RC14513 / COASTAL PROTECTION STRUCTURE AND ASSOCIATED ACTIVITIES
SUMMARY STATEMENT OF CRAIG DAVIS (COASTAL ENGINEERING AND PROCESSES)

This summary highlights the key matters addressed in my statement of evidence dated 25 July 2025 .

EROSION ISSUE

1. The issue facing the GIPS properties and the adjacent back dune is

    a) Protection from large event short term storm cut erosion;

    b) Enduring protection as the shoreline retreats due to climate change driven sea level rise.

2. The groynes in the upper inter-tidal area on either side of the Creek have mitigated but not entirely addressed the shoreline erosion problems associated with water course outlets.

SEA LEVEL RISE AND CLIMATE CHANGE

3. Engineering design and assessment for the project adopted the Tonkin and Taylor (T&T) 2015 assessment of Sea Level Rise and Coastal Retreat. A T&T 2024 update is now available, with slightly greater assumed extent of shoreline retreat. The T&T 2024 update is based on 2017 guidance from the Ministry for the Environment (MfE).

4. The MfE 2017 guidance has also been updated by Coastal Hazards and Climate Change Guidance 2024.

5. The coastal process assessments and engineering design for the project have been reviewed against these updates. Conservatism in the initial analysis has resulted in the analysis being consistent with these updates, mainly because:

    a) Differences in the predictions over the next 30 -50 years are minimal (but become more divergent over longer timeframes);

    b) Sea level rise on all scenarios increases exponentially but has been modeled to occur linearly creating conservatism in near decades (ref figure 6.15).

6. Assumptions for shoreline retreat in all guidance are conservative and precautionary suggesting the likely retreat actually experienced will be less.

7. The Engineering Design report used these conservative assumptions, consistent with the adopted Coastal Hazard Lines. A table indicating more likely scenarios of wall exposure has also been produced in my evidence (ref Para 6.21 Table 3).

EXTENT OF POTENTIAL STORM CUT

8. Regular beach monitoring data since 1990 shows that the most eroded the shoreline has been during the monitoring period was following the Cyclone Gabrielle and Hale series of events.

9. There is an approximately 70% chance that the maximum 1% AEP storm has not occurred during 35 years of monitoring.

10. Maximum storm cut has been calculated at 35-40m (Eco Nomos 2003) 20m (T&T 2015) and 18m (T&T 2024). The T&T 2024 report states a 5% chance of an 18m storm cut in the next 10 years or 22% of such an event occurring in 50 years. A 22% chance of occurrence of a failure criterion is very high.

11. The most recent reporting uses statistical relationships based on historical data to define future storm-cut in different cells along the shoreline. Given the very limited occurrence of the long-term data points, there is a risk associated with the accuracy of particular prediction outcomes. This analysis leaves room to underpredict the severity of major events.

12. Storm cut of the scale predicted would damage homes within the GIPS properties.

OPTIONS ASSESSMENT AND PROJECT DESIGN

13. A rigorous options assessment of possible options to mitigate the erosion risks were assessed, including 'do nothing', 'managed retreat' and 'soft engineering' measures.

14. The assessment was that the best option is for the provision of an enhanced dune system to operate in front of a rock revetment backstop wall placed sufficiently landward to allow the dunes function.

15. Analysis has considered a progressively retreating beach over time. The wall has been designed to withstand the incident wave conditions over such progressive shoreline retreat. The wall will be covered with sand and planted with native sand binding species. Wind fencing will be placed to enhance planting survival and rate of growth.

16. Based on the historic monitoring records the upper crest of the wall (1-1.5m) would have only been exposed once in 35 years, following Cyclone Gabrielle. This

distinguishes the proposed wall from the existing rock walls further north on Waihi Beach.

CONSTRUCTION METHODOLOGY

17. Access to the site will be along the north side of Three Mile Creek, with rock delivered to site on rubber-tired trailers

18. The 'high value' dune vegetation area outside the construction footprint will be fenced off prior to commencement.

19. Work will be undertaken as much as possible within the footprint of the wall, with progressive or sequential construction of portions of the wall to minimise the area of beach exposed.

20. All machinery to be used has previously been used extensively in the dredging of Three Mile Creek. The machinery and rock placement methodology has also previously been used building Rock rip rap wall along the southern side of Three Mile Creek.

POTENTIAL WALL EFFECTS

21. While the wall is buried it will have no effects on coastal processes.

22. Occasionally, the upper face of the wall may be exposed by storm events, as would have occurred in Cyclone Gabriele. Sand would remain within the wall and in places on the crest with stolons of the spinifex draped over the face and through the rocks. Sand will naturally return and rebuild over this area of the beach without human intervention, as has been experienced at the site following Gabrielle.

23. As longer term beach retreat occurs or a very large storm cut erosion event takes place more of the wall will be exposed and some localized edged effects would be expected. This would be evidenced at the south end of the wall by erosion of an area in the order of 2-5m landward and 5-15m parallel to the shoreline. This "end effect" zone would be of the same form and effect as the erosion of the remainder of the beach to the south. The difference being a short length of shoreline would be 2-5m more landward. Variations of this order could well occur naturally in the reserve frontage to the south in such an event.

24. Localised scour at the northern end of the shore-parallel section of wall will cause some greater retreat in front of the northern section of wall. The angled northern section creates a good end detail.

25. With ongoing beach retreat eventually swash will run completely to the end of the northern end. At this stage if the groynes are in place they will contain the swash and effects. If the groynes are not in place an end detail could be readily constructed. If the groynes were not in place the wave approach is likely to be more perpendicular to the northern end and the area will act more like a natural stream mouth.

26. Beach lowering in front of the wall, as a result of wave interaction with the wall, is unlikely to occur beyond scour during storm events occurring more quickly than if the wall was not there. Scour depth is unlikely to be different.

27. The wall trapping sand or acting like a groyne will not occur, with or without the long groynes immediately to the north.

COUNCIL ASSESSMENT

28. Planning officers discount the potential value of future public access behind the wall in the Council reserve area. At current beach levels there is no need. However, with sea level rise the situation may change and access behind the wall might be considered more valuable. Without the wall, if the reserve land is lost, future public access would not be possible.

29. Mr Davidson asserts that some of the northern part of the wall (undefined) is unnecessary because the design can rely on the ongoing presence of the groynes. I disagree, as the groynes are only consented with a fixed duration currently to 2032.

30. Part of the northern length of wall will be required as soon as the southern length of wall is required, to address any localised end scour during storm events. As sea level rise exposes more of the southern wall more often, the length of the northern part of the wall required will increase.

31. Further, a major storm cut event will cause back shore retreat along the full length of the GIPS properties irrespective of the groynes, as demonstrated by Cyclone Gabriele. In a large storm event, storm cut could damage all of the properties at Glen Isla Place in the absence of the proposed wall, with or without the groyne.

32. While Mr Davidson agrees the design of the proposed structure is sound and in line with best practice, he suggests that the southern length of the wall could be located closer to the private boundaries of the GIPS properties. I consider there is a trade off between the benefits of delaying potential exposure of the structure by moving the wall further back and losing the width of reserve at the top of the wall, and the ecological benefits of protecting and replanting this area, including potential access benefits if sea level rise is realised. I have examined decreasing the distance to the

boundaries to 1.5m and present that in my evidence. The solution works from an engineering perspective. I prefer the 5m distance because of the coastal management advantages of retaining a wider, replanted area behind the wall.

PEER REVIEW

33. My work has been supported by Mr Clarke's peer review, and his recommendations for refining the design have all been addressed.

CONCLUSION

34. The project is unlike the rock walls to the north on Waihi Beach. The significantly more seaward nature of those walls, and their location in the CMA, creates many additional effects.

35. The proposed solution encompasses all the sensible soft engineering options that are promoted by good coastal management. However the risks necessitate that the project include a hard protection structure. Management of the coastline in these times of sea level rise will require changing solutions. The proposal seeks to provide the surety of protection while enhancing the dune environment.