GISBORNE DISTRICT COUNCIL

Title: **Addendum Section 42A Officer's Report**

Section: Environmental & Regulatory Services

Prepared by: Todd Whittaker (Consultant Planner)

Applicant:	Simon Cave
Location:	4,6 and 8 Tuahine Crescent, Wainui Beach
Legal Description:	Lots 5, 6, and 7 DP 3216
District and Regional Plans:	Te Papa Tipu Taunaki o Te Tairāwhiti – Tairāwhiti Resource Management Plan (Tairāwhiti Plan)
Proposal:	To construct a revetment wall at the toe of the dune below 4, 6 and 8 Tuahine Crescent

Addendum Report to Commissioner for decision

A S.42A planning report was prepared back in June 2020 for a resource consent to construct a revetment wall at the toe of the dune below 4, 6 and 8 Tuahine Crescent to protect private land holdings from coastal erosion. The 42A planning report recommended the granting of consent subject to conditions including a term of 20 years.

Immediately following the issue of the S.42A planning report, the Applicant requested a deferral of the hearing and application process to allow further consideration of the term issue and whether the works required consent.

In May 2021, the Applicant made application for a certificate confirming Existing Use Rights for the revetment wall. Council issued its decision on 4 March 2022 which was to decline that application. The Applicant subsequently lodged an objection on 6 May 2022 and this objection will be heard as a separate matter by the Commissioner. This current addendum report deals solely with the application for resource consent.

The Applicant is seeking to reactivate the processing and hearing of the original resource consent application alongside the hearing of the objection to the Existing Use Rights decision.

This Addendum has been prepared to provide additional assessment and discussion on matters affecting the assessment of the resource consent application which have arisen since the original s42A Report was prepared in June 2020.

The central issue of contention with the Applicant remains the need for or appropriateness of a consent term. In my opinion, a term is essential to the grant of any consent for the proposal and is supported by the statutory planning instruments and by Council's Wainui Beach Erosion Management Strategy. However, the Applicant's opposition to a term undermines a favourable assessment and decision on the application and in my opinion, the application should be refused unless a term forms part of any consent.

RECOMMENDATION

That the Commissioner

1. **Subject to conditions including a term of consent, approves resource consent for the application by Simon Cave to construct a revetment wall at the toe of the dune below 4, 6 and 8 Tuahine Crescent to protect private land holdings from coastal erosion pursuant to Sections 104 and 104D of the Resource Management Act 1991.**

Authorised for Distribution:

Cristal Bennet
Regional Consents Team Leader

Helen Montgomery
Director - Environmental Services and Protection

INTRODUCTION

1. A full assessment of the application including the relevant planning instruments was presented in the S.42A planning report dated 20 June 2020. That report and assessment remains relevant subject to the particular updating matters contained in this Addendum. Together they constitute the S.42A report.

2. The Addendum Report provides further information discussion and assessment on matters which have arisen since the original report was issued and include;

    - Potential Blue Penguin Habitat
    - Coastal processes and sea level rise
    - Consent Term
    - Conditions

POTENTIAL BLUE PENGUIN HABITAT

3. Since the original S.42A report was issued, there have been studies and reporting of Blue Penguin habitat around Gisborne Port and the coastal margin to the south of the subject site.

4. Mr Paul Murphy (GDC Team Leader Environmental Science) prepared a technical memo for the earlier S.42A report and has provided a subsequent addendum (**Attachment 1**) on the Blue Penguin which recommends conditions to ensure that any works do not impact on any existing habitat.

5. These conditions have been shared with the Applicant who is not opposed to addressing the potential issue of blue penguin habitat in principle and will be providing further comments on the conditions as part of their evidence.

COASTAL PROCESSES AND SEA LEVEL RISE

6. Dr Willem de Lange (Coastal Processes Expert) provided a technical memo in relation to coastal processes which helped inform the original S.42A report. Dr de Lange has also prepared an addendum (**Attachment 2**) to specifically address new information and models for sea level rise around the New Zealand coastline which have become available since the original report.

7. Dr de Lange has outlined uncertainties around modelling for sea level rise and vertical land movement within coastal areas which may potentially increase or decrease the effects of sea level rise.

8. Overall Dr de Lange has not identified any new information that would affect his earlier assessment of coastal processes. Dr de Lange considers that the proposed revetment wall will have only minimal effects on coastal processes. He also considers that sea level rise may be overestimated and that the scale of the revetment wall could be reduced.

CONSENT TERM

9. The issue of a consent term is central to the current application and was the reason why the Applicant sought a deferral of the original hearings process. Since that time, an application for an Existing Use Certificate (EUC) has been lodged which, if upheld following a successful objection, would effectively allow the proposed wall to remain indefinitely. Council has also received comments back from the Applicant on the original draft conditions provided with the s42A report.

10. It is appropriate to provide some background and context on the term matter and how this was addressed in the original S.42A report. In my original S.42A report, I relied upon a term being part of the application and this was a key part of my overall assessment and recommendation for consent to be granted.

11. It is now clear that the Applicant does not accept that a consent term is appropriate or necessary. It is important to note that the original AEE and application material did not refer to a term and this was subsequently raised as a matter prior to the notification decision. The Applicant submitted a letter on 13 August 2019 as follows:

> Todd Whittaker
> Planning Works
>
> By e-mail: todd@planningworks.co.nz
>
> Dear Todd,
>
> **Re: Consent term**
>
> Following up from recent conversations our client would be happy for a term be placed on any prospective consent for the proposed that aligns with the expiry of the structures to the immediate south. This is on the proviso that the application continues to be processed on a non-notified basis and that the applicant is able to agree to any relevant condition.
>
> Kind Regards,
>
> 
>
> Sam Morgan
> Senior Coastal Consultant
> **4Sight Consulting Ltd**

12. The Applicant also exchanged emails with Ngati Oneone Hapu on 15 August 2019 which referred to a term. This email string is attached as **Attachment 3**.

13. After reviewing the application material and the letter referring to a consent term, I subsequently provided a recommendation to Council for the application to be processed on a non-notified basis. This recommendation was not accepted and instead Council used its discretion to notify the application under special circumstances given other matters with sea walls and community interest with coastal erosion processes at Wainui Beach.

14. In preparing the original S.42A report I relied upon a term being part of the application to align with the expiry of the consent granted for the sea wall to the south as proposed in the Applicant's letter shown above. However, the letter from the Applicant specifically refers to the term being offered as part of a non-notified process. In light of the subsequent notification of the application and the Applicant's advice that it no longer accepts a term of consent, I am advised that this at least raises some legal questions around whether a term can be relied upon as forming part of the application. This is significant in terms of the assessment and determination of the application and will presumably be subject to planning evidence and legal submissions from the Applicant.

15. For the following reasons, it is my view that a consent term is both an appropriate and necessary condition for any consent granted to this proposal;

(a) The revetment wall to the south of the site has a term which was set at 35 years and runs through until 2042 (based on the date of the decision). The revetment wall adjoins the concrete groyne and southern edge of the Applicant's proposed revetment wall. Given the spatial and functional relationship of the respective walls, it is logical in my opinion for a term to be imposed to align a renewal process for both walls,

(b) My original assessment of the revetment wall in relation to the 2010 NZ Coastal Policy Statement (NZCPS) was that the proposal falls short of being consistent with the NZCPS, however I also considered that it was not *contrary* to the NZCPS. This was on the basis of the works being on private property, that the wall was effectively replacing an existing wall and that there was a defined term to be applied to any consent,

(c) Without a consent term (meaning the structure can remain indefinitely), it is my opinion that the proposal is inconsistent with and contrary to the NZCPS, particularly Policies 25 and 27, which discourage the use of hard protection structures and promote consideration of alternatives. A permanently authorised revetment wall would in my opinion secure a hard protection structure as the primary defence or response to coastal erosion and effectively preclude the development of risk management options which reduce or avoid the need for hard protection structures as envisaged by the NZCPS. Providing for a permanent hard protection structure is not, in my opinion, supported by the NZCPS.

(d) While the provisions of the Regional Plan have not been reviewed to give effect to the NZCPS, any revetment wall which is consented in perpetuity raises inconsistency with the general policy direction to very much limit the nature and extent of revetment walls as the preferred response to coastal erosion processes.

More specifically, I consider a revetment wall granted consent in perpetuity is not consistent with (refer original S.42A report for policy text):

Policy B5.1.3	The purpose of the seawall is to protect private property with Policy B5.1.3 limiting such works to where these represent the only practical alternative. In this case, other practical alternatives would be to retain the existing seawall or to include a term as part of the conditions on any new consent.
Policy C8.2.2.18	This policy specifically refers to revetment walls proposed to protect existing development and sets a qualification on any such works that they are the *best practicable option for the future*. In my opinion, options for the future will necessarily include adaptive/managed retreat and a consent which provides for a revetment wall in perpetuity is likely to preclude other options and therefore cannot demonstrate that it is the best practical option for the future.

(e) As discussed in Section 11 of my original S.42A report, the Wainui Beach Erosion Management Strategy (WBEMS) is a relevant community policy document, and this also sets out direction for any further revetment walls along Tuahine Crescent to be subject to a term in alignment with the sea wall to the south.

(f) As part of the TRMP review of Natural Hazards provisions, Council has identified coastal hazards risk as a high priority for the whole district and is presently considering whether to initiate a dynamic adaptive planning programme (DAPP) for Wainui Beach in this financial year. It is understood that a decision will be made by Council's Management Team confirming the DAPP process prior to the Cave hearing. I can confirm any decision once this is available.

(g) In February 2021, the Government announced it would repeal the RMA and enact new legislation based on the recommendations of the Resource Management Review Panel. The three proposed enactments are:

- Natural and Built Environments Act (NBA), as the main replacement for the RMA, to protect and restore the environment while better enabling development;
- Strategic Planning Act (SPA), requiring the development of long-term regional spatial strategies to help coordinate and integrate decisions made under relevant legislation; and
- Climate Adaptation Act (CAA), to address complex issues associated with managed retreat.

It is anticipated that there will be stronger national policy direction around managed retreat and the response to coastal erosion that local authorities will need to adopt. The evolving context of legislative review and central government focus on how communities respond to climate change and coastal processes is a matter that can

be considered as part of S.104(1)(c) – *Other matters.* In my opinion this is relevant given that the Applicant is seeking a consent in perpetuity for the revetment wall. While it is acknowledged that the future policy direction remains to some extent speculative, given the current policy direction supports a move away from hard protection structures and the preservation of options including managed retreat, and given the signalled CAA is intended to address managed retreat, it would seem more consistent with the sustainable management of the coastal environment to keep future options open rather than foreclosing them by granting a consent in perpetuity.

16. Taking the above matters into account, it is my opinion that granting consent to the revetment wall without a consent term, effectively allowing it to remain in perpetuity, is not supported by the policy documents nor is it consistent with the sustainable management of the coastal environment. If there are outstanding issues associated with imposing such a condition on the basis it does not form part of the Applicant's proposal, then it is my opinion that the application should be declined.

CONDITIONS

17. Along with the original S.42A report, a set of draft conditions were prepared. I have updated and amended these conditions with the revised set included as **Attachment 4**. These are largely based on the original set of draft conditions with the following amendments;

(a) Blue Penguin
New conditions have been recommended to require monitoring and restrictions on the work site should any habitat for blue penguin be identified,

(b) Decommissioning of Works
The original conditions required a plan for the decommissioning of works should a term be imposed and the consent holder decides not to seek a renewal or fails to obtain a renewal at the expiry of the term. The purpose of the proposed condition was to ensure that if the new revetment wall did not gain a renewal after the prescribed term, then it was clear that the consent holder would be responsible for decommissioning the wall. This is considered consistent with the direction in the NZCPS to promote restoration or rehabilitation of the natural character of the coastal environment, including by removing redundant structures and materials (Policy 14).

I have had some discussions with the Applicant's planning consultants who have advised that the Applicant is opposed to these conditions.

Council's primary concern is to ensure that ratepayers are not left having to fund the cost of decommissioning the wall if a replacement consent is not obtained at the end of the consent term. I therefore remain of the view that it is appropriate to consider decommissioning conditions alongside any conditions for a consent term.

I am advised by Council staff that decommissioning conditions and/or bonds for such works have not generally been imposed on other consents for revetment walls. However, the 2020 decision for approval of a Council application for emergency works at Pare Street included a 3 year term and decommissioning conditions[1].

It occurs to me for the current case, that any decommissioning works would need to take into account that the existing seawall is providing a degree of mitigation from coastal hazards and that to completely remove any new revetment wall may well lead to a future acceleration in erosion at the bottom of the escarpment.

I have therefore proposed to amend the decommissioning condition to only require the consent holder to identify what is proposed with respect to any reconsenting or decommissioning process 1 year prior to the expiry of any consent term. This would allow both the consent holder and Council the opportunity to engage and review what alternative(s) are proposed including any necessary consent processes/requirements and any future effects on coastal erosion.

(c) Review Condition

On reflection, I am now of the view that a review condition is not required if there is a term of consent.

(d) Term of Consent

I have recommended imposing a consent term expiring on 11 April 2042 to align with the wall to the south, consistent with the WBEMS.

(e) Design and Scale of Revetment Wall

In discussing the conditions with the Applicant, a request has been made to amend the plan references for the wall design from those submitted with the original resource consent application with those submitted with the EUC application.

I understand that the design change has been made to better address potential wall end effects with the length of the front face of the wall increasing from 23.9m to 29.4m and a 20 degree taper on the wall return as shown in **Figure 1** and **Figure 2**.

[1] GDC Ref: 109217: Decision granted 15 July 2020 by Commissioner Alan Watson

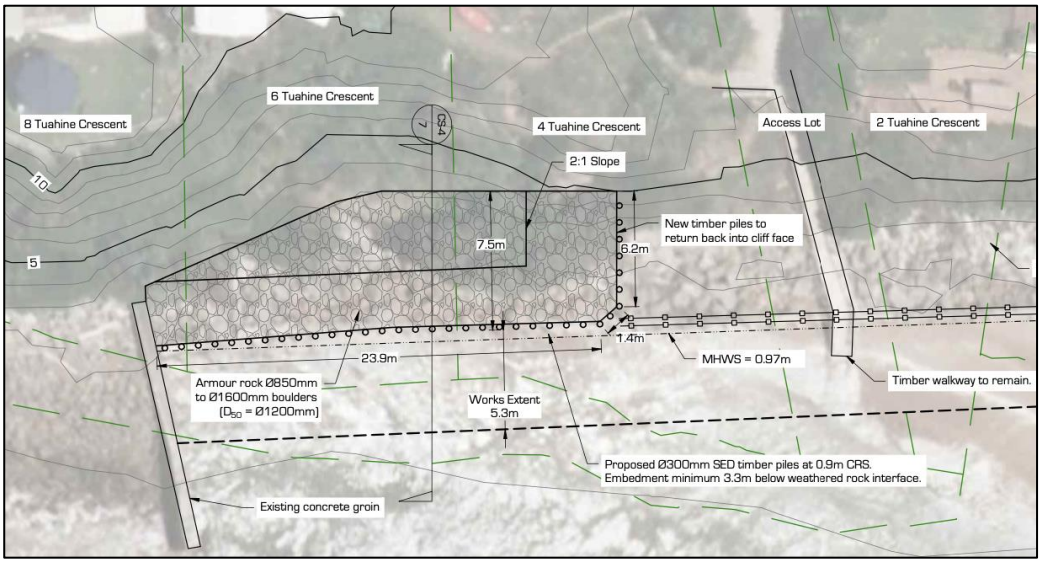


Figure 1: Detail of revetment wall design from original resource consent application.

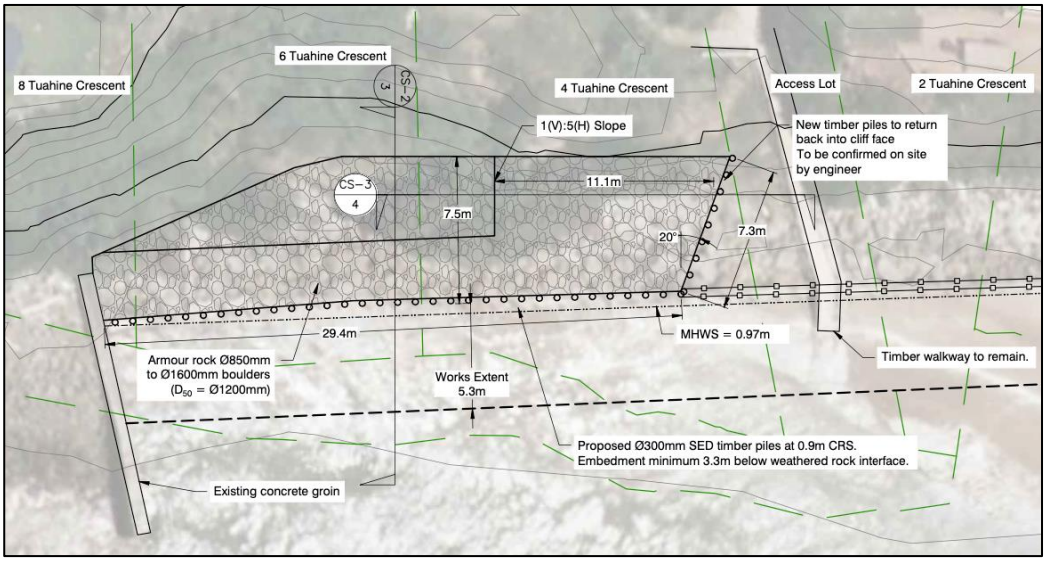


Figure 2: Detail of revetment wall design from EUC application.

The increase in the length of wall is not large physically, however it does represent a reasonably large proportionate increase of approximately 23%. As such, it is my opinion that the Applicant will need to provide planning and legal submission to enable a proper evaluation of whether it is appropriate to accept the amended design plans should the Commissioner be mindful to grant consent.

CONCLUSION AND RECOMENDATION

18. In my opinion, there is a pathway forward to allow consent for the revetment wall. As discussed in my original S.42A report and in this addendum, the proposed works replace an existing wall and the adverse effects on the environment can be addressed by the design and scale of the wall including measures to manage any construction effects.

19. However, my overall assessment and recommendation supporting the grant of consent was originally, and fully remains, based on a consent term forming part of any consent.

20. I have updated and amended the conditions with the revised set included as **Attachment 4**. These conditions have been issued as draft to the Applicant who has provided some preliminary comments supporting the direction of changes (except around the term condition) and indicated that further assessment and amendments will be proposed as part of their evidence.

Todd Whittaker (MNZPI)
Independent Planning Consultant
28 September 2022

APPENDIX 1

Addendum Memo – Mr Paul Murphy (Coastal Works)

Technical Report Addendum

TO: Todd Whittaker

FROM: Paul Murphy

DATE: 21 September 2022

SUBJECT: **ADDENDUM TO S CAVE - APPLICATION FOR CONSTRUCTION OF A PRIVATE SEA WALL LU-2019-108876-00 ASSESSMENT OF WAINUI BEACH COASTAL WORKS**

This addendum to the technical report of 20 May 2020 specifically addresses Little Blue Penguin (Kororā) which are now known to be present within both the proposed coastal erosion protection works area at Wainui Beach.

This addendum is limited to providing comments on recommended protocols to avoid and or mitigate potential effects on Little Blue Penguin (Kororā) during the before, during and following the proposed physical works.

Figure 1 Tuahine Crescent approximate work area outined in red.

Figure 2 Tuahine Crescent work site approximately 400 metres south of Pare Street beach access

Birds

The rock revetment is not located within a marine area of significant conservation value in the Proposed Regional Coastal Environment Plan. However the proposed work and surrounding coastal environment provides habitat for Little Blue Penguin (Kororā).

The recommended consent conditions require a survey of the proposed works area be undertaken by a suitably experienced and qualified expert to ascertain whether there is Blue Penguin habitat within the proposed works area. A survey report is required to be submitted to Gisborne District Council at least two months prior to any construction works for certification.

In addition to the survey report outlined above a management plan is recommended to specifically identify the construction protocols that apply for the period of construction works to ensure that any potential effects on Blue Penguin habitat are mitigated or avoided. These include, but are not limited to;

- Periods of the year when works should be avoided,
- Protocols for works within and outside any restricted construction periods,
- Access pathways to the foreshore for any areas where penguin habitats have been identified within or adjacent to the works area,
- Provision of additional artificial refuge sites where any existing Penguin habitat sites are compromised,

The management plan shall be submitted to the Gisborne District Council at least two months prior to construction for certification and all works shall be thereafter undertaken in accordance with the certified plan.

Providing the survey and management plan is a recommended consent condition and the requirements of both are followed potential effects on Little Blue Penguins (Kororā) is likely to be less than minor.

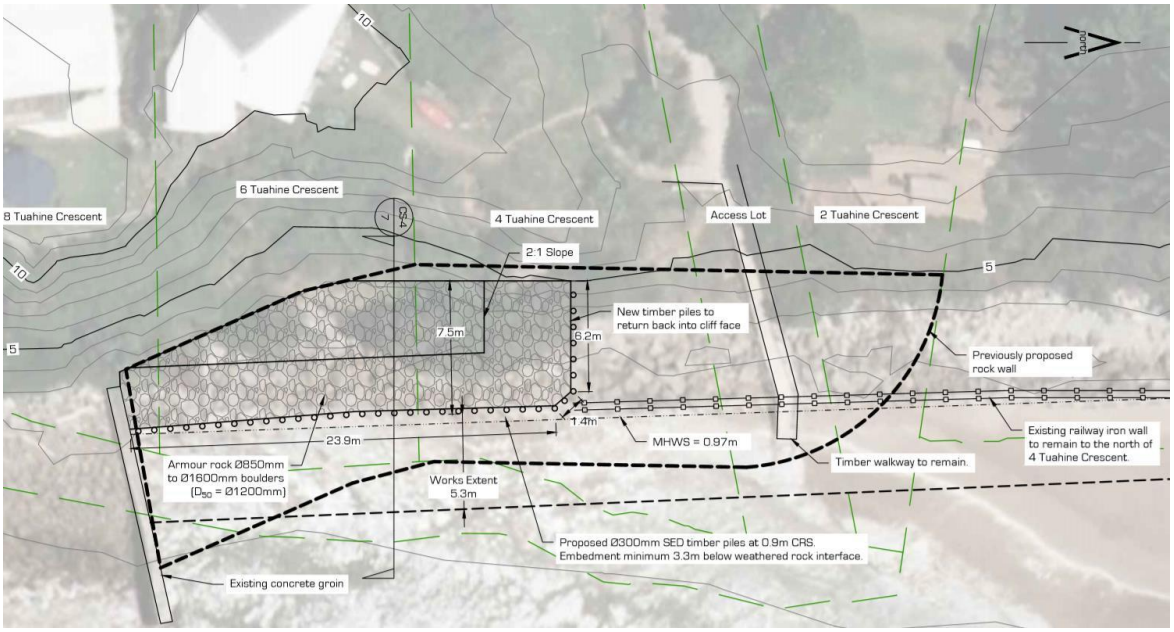
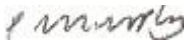


Figure 3 Plan taken from the application of the proposed wall in relation to the previously proposed rock wall by GDC.

Figure 4 Tuahine Crescent 26 June 2015

Figure 5 Tuahine Crescent 26 June 201



Paul Murphy

Team Leader Environmental Science

APPENDIX 2

Addendum Review - Dr Willem de Lange

(Coastal Processes)

Review of coastal process impacts of proposed Tuahine Crescent Seawall Addendum

20 September 2022

Introduction

In the 2 years since I wrote the review included as Appendix 1 of the S.42A report on the Tuahine Crescent (Cave) seawall, there have been several studies and reports on sea level rise that have some relevance to the potential coastal process impacts of, and on, a seawall. This addendum summarises the relevant literature, and the recently released SeaRise online tool for predicting sea level rise.

Sea level rise projections

The IPCC AR6 WGI report released in 2021 reviews available literature on sea level rise, and summarises projections of future sea level derived from the CMIP6 global climate models (IPCC, 2021). Figure 1 and Table 1 summarise the sea level projections from the AR6 assessment report (IPCC, 2021). The most plausible scenario presented is SSP2-4.5, which predicts median *likely* (>66% probability) *medium confidence* sea level rises relative to the 1995-2014 baseline of 0.56 m by AD 2100 and 0.93 by AD 2150. The SSP5-8.5 scenario was considered to be implausible in the AR6 report. The report also included the even less plausible low-likelihood, high-impact storyline in summary figures and tables, although it was acknowledged as having *low confidence*.

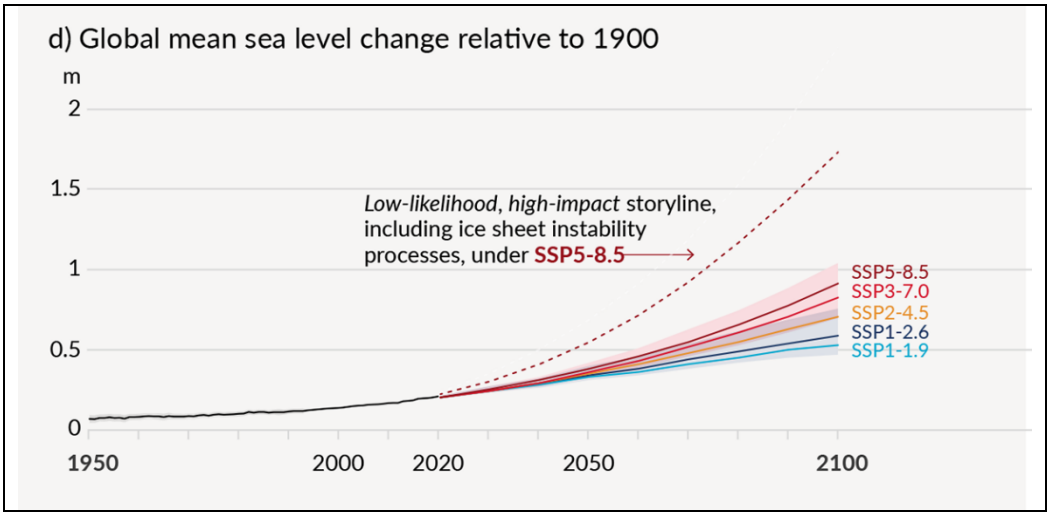


Figure 1 – IPCC AR6 WGI projected eustatic sea level changes relative to AD 1900 for 5 storylines (IPCC, 2021). The corresponding data are summarised in Table 1. The data for 1950-1992 are from tide gauges, satellite altimetry for 1992-2014, and CMIP6 models from 2014. Data are adjusted upwards to allow for 0.158 m sea level rise from 1900 to the 1995-2014 baseline used for simulations.

Table 1 – Eustatic sea level projections (m) relative to a 1995-2014 baseline for 6 storylines summarised from Table 9.9 (IPCC, 2021), and the NZ RCP8.5 H+ projections (MfE, 2017). The projections are from *likely* (>66% probability) ranges with *medium confidence.* Low, median and high values are provided for each scenario. The data up to AD 2100 are plotted in Figure 1.

	By AD 2100			By AD 2150		
Scenario	Low	Median	High	Low	Median	High
SSP1 – 1.9	0.28	0.38	0.55	0.37	0.57	0.86
SSP1 – 2.6	0.32	0.39	0.62	0.46	0.69	0.99
SSP2 – 4.5	0.44	0.56	0.76	0.66	0.93	1.33
SSP3 – 7.0	0.55	0.68	0.90	0.92	1.21	1.89
SSP5 – 8.5	0.63	0.77	1.01	0.98	1.35	1.88
SSP5 – 8.5	0.63	0.88	1.60	1.02	1.99	4.83
Low confidence						
NZ RCP8.5 H+		1.05			1.88	

The AR6 report did not clearly indicate that the underlying methodology for producing the values from model ensembles displayed in summary tables and figures had changed. Subsequent publications by the modellers and authors involved have clarified the situation (*viz*. Hausfather *et al*, 2022). It was recognised that some models either projected to much warming, or warmed too quickly, or both. The results of these models were considered implausible and the models were excluded from further analyses. Figure 2 is from Hausfather *et al* (2022) and indicates the ranges of temperature changes determined by including all model projections, excluding models deemed to be too hot, and the results finally included in the AR6. It is evident that further selection and/or adjustment beyond excluding 'hot models' has occurred, as indicated by the statement on Figure 2 that excluding 'hot models' is a shortcut approximation to the AR6 average. It is not clear what this involved, but the AR6 results reported (as in Table 1), give a range including 66% of the ensemble results between the 17% and 83% percentiles, while the ranges in Figure 2 include 90% of the ensemble results between the 5% and 95% percentiles. Hence, AR6 has less emphasis on the extreme tails of the ensemble distributions.

From Figure 2 and Hausfather *et al* (2022) it is evident that the choice of CMIP6 models affects the results for all future projections based on the CMIP6 models, and this includes sea level projections. As far as can be determined from the AR6 reports, the sea level results in Figure 1 and Table 1 are subjected to the same weighting processes as the temperature projections in Figure 2. Little *et al* (2015) also demonstrated that the ensemble results from 16 CMIP5 AOGCM models used to project future sea levels were distorted by 4 outliers regardless of the scenario and temperature model. It is not known if this is still an issue for CMIP6 AOGCM models.

Included in Table 1 are the NZ RCP8.5 H+ sea level projections that MfE (2017) recommended as being used to assess sea level rise impacts particularly Category A. The NZ RCP8.5 H+ values are based on the RCP 8.5 pathway within the SSP5-8.5 storyline, and represent the median of the 18% highest ensemble values. The IPCC AR6 report indicates that SSP5-8.5 is implausible, while SSP2-4.5 is considered the most plausible. Table 1 shows that the NZ RCP8.5 H+ sea level projections are too high. For the Tuahine Crescent seawall, the proposal initially reviewed was based on the MfE (2017) guideline of 1 m, which is consistent with the 83% levels for the SSP2-4.5 storyline beyond AD 2100, and well beyond the design life of the structure.

In my review, I discussed the influence of vertical land movement on relative sea level at Tuahine Crescent. Geomorphic, sedimentological and continuous GPS (GNSS) evidence indicated that Wainui Beach was rising at rates comparable to the global eustatic sea level rise (1-2 mm/y). I suggested that, as a consequence, the seawall should be designed to the Category D transitional sea level of 0.65 m (MfE, 2017). This value is consistent with the median (50%) projections for the SSP2-4.5 storyline beyond AD 2100, and well beyond the design life of the structure.

Denys *et al* (2020) undertook an analysis of relative sea level and vertical land movement at 5 ports around New Zealand, and used these data to determine the underlying eustatic sea level rise for New Zealand for the period 1900-2013. Their results indicate an average rate of eustatic sea level rise of 1.45 ± 0.36 mm.y^{-1}, and they did not detect any acceleration in the rate over time, which agrees with an earlier assessment by Fadil *et al* (2013) that found an average rate over the period 1900-2011 of 1.46 ± 0.10 mm.y^{-1}. Garrett *et al* (2022) present a re-analysis of proxy measures of

New Zealand relative sea level for the last millennium. Their reconstructed sea level agrees well with the Denys *et al* (2020) analysis of tide gauge data, and shows an acceleration in the rate of sea level rise in the early 20th Century, peaking in the 1940s and slowing since then. There is no evidence of a recent acceleration. As shown in Figure 1, all of the AR6 sea level projections assume sea level rise has accelerated since 2005 and will continue to do so until at least AD 2150.

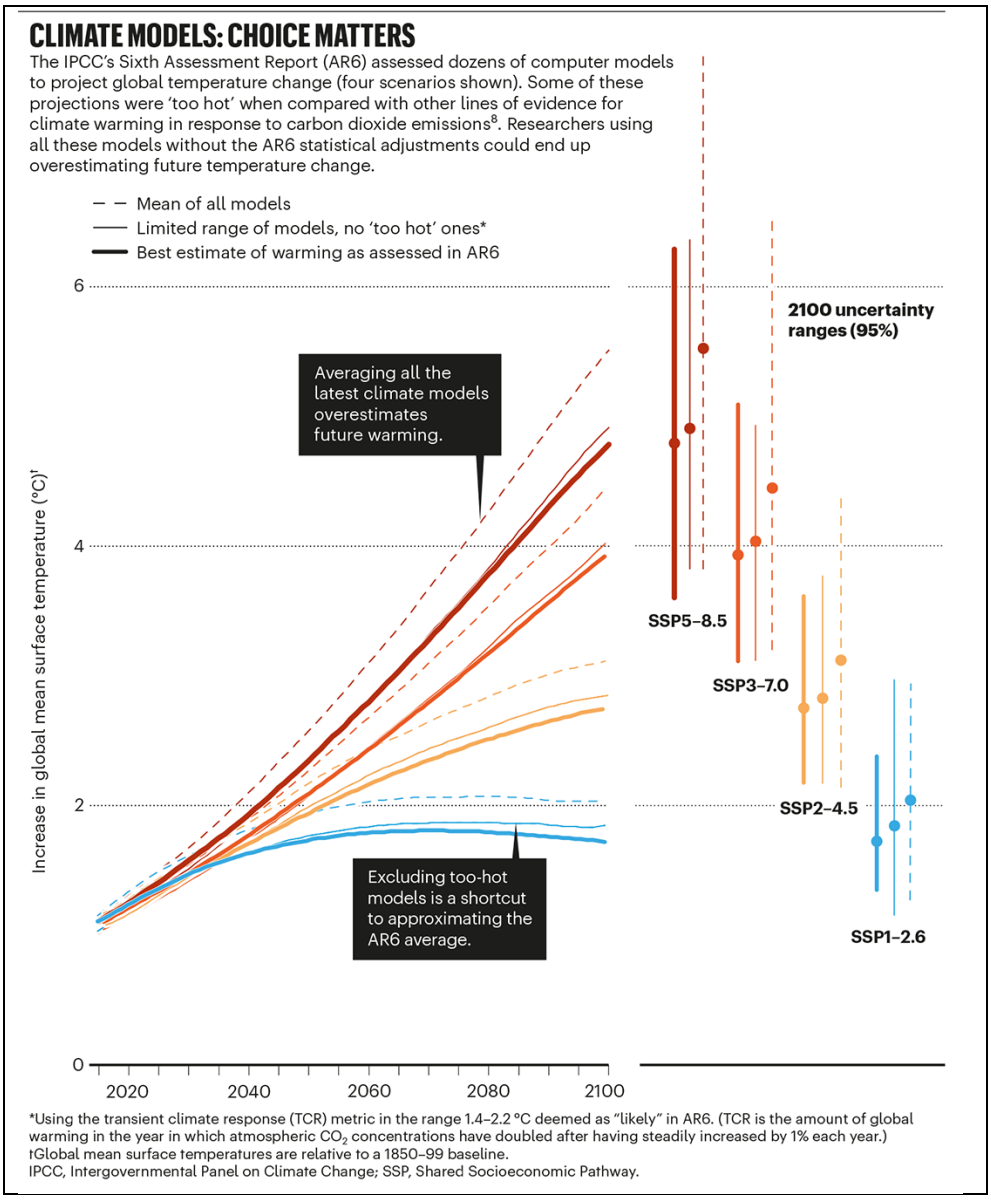


Figure 2 – Comparison of ensemble CMIP6 model medians and ranges for the projected increase in global mean surface temperature: including all models; excluding 'hot models'; and as reported by IPCC AR6 (Hausfather *et al*, 2022).

Recently (May 2022), the SeaRise online tool became available that combines vertical land movement and projections of eustatic sea level rise approximately every 2 km along the New Zealand coastline. The website points to an article written for the New Zealand Coastal Society to explain the methodology used (Levy *et al*, 2020). This article provides little detail about the methodology: particularly about potential errors and uncertainties. There is also no validation of the sea level predictions presented in the article. It is clear, however, that the online tool consists of a database of estimated rates of vertical land movement for all the sites, and a single set of sea level rise projections consisting of decadal estimates of sea level rise from AD 2020 to AD 2300 for 5 storylines. The sea level rise estimates are baselined to zero in AD 2005, and the SeaRise website indicates that the predictions should be offset by the mean observed sea level for the period 1995 to 2014 at the location of interest.

Vertical land movement

Considering the database of vertical land movement estimates, the Levy *et al* (2020) article doesn't provide much detail about the methodology used to derive the estimates. However, Hamling *et al* (2022) do provide a good description of the methodology used to estimate vertical land movement for the New Zealand coastline, and their datasets available online include the 2 km coastal vertical land movement data used by the SeaRise online tool. Hamling *et al* (2022) note that the dataset was restricted to 8 years between 2003 and 2011 with minimal large seismic events causing vertical land movement; data associated with the Fiordland 2009 and Darfield 2010 events were dropped from the analysis. Uplift associated with the Matata earthquake swarm between 2005 and 2011 in the Bay of Plenty was also adjusted to reduce the estimated uplift rate for that area.

The Hamling *et al* (2022) dataset involved combining Interferometric Synthetic Aperture (InSAR) data with continuous GPS measurements (GNSS) collected by GeoNet. The InSAR data measures deformation as result of volcanic, tectonic, and anthropogenic sources: anything that changes the elevation of the dominant radar reflector in an area, so it may not reflect the actual vertical land movement. They also note that the Synthetic Aperture Radar data used to estimate deformation was predominantly derived from ascending satellite tracks, "*making it* [the InSAR data] *largely unusable for deriving a long-term rate*". The issues raised by Hamling *et al* (2022) imply that their estimated rates are not suitable for projecting vertical land movement, and hence relative sea level, out to AD 2300. Levy *et al* (2020) also note that "*the evolution of coastal vertical land movement will pose an ongoing challenge*".

Table 2 summarises the occurrence of earthquakes with magnitudes greater than M_w 4.0 between 1960 and 2021. Given the location of Wainui Beach within the Hikurangi Deformation Front, it is *exceptionally likely* that there will be vertical movement due to at least one earthquake before AD 2300.

Table 2 – Frequency of New Zealand between 1960 and 2021. Data from https://www.geonet.org.nz/earthquake/statistics_long

Magnitude	Annual average	Annual minimum	Annual maximum	"In general"
4.0 - 4.9	360.74	124	1,178	1 per day
5.0 - 5.9	30.05	6	109	2 per month
6.0 - 6.9	1.68	0	9	3 per 2 years
7.0 - 7.9	0.27	0	2	1 per 4 years
8.0 or over	0	0	0	1 per century

Figure 3 shows the estimated rates of vertical land movement for the SeaRise sites between Gisborne and Tatapouri. For Wainui Beach near the proposed seawall, the rates vary from -0.770 mm/y at Tuahine Point to -0.730 mm/y at the beach access near the Pare St and Wairere Road intersection. The maximum subsidence rate is -0.850 mm/y near Sponge Bay. These rates of subsidence contradict the uplift rates determined by previous studies using longer term indicators of vertical land movement as summarised in my initial review. Considering all of the sites in Figure 3, there is no pattern to the estimated rates that is consistent with published studies of the overall tectonic deformation of the region, which are summarised by Clark *et al* (2010) as discussed below. It is possible that the vertical deformation rates determined by InSAR reflect shoreline erosion, landslides and anthropogenic sources; not the actual underlying vertical land movement. Alternatively, the vertical movement is also a consequence of aseismic processes, or slow slip events.

Figure 4 shows an updated plot of the vertical component of ground movement at the Makorori GNSS site (MAKO) that was included in my initial review, and a similar plot for the Gisborne GNSS site (GSIB). The InSAR data for the area around Gisborne would have been adjusted using the GISB GNSS data as it is the only nearby GNSS site that has data for the 2003-2011 period considered. That site lies inland within an area of subsidence under the Poverty Bay flats, and is not representative of the coast around Wainui Beach (Figure 3). Both records show vertical land movement occurring in response to slow slip events.

Figure 3 – Estimated rates of vertical land movement between Gisborne and Tatapouri from the SeaRise online tool. Also shown are the locations of the GISB and MAKO continuous GPS sites, and the location of the proposed seawall.

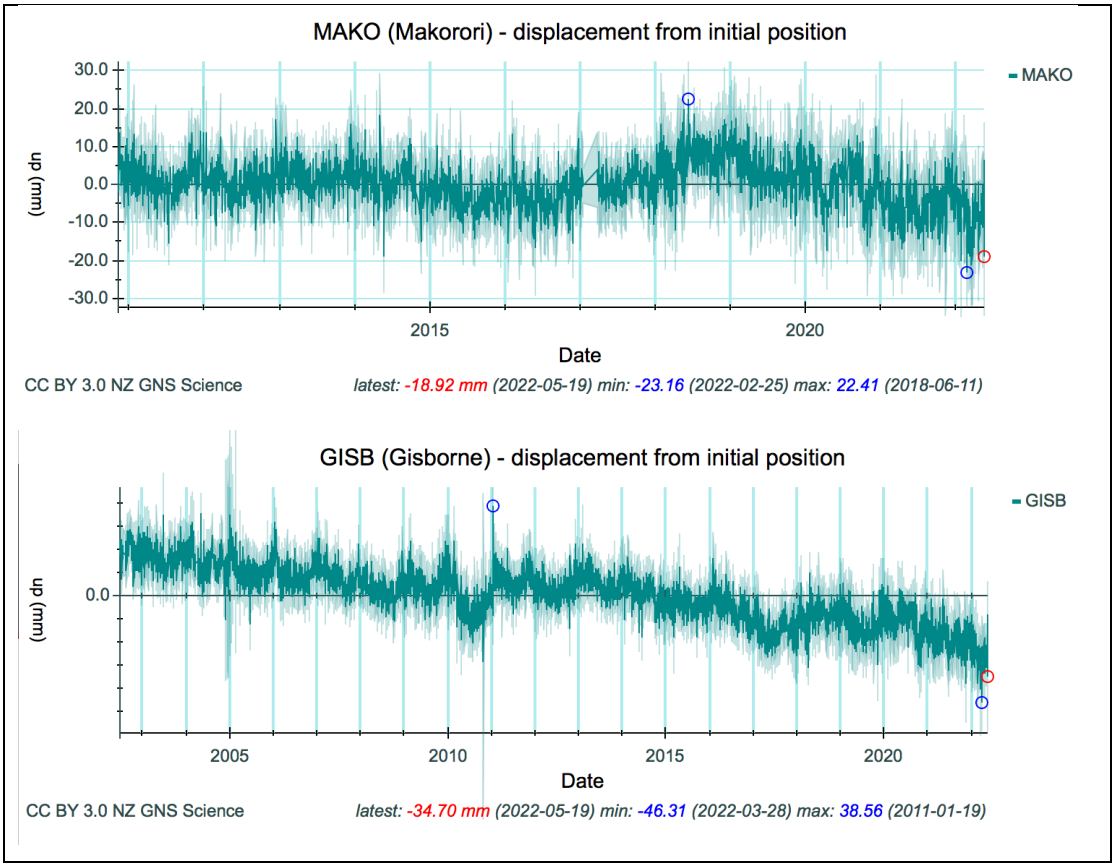


Figure 4 – Continuous GPS (GNSS) records for sites MAKO at Makorori, and GISB in Poverty Bay. The latest, minimum, and maximum values are labelled with coloured circles, and their corresponding values listed below the plot.

Perez-Silva *et al* (2022) analysed slow slip events for the Hikurangi Deformation Front between Anaura Bay and Porangahau for the period from 2004 to 2020. Figure 5 shows the distribution of slow slip events over this period. This shows that Wainui Beach experiences deformation due to slow slip events almost every year, but the frequency during 2003-2011 was lower than subsequently. All of the slow slip events recorded at the GISB station were associated with uplift at the MAKO station; with the strongest response evident for the 2017 event.

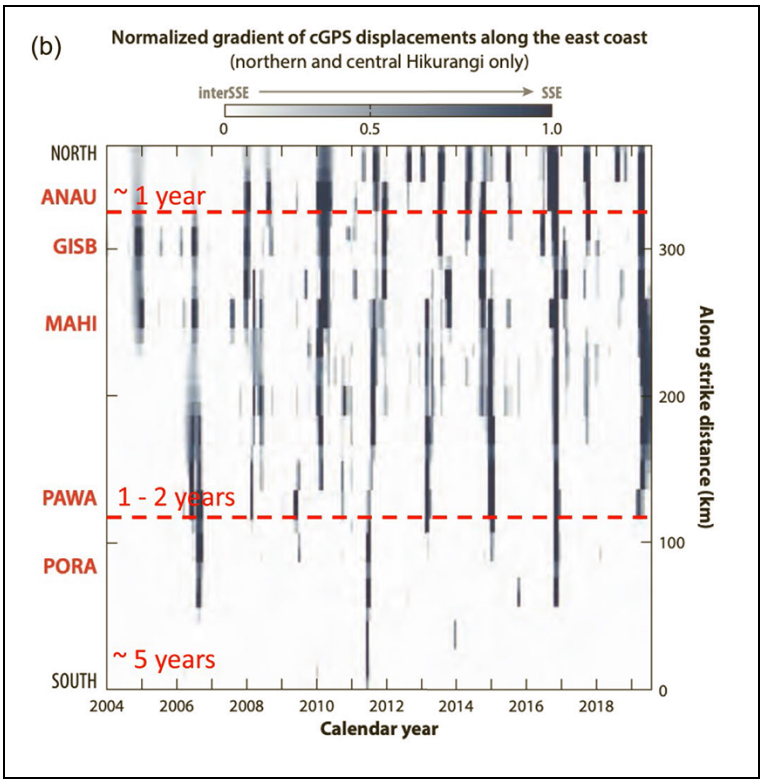


Figure 5 - Change in rate of motion of GeoNet continuous GPS stations as a normalized gradient. Darker colours represent the fastest rate change, which is indicative of slow slip events. The white colour indicates intervals between slow slip events. (Figure 1b from Perez-Silva *et al*, 2022).

Figure 6 is a combination of figures 4 and 6 from Clark *et al* (2010) and shows:

A. A schematic cross-section through the Raukumara Peninsula to indicate the changing processes at depth that are driving coastal deformation, including uplift and subsidence. Wainui Beach lies in an intermediate zone where deformation is changing from being driven primarily by episodic large earthquakes (intermittent deformation zone) to being driven by gradual uplift due to crustal thickening (gradual uplift zone). Within the intermediate zone, causes of deformation vary and are not well understood. However, for the Wainui Beach region it is considered that slow slip events are a significant contributor to deformation;

B. A map of the Raukumara Peninsula and Hikurangi Trough showing the location of the 3 deformation zones, major structures contributing to deformation, and coastal rates of vertical land movement. The map highlights a lack of identified faults in the Poverty Bay region, which is still evident in the active fault database for New Zealand released in May 2022 (Seebeck *et al*, 2022); the abrupt transition from uplift at the coast near Wainui Beach (MAKO site), and subsidence in the western Poverty Bay region (GISB site); and the location of subducted seamounts that are considered to contribute to seismic tremor and the formation of slow slip events; and

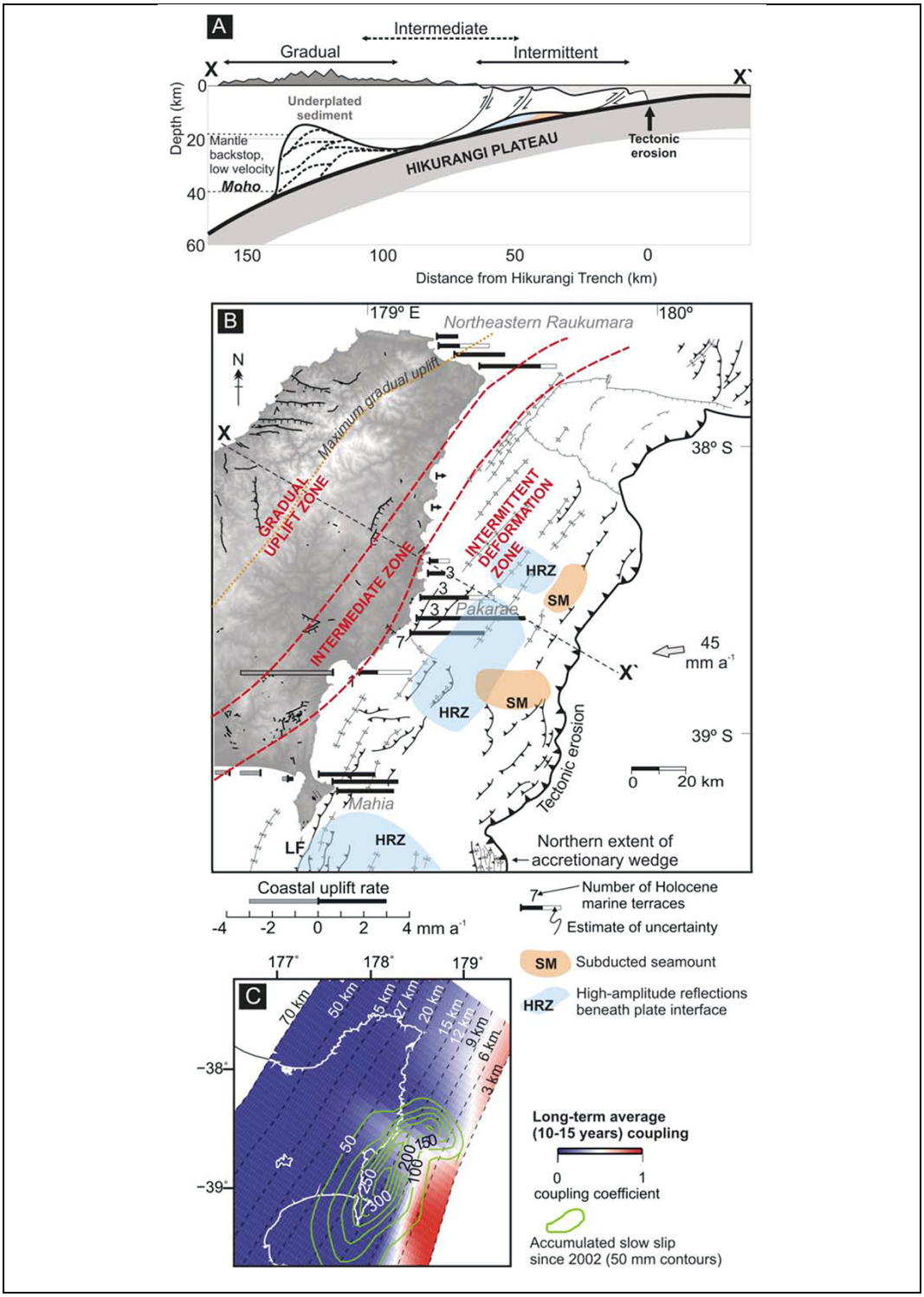


Figure 6 - Summary of the coastal deformation mechanisms of the Raukumara Peninsula. (A) Cross-section across the Raukumara Peninsula showing the tectonic processes responsible the coastal deformation. (B) Map showing relationship between the coastal deformation zones of the Raukumara Peninsula, the upper plate structure and topography and the physical properties of the plate interface. Dotted lines delineate the approximate boundaries of the margin-parallel zones of intermittent and gradual deformation along with the intermediate zone in between. Estimated rates of uplift are shown(C) Interseismic plate coupling along the northern Hikurangi margin derived from geodetic data, and the distribution of plate interface slow-slip since 2002. Dashed lines represent depth contours on the plate interface. Modified from figure 6 of Clark *et al* (2010) by adding the key for coastal uplift from figure 2 in the same publication below panel B.

C. A map showing the amount of coupling between the Pacific and Indo-Australia Plates between seismic events, and the total slow slip deformation between 2002 and 2010. This shows the local concentration of slow slip events associated with subducting submarine seamounts. Barker *et al* (2018) examined the deformation occurring offshore from Wainui Beach associated with Ariel Bank and the Tuaheni Basin, and linked the September to October 2014 slow slip event to a 40 km long, 15 km wide, and 2.5 km thick lozenge-shaped buried ridge on the descending plate.

Overall, the published evidence for ongoing uplift of the Wainui Beach area due to slow slip events and episodic large earthquakes is compelling and indicates that the extrapolation of short-term estimates of vertical land movement from the InSAR observations between 2003 and 2011 is not a reliable predictor of future vertical land movement.

SeaRise eustatic sea level projections

Levy *et al* (2020) state that the eustatic projections are the projected rates from the IPCC Special Report on the Ocean and Cryosphere Change (Oppenheimer *et al*, 2019) combined with extra sea level rise due to ice sheet melt determined by expert elicitation. It further indicates that the median and *likely* range (17% to 83% percentiles) values from Oppenheimer *et al* (2019) were used to define the central region of the sea level projection distributions, and expert elicitation was used to define the extreme tails (upper and lower 17%). The source of the expert elicitation was not specified. Therefore, the methodology is based on adjusted CMIP5 model results and it is unclear if the outlier AOGCM models identified by Little *et al* (2015) were included or excluded.

However, the SeaRise website provides projected sea level rise using the median (p50), lower 17% percentile (p17) and upper 83% percentile (p83) values based on the CMIP6 models. This means that the expert elicitations of the extreme tails for the CMIP5 model projections should not be included in the online tool projections. Comparison of the SeaRise sea level rise projections with those from the IPCC AR6 WGI report summarised in Table 1, show that they agree up to AD 2030, but increasingly deviate over time depending on the storyline: SSP1-1.9 is essentially unchanged; while SSP5-8.5 shows the largest change.

Table 2 – Eustatic sea level projections (m) relative to a 1995-2014 baseline for the 5 storylines used in the SeaRise online tool.

	By AD 2100			By AD 2150		
Scenario	Low	Median	High	Low	Median	High
SSP1 – 1.9	0.25	0.38	0.57	0.34	0.58	0.89
SSP1 – 2.6	0.30	0.42	0.62	0.43	0.67	1.00
SSP2 – 4.5	0.44	0.57	0.78	0.68	0.96	1.35
SSP3 – 7.0	0.59	0.73	0.96	0.99	1.31	1.74
SSP5 – 8.5	0.67	0.83	1.10	1.09	1.47	2.02

As mentioned above, Denys *et al* (2020) analysed relative sea levels and vertical land movements for ports around New Zealand with a sufficiently long record; reporting an average rate of eustatic sea level rise of 1.45 ± 0.36 mm/y. This rate is based on observations that overlap with the start of the SeaRise projections between AD 2005 and AD 2030. For this overlap period, SeaRise projections assume a rate of eustatic sea level rise of 3.2 mm/y for p17, 4.4 mm/y for p50, and 5.6-6.0 mm/y for p83 depending on the storyline (lower rates for higher emission storylines). These rates are more than double the observed long-term rate around New Zealand based on coastal tide gauges. The SeaRise p50 and p83 eustatic sea level rise rates are also higher than the global eustatic sea level rise rate determined by satellite altimetry of 3.0 ± 0.4 mm/y for the period AD 1992 to AD 2022 (this rate excludes the estimated glacial isostatic adjustment for the increasing depth of the ocean basins of 0.2-0.5 mm/y) reported by the NOAA/NESDIS/STAR Laboratory for Satellite Altimetry (https://www.star.nesdis.noaa.gov/socd/lsa/).

The SeaRise projections, therefore, start with a higher rate of eustatic sea level rise than observed for New Zealand, or globally, and assume continual acceleration of the rate of rise until AD 2300. As discussed above, there is currently no evidence for long-term acceleration of the rate of sea level rise for New Zealand. There is evidence that the rate of sea level rise varies at annual to decadal time scales, so it is necessary to analyse time series of sufficient length to average out these

variations. The minimum time period required is considered to be 60-70 years, which means that satellite altimetry data are too short to provide a reliable estimate of long-term rates. Therefore, the global eustatic sea level rise rates should be reduced by at least 50% to match the observed rates for the New Zealand coast.

Levy *et al* (2020) also point out that there are latitudinal differences in the rate of eustatic sea level rise, which they illustrate with an extreme example of a large release of water from the Greenland and Antarctic ice caps. Table 3 summarises the results from Denys *et al* (2020) for the ports analysed, and they indicate that there is a latitudinal variation in the rate of eustatic sea level rise for the New Zealand coast; although the value for Dunedin appears anomalous. Despite the differences being small, they are the same magnitude as the glacial isostatic adjustment the Local Government Guidance Note (MfE, 2017) added to eustatic sea level rise projections, and therefore should be considered for 100-year projections (and longer).

Table 3– Summary of the results from Denys *et al* (2020) of rates of relative sea level rise (RSL), vertical land movement (VLM), and eustatic sea level rise (ASL) for 5 New Zealand ports.

Port	RSL (mm.y^{-1})	VLM (mm.y^{-1})	ASL (mm.y^{-1})
Auckland	1.57 ± 0.15	-0.16 ± 0.10	1.41 ± 0.18
New Plymouth	1.46 ± 0.54	-0.04	1.42 ± 0.54
Wellington	2.18 ± 0.17	-0.62 ± 0.31	1.56 ± 0.36
Lyttelton	1.91 ± 0.13	-0.27 ± 0.23	1.64 ± 0.26
Dunedin	1.35 ± 0.15	-0.14 ± 0.31	1.21 ± 0.35
mean	1.69 ± 0.28		1.45 ± 0.36

Figure 7 shows the measured monthly and annual relative mean sea level at Gisborne (station 1613) as provided by the Permanent Service for Mean Sea Level (PSMSL) website (https://www.psmsl.org/), and the SeaRise relative sea level predictions for site 2130 located within Eastland Port with a vertical land movement of -0.020 mm/y (Figure 3). Sea level data for Gisborne before 2010 are sparse and unreliable, so they have not been plotted. The SeaRise predictions have been baselined using the procedure given by SeaRise. This has the effect of forcing the SeaRise projections to overlap the observed sea level for the period 1995-2014. In this case data were not available for the full period, so the mean was based on data for 2007, 2008, and 2010-2014). As plotted, Figure 7 indicates sea level rose faster than predicted until 2016, and then has gradually fallen until the observed mean relative sea level is in close agreement with the predicted sea level in 2020.

Figure 4 shows the vertical land movements at the GISB and MAKO sites approximately equidistant from site 2130, and a comparison with Figure 7 indicates that vertical land movement has had a minor impact on the measured sea level (~10%). The influence of vertical land movement does vary over time, with the largest impact occurring during 2010-2011 period when there was strong slow slip event deformation (Figure 5). Overall, the observed rise and then fall of relative sea level cannot be attributed solely to vertical land movement at site 2130.

Figure 8 shows the measured monthly relative mean sea level at Gisborne and the eustatic sea level measured by satellite altimetry at 38.75°S 178.08°E, which is approximately 10 km south-southeast of the Gisborne tide gauge at 38.68°S 178.02°E. The satellite altimetry data were obtained from the Sea Level Explorer website (https://ccar.colorado.edu/altimetry/index.html). Despite not correcting the Gisborne relative sea level data for vertical land movements, it is generally a good match with the satellite eustatic sea level data. This suggests that sea level at Gisborne (and therefore Wainui Beach) predominantly responded to changes in eustatic sea level offshore from the coast over the period plotted. The main deviations between the two data sets occurs for 2010-2011 when there were larger vertical land movements.

Figure 8 also shows that the rate of sea level rise at Gisborne varies over time, with intervals of acceleration and deceleration. The is no obvious evidence of an overall acceleration or deceleration in the rate of sea level rise in the available data, but the record duration is too short to undertake

a reliable analysis. The pattern of sea level variations in Figure 8 also suggest that sea level at Gisborne will soon drop below the SeaRise predicted sea levels (Figure 7).

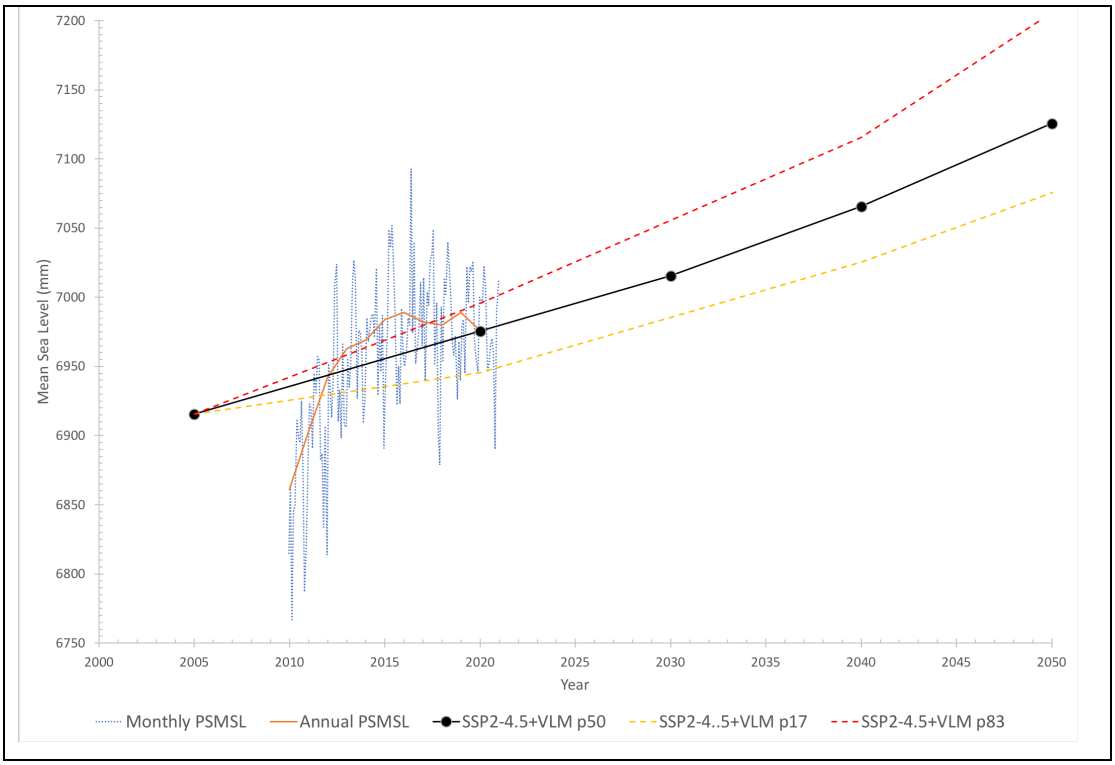


Figure 7 – Measured mean annual and monthly relative sea level at Gisborne for 2010-2020 as reported by PSMSL, and the SeaRise predicted sea level from 2005 to 2050 at site 2130. The SeaRise data have been baselined to the mean of the annual observations for 1995-2014 (6915.6 mm).

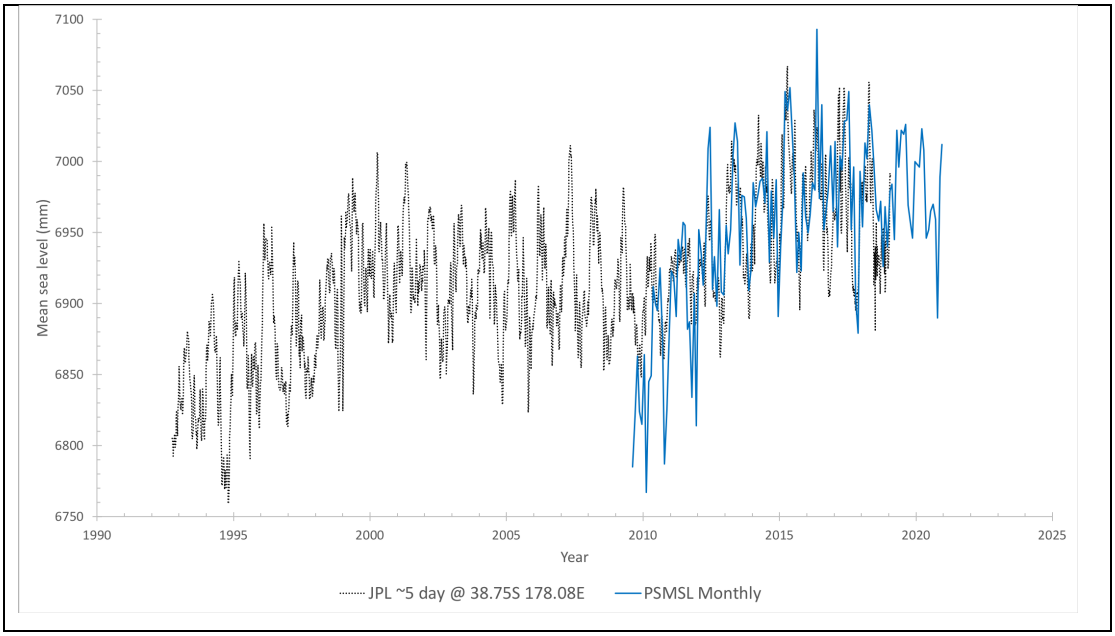


Figure 8 – Measured monthly relative sea level at Gisborne for 2010-2020 as reported by PSMSL, and the satellite altimetry measured eustatic sea level offshore at 5-day intervals as provided by the Sea Level Explorer Website.

Normally La Niña conditions tend to result in an elevated mean sea level around New Zealand, particularly on the east coast of the North Island (areas affected by the East Auckland Current transporting warm tropical water towards polar regions). In contrast El Niño conditions tend to

result in lowered mean sea levels. Since 2016, La Niña conditions have dominated, including a prolonged event underway at present (https://www.cpc.ncep.noaa.gov/data/indices/soi). Even though the ocean surface temperatures have increased during the La Niña events, Figure 8 shows that sea level has fallen. When the next El Niño event occurs, it is *likely* that sea level will fall faster.

Overall, the limited sea level data for the Gisborne region indicates that the SeaRise predictions, while currently matching observations after baselining, are *very likely* to overestimate future sea levels at Wainui Beach, particularly over longer time periods (after 2030-2050).

Summary

The additional information on historic sea level changes and new future sea level projections/predictions has not significantly changed my original review. The key findings are:

- Since the predicted sea level is *very likely* to less than assumed for the initial review, the proposed replacement seawall is still *likely* to have the same effect on coastal processes as the existing structure, which is minimal.
- Sea level rise is *very likely* to be less than assumed for the initial proposal reviewed. The RCP 8.5 H+ sea level projections applied then, which were *exceptionally unlikely* at the time, are recognised as not plausible. The new sea level predictions from the SeaRise online tool are not reliable, and a *very likely* to overestimate future sea level, particularly after 2030-2050 depending on the storyline used. Hence, I would still suggest that there is scope to reduce the size of the proposed replacement seawall, and hence the impact, if it is treated as a Category D development following the Ministry for the Environment (2017) guidance with a lower assumed future sea level.

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APPENDIX 3

Email String between Applicant and Ngati OneOne

Subject: RE: Cave/Reynolds Seawall at Tuahine
Date: Friday, 16 August 2019 at 10:40:21 AM New Zealand Standard Time
From: Sam Morgan
To: Nikki Searancke
CC: Todd Whittaker
Attachments: image001.png

Kia ora Nikki,

Thank you for the support.

I will keep you informed of progress.

Nga mihi

Sam Morgan
Senior Coastal Consultant
Mobile: 022 126 2514
4Sight.Consulting

From: Nikki Searancke <searanckenikki@yahoo.com>
Sent: Thursday, 15 August 2019 2:00 PM
To: Sam Morgan <samm@4sight.co.nz>
Cc: Todd Whittaker <todd@planningworks.co.nz>
Subject: Re: Cave/Reynolds Seawall at Tuahine

Kia ora Sam

Thank you for the update. I can state that Ngati Oneone Hapu support the consent application by your client.
Once again the reasons for supporting is twofold, both protecting our hapu ancestral history of whare wananga at this general location, including your clients property and the need to protect the Maungaroa Headland and beyond to the Tuaheni Point.

I look forward to observing the project and works as it proceeds.

Nga mihi
Nikki Searancke
027 8617704

On Thursday, 15 August 2019, 01:23:10 pm NZST, Sam Morgan <samm@4sight.co.nz> wrote:

Kia ora Nikki,

I just wanted to give you an update about where things are at with the consent application.

We have been working through a couple of issues with GDC. We have settled on a consent term that aligns with the structures to the south. This will allow for some continuity in managing the beach.

If you could please le me know if you are still supportive of the proposal that would be appreciated.

It would be good to get this through as confirmation from Ngati Oneone is the last remaining matter to address.

Nga mihi,

Sam Morgan
Senior Coastal Consultant

Mobile: 022 126 2514

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APPENDIX 4

Revised Conditions

General Conditions

1. The design of the structures and construction works shall be undertaken in general in accordance with the following documents and material;
   - The Resource Consent Application and AEE Report prepared by 4sight Consulting dated April 2019 (Ref LU 2019-108876-00),
   - The further Information response dated 21 June 2019,
   - The letter dated 5 September 2019 (provision of a consent term),
   - LDE Drawings 'Seawall Renewal 4-8 Tuahine Crescent' Drw 14608 CO1 Sheet 1 and 2, and 14608 CO2 Sheet 1 and 2 ,
   - [Material new/relevant material from hearing]

   unless otherwise amended by the following conditions of consent.

2. The consent holder shall pay the Gisborne District Council any administration, inspection or monitoring charges fixed in accordance with S36(1) of the Resource Management Act 1991.

3. Where a conflict arises between any conditions of this consent and the application, the conditions of this consent will prevail.

4. All works and structures relating to this resource consent shall be designed and constructed to conform to the best engineering practices and at all times maintained to a safe and serviceable standard.

Term of Consent

5. The consent shall expire on **11 April 2042**.

Cultural Protocols Archaeological Site Conditions

6. In the event of any archaeological site, waahi tapu, taonga or koiwi being discovered during the works authorised by this consent, the Consent Holder shall immediately cease work in the immediate vicinity (at least 20m from the site of the discovery)and secure the area. The Consent Holder shall contact the Council to obtain contact details of the relevant hapu and /or marae. The consent holder shall then consult with the appropriate tribal entities and Heritage New Zealand Pouhere Taonga, and appropriate protocols (tikanga) must be observed. If the discovery is of human remains, the New Zealand Police shall also be informed. Works in the area of the discovery shall not recommence until the steps set out above have been followed and commencement of works approved by Council.

Final Wall Design and End Effects

7. At least 1 month prior to the works commencing, final design plans for the revetment wall shall be certified in writing by a suitably qualified and experienced coastal engineer, as being able to appropriately avoid or mitigate potential end effects from the revetment wall on adjoining properties. The final design plans shall be in general accordance with the LDE Drawings 'Seawall Renewal 4-8 Tuahine Crescent' Drw 14608 CO1 Sheet 1 and 2, and 14608 CO2 Sheet 1 and 2 **.** A copy of the certification shall be submitted to the Consents Manager, Gisborne District Council prior to commencement of construction of the revetment wall.

Little Blue Penguin (Kororā) management protocols and plan

8. A survey of the proposed works area shall be undertaken by a suitably experienced and qualified expert to ascertain whether there is any blue penguin habitat within the proposed works area. A survey report shall be submitted to Gisborne District Council at least 2 months prior to construction for certification.

9. In addition to the survey report required by condition 8, the consent holder shall submit a management plan to specifically identify the construction protocols that shall apply for the period of construction works to ensure that any effects on blue penguin habitat are mitigated or avoided. These shall include, but not be limited to;

    - Periods of the year when works should be avoided,
    - Protocols for works within and outside any restricted construction periods,
    - Access pathways to the foreshore for any areas where penguin habitats have been identified within or adjacent to the works area,
    - Provision of additional artificial refuge sites where any existing penguin habitat sites are compromised,

    The management plan shall be submitted to Gisborne District Council at least 2 months prior to construction for certification and all works shall be thereafter undertaken in accordance with the certified plan.

Construction Management Plan (CMP)

10. At least 1 month prior to the works commencing, the Consent Holder shall submit to the Consents Manager, Gisborne District Council, for certification, a Construction Management Plan (CMP) prepared by a suitably qualified and experienced person(s). The purpose of the CMP shall be to outline the environmental management and monitoring measures to be installed prior to and maintained during construction works to maintain compliance with the conditions of this consent and to ensure that any potential adverse environmental effects are

minimised over the period of works. The finalised CMP shall include, but not be limited to the following;

- Compliance with all consent conditions, and specifically conditions 9, and 11 – 21,
- Sediment and erosion control measures and water quality management
- Management and stabilisation of works in relation to tide and weather conditions
- Machinery and truck refueling and maintenance
- Contingency plans
- Stockpile management
- Waste management and disposal
- Vehicle and machinery access management within the coastal marine area
- Public notice information and signage
- Public health and safety measures
- Vigilant attention to weather forecasting to prevent commencing work close to the arrival of coastal storms or extreme weather events, and undertaking construction in discrete stages

11. Prior to commencing any works a copy of this consent and the CMP shall be given to all person(s) undertaking activities authorised by this consent.

12. The Consent Holder may amend the CMP provided under condition 8, by submitting the amended plan to the Consents Manager, Gisborne District Council, for certification. Construction activities subject to the amendment shall not commence until the amendment has been certified by the Manager, Gisborne District Council.

Construction Methodology and Conditions

13. The consent holder shall notify the Gisborne District Council Monitoring and Compliance Team of the intention to begin works at least 3 working days prior to the exercise of this consent. Where works are to be undertaken again having been discontinued for more than seven consecutive working days Council shall be re-notified.

Note: Reporting, notification and submission of records required by conditions of this consent should be directed to **Compliance.Admin@gdc.govt.nz** or (in writing) to the Monitoring, Compliance and Enforcement Manager, Gisborne District Council, PO Box 747, Gisborne 4040, this notification shall include the consent number LU-2019-108876-00.

14. All noise from construction shall comply with the following criteria for long term construction activities at the boundary of any residential site:

Time period	*Average Maximum Noise Level (dBA)*		
	L_{95}	L_{10}	L_{MAX}
Monday – Saturday 0600 – 1800 hours	*60*	*75*	*90*
Monday - Saturday at all other times	*60*	*75*	*90*

Sound levels shall be measured in accordance with New Zealand Standard NZS6801:1999 "Acoustics: Measurements of Environmental Sound" and assessed in accordance with NZS6802:1991 "Assessment of Environmental Sound".

15. All vibration from construction shall comply with the following vibration criteria: The maximum weighted vibration level (Wb or Wd) arising from construction, when measured at or within the boundary of any site, or the notional boundary of any adjacent dwelling shall not exceed the following limits:

General vibration	**Time**	**Maximum Weighted Vibration Level (Wb or Wd)**
	0600- 1800 hours Monday to Saturday	45mm/s^2
Construction Vibration	**Time**	**Maximum Weighted Vibration Level (Wb or Wd)**
	0600-1800 hrs Monday – Saturday	60mm/s2
	At all other times	15mm/s2

16. All vehicles involved in the exercise of this consent shall be inspected daily prior to entering the coastal marine area for leaks or other sources of contaminants. Evidence of this inspection shall be recorded in a log book and shall be made available to the consenting authority on request.

17. Works shall only occur during low tidal conditions, three hours either side of low tide. This time restriction does not apply to planting works landward of the upper extent of the revetment wall.

18. Works shall not cause erosion of the dune face.

19. Sediment may be discharged only in conditions and to a degree that does not visibly alter the turbidity of the sea after reasonable mixing.

20. All waste material shall be removed from the coastal marine area as well as the works area above MHWS and disposed of appropriately.

21. The consent holder shall arrange a site visit during operations to demonstrate compliance with all consent conditions. The site visit shall be attended by representatives of the Gisborne District Council Monitoring and Compliance Team the contractor(s) and consent holder.

22. All maintenance and refuelling activities shall be undertaken outside of the coastal marine area. Refuelling and maintenance to extraction and transport machinery must be carried out off to site to ensure that any contaminants (such as oil, diesel and petrol) used during the exercise of this consent cannot enter any watercourse.

Finished Site Works and Planting Plan

23. At least 1 month prior to the works commencing, the Consent Holder shall submit to the Consents Manager, Gisborne District Council, for certification, a Finished Site Works and Planting Plan which shall;
    (i) Be in general accordance with the 4Sight Visual and Landscape Assessment dated April 2019,
    (ii) Provide details of landscape and stabilisation planting/works to be completed along the top of the rock armour and the proposed work areas and the timeframe for when the works shall be completed,
    (ii) Provide measures to rehabilitate any areas within the CMA which have been affected by the construction works including all access routes to and along the CMA,
    (ii) Provide details of ongoing maintenance of any landscape and stabilisation planting/works which shall be undertaken during the term of the consent.

24. The Consent Holder shall be responsible for undertaking the approved planting and rehabilitation works within the timeframes set out in the finalised Finished Site Works and Planting Plan and thereafter shall maintain the site and works for the term of the consent.

Recording and Notifications

25. A daily photographic record of the proposed work sites shall be taken prior to, during the works and at completion showing work progress and control measures. These photos shall be provided regularly to the consent authority throughout the works.

Expiry of Consent/Decommissioning of Works

26. At least 1 year prior to the expiry of the consent, the consent holder shall provide details to the Consents Manager, Gisborne District Council that set out the consent holder's intention with regards to;

    - Whether a reconsenting process will be commenced to provide for the retention of the revetment wall,

- If a reconsenting process is not proposed, the consenting process and proposed works which will be undertaken to decommission the works approved under this consent,
- If a reconsenting process is not proposed, what structures or final escarpment profile is proposed with an assessment of how this will respond to on-going coastal erosion processes.