCC Drawing CP503768, Issue D, 17/10/24). The “soft edge” natural beach

² Jacobs (2023). Southshore and South New Brighton Park Erosion Protection and Inundation Works Resource Consent Application. 4 December 2023.

design therefore further reduces the total CMA occupation area by 181 m² and increases the declamation by 583 m².

- 9.4 The design is expected to increase shoreline stability due to the change in orientation, but some sand losses and shoreline adjustment can be expected over the next 20 years. Within the project site this may manifest in adjustments to the MHWS location and movement of the sand within the cells, adjusting to the incident wind-wave climate. There is the potential for cross-shore sand losses during more significant events, and sand lost from the beach is expected to be thinly dispersed on the seabed seaward of the beach to the north, and potentially ending up on the estuary bed to the north of the wharf. The depth and rate of loss and transport will be a function of the wave energy, and it is anticipated to replicate the existing sediment transport processes and extents of estuary bed where sediment transport and wave and wind induced estuary bed changes have been observed.

10. ISSUES RAISED IN THE SUBMISSIONS

- 10.1 The submission from Scott Butcher recommends an alternative shoreline alignment for the proposed cobble beach at South Brighton Reserve. The alternative alignment allows natural erosional processes to continue landward into South Brighton Reserve with the intent of allowing saltmarsh to develop in this area over time. The alternative shoreline alignment presented in the submission is likely to be more consistent with the natural shoreline equilibrium (similar alignment to the soft edge design), however given the wave exposure for this section of shoreline compared to those more sheltered locations where salt marsh is present, I am uncertain on the likelihood of saltmarsh establishing within this environment.
- 10.2 The submission from Scott Butcher also includes alternative design for the section of shoreline at Ebbside Street and Kingfisher Lane to Penguin Street. The alternative design includes no hard edge and shifting the bund landward to allow more space for saltmarsh retreat. I have not undertaken assessment of alternative design for these sections of shoreline.

11. ISSUES RAISED IN THE SECTION 42A REPORT

- 11.1 The Section 42A report recommends the grant of the consent application subject to conditions after a careful examination of the relevant objectives and policies, including Objective 5 and policies 25, 26 and 27 of the NZCPS.

- 11.2 The part of the Section 42A report that relates to coastal hazards was informed by the specialist review of Mr Bruce Gabites, a Senior Scientist for Environment Canterbury. Mr Gabites concludes that significant impacts on coastal processes during construction and once the works are complete will be less than minor due to the relatively low energy environment present and that end effects will be negligible. I agree with this assessment.
- 11.3 Mr Gabites (para 112) raises comments on the new bund dimensions and armour size representing an upgrade, and potentially an over-conservative design for the 20-year period being considered. As a coastal engineer, I am aware of the challenges with designing coastal protection works with an intended short life and the trade-off between the construction costs and potentially increased maintenance costs for designs that are less conservative. I agree that the with the proposed designs erosion is unlikely over the next 20 years as well as being resilient to wave run-up and overtopping.
- 11.4 In his report, Mr Gabites (para 110) also expresses an opinion that by moving the proposed inundation bund a further 5 m landward of the existing LINZ bund there would be sufficient space and time for natural processes to occur without impacting on the level of protection afforded to the local community for the next 20 years. I have not carried out a coastal process assessment to enable me to comment in detail on this option but can say there are areas where bund relocation is not possible without affecting private property (e.g. between chainage 320 and Ch 440) and that with this option erosion would then be expected to continue along portions of the coastal edge. Based on the Jacobs (2020) Preliminary Site Investigation Report there could also be the potential for contaminants, including asbestos, to enter the CMA. These issues were identified in the Jacobs (2020) Memorandum on the Long List Options Assessment. In my opinion providing a time period to develop a more comprehensive strategy that addresses these issues is prudent.

12. CONCLUSIONS

- 12.1 My evidence has addressed the proposed 20-year consent term and design life for the coastal protection works, the adequacy of the monitoring plan, and the implications of the proposed reclamation and declamation areas. I have also considered the feasibility of the decommissioning and restoration plan and assessed the alternative “soft edge” natural beach design compared to

the cobble beach proposal. These matters have been evaluated against relevant policy, best practice guidance, and my experience in coastal engineering and adaptation planning.

- 12.2 The proposed design will reduce erosion risk and minimise overtopping over the 20-year consent duration. The monitoring plan, with the additional detail I have recommended, will enable robust assessment of the structures' performance and their influence on estuarine processes. This information will be useful for setting trigger points and informing future adaptation options.
- 12.3 While the works involve some occupation of the coastal marine area, they result in a net increase in mudflat habitat and are consistent with the intent of NZCPS Policy 10 to avoid unnecessary reclamation and enhance coastal resources. The design changes, including the soft edge option, further reduce CMA occupation and increase declamation, which is a positive environmental outcome.
- 12.4 The decommissioning and restoration plan concept of removing the revetment and restoring a softer edge at the end of the consent period will help maintain natural processes while continuing to provide some level of protection to the existing bund and adjacent properties. There are matters such as the potential for contamination within the existing reserve that will require evaluation prior to implementation of the plan.
- 12.5 The "soft edge" natural beach design offers benefits by reducing CMA occupation and promoting more natural shoreline processes. While some sediment movement and adjustment are expected, these changes are consistent with the dynamic nature of the estuary and can be managed through ongoing monitoring and adaptive management.
- 12.6 In my opinion, the proposed works, together with the recommended enhancements to monitoring and adaptation planning, represent a balanced approach that addresses immediate erosion and inundation risks while maintaining flexibility for future change.

Richard Reinen-Hamill

Dated 18 November 2025

**Attachment A: South New Brighton Park Soft Edge Concept Design
Report**