

Invitation for Comment on Te Ara Tupua – Ngauranga to Petone Shared Path at Ngauranga to Petone.

The Te Ara Tupua – Ngauranga to Petone Shared Path is a Listed Project under the COVID-19 Recovery (Fast-track Consenting) Act 2020

Application Name:	Te Ara Tupua – Ngauranga to Petone Shared Path
EPA Reference:	FTC000001
Applicant:	New Zealand Transport Agency
Comments due by:	11 December 2020
Accessing the application:	The full application and supporting documents can be viewed on the EPA website, which can be accessed here: https://www.epa.govt.nz/fast-track-consenting/listed-projects/te-ara-tupua/

An application for resource consents and notices of requirement has been made by New Zealand Transport Agency under the COVID-19 Recovery (Fast-track Consenting) Act 2020 for Te Ara Tupua – Ngauranga to Petone shared path.

To comment on the Te Ara Tupua application and notices of requirement using the form below, please fill in the details and:

- **Email** the form to tearatupuafasttrack@epa.govt.nz. *Please mark in the subject line: “Comments on Te Ara Tupua – Ngauranga to Petone Shared Path” (Your name/organisation) by 11 December 2020; or*
- **Post** the form to Te Ara Tupua – Ngauranga to Petone Shared Path, Environmental Protection Authority, Private Bag 63002, Waterloo Quay, Wellington 6140 in time for the form to be received by the 11 December 2020; or
- **Deliver in person** to Environmental Protection Authority, Grant Thornton House, Level 10, 215 Lambton Quay, Wellington by 11 December 2020. *Please note that due to potential changes in COVID-19 Alert Levels our reception may not be open to the public. We suggest phoning ahead to check.*

Comments must be received by the EPA, on behalf of the Te Ara Tupua – Ngauranga to Petone Expert Consenting Panel, no later than 11 December 2020.

If your comment is not received by the EPA by 11 December 2020 the Panel is not required to consider your comment (although it may decide to). Under the COVID-19 Recovery (Fast-track Consenting) Act 2020 there is no right to seek a waiver of the time limit.

If you are an iwi authority you may share the consent application with hapū whose rohe is in the project area in the application, and choose to include comments from the hapū with any comments you may wish to provide.

Important information

Your personal information will be held by the EPA and used in relation to the Te Ara Tupua – Ngauranga to Petone shared path consent application and notices of requirement process. You have the right to access and correct personal information held by the EPA.

A copy of your comments, including all personal information, will be provided to the Expert Consenting Panel and the applicant.

All comments received on the application will be available on the EPA website.

If you are a corporate entity making comments on this application, your full contact details will be publicly available. For individuals, your name will be publicly available but your contact details (phone number, address, and email) will not be publicly available.

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More information on the fast-track consenting process can be found at <https://www.epa.govt.nz/fast-track-consenting/about/>.

Comment on the Te Ara Tupua – Ngauranga to Petone shared path Fast Track Application

1. Contact Details

Please ensure that you have authority to comment on the application on behalf of those named on this form.

Organisation name (if relevant):	Director-General of Conservation		
First name:*	Deavoll		
Last name:*	Geoff		
Postal address:	Private Bag 3072 Hamilton 3240		
Home phone / Mobile phone*:	0275367020	Work phone*:	0275367020
Email*: (A valid email address enables us to communicate efficiently with you)	gdeavoll@doc.govt.nz		

All sections of this form with an asterisk (*) are mandatory.

2. We will email you draft conditions of consent/notices of requirement for your comment.*

<input checked="" type="checkbox"/>	I can receive emails and my email address is correct	<input checked="" type="checkbox"/>	
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3. Please provide your comments on the Te Ara Tupua – Ngauranga to Petone shared path Application

If you need more space, please attach additional pages. Please include your name, page numbers and Te Ara Tupua Application on the additional pages

Acknowledgement

1. I would like to acknowledge Waka Kotahi – NZTA for their active engagement with Te Papa Atawhai – DOC throughout the development of this proposal. The applicant has shared information, made its experts available, and assisted DOC in developing its understanding of this activity and its effects on conservation values. The provision of draft ecological assessments and the numerous workshops on compensation and offsetting were all useful exercises. The opportunity to be involved and consulted is appreciated.
2. I also acknowledge that this proposal will actively contribute to encouraging a mode shift from vehicle traffic to walking and cycling. This shift will contribute to a reduction in emissions toward New Zealand’s 2050 target of net-zero greenhouse gas emissions.

Avifauna

3. The use of penguin detection dogs is supported. The project site is likely to provide nesting and moulting habitat for penguins which may be potentially affected. The applicant has proposed conditions of consent requiring the use of penguin detector dogs in the event any works are to be undertaken outside of confirmed penguin habitat, once it is confirmed penguins are not present. This must occur prior to the various construction phases. Ideally the during the early stages of the breeding season. I am supportive of the seasonal restriction timing. Works to occur outside penguin breeding season – April to June is supported. Birds are active in nests from July to January and moult from Jan to March. Breeding birds cannot be moved while moulting birds can be moved.
4. I support the enhancement of coastal habitat through planting to improve penguin habitat as well as the inclusion of penguin nest boxes. The requirement to consult with DOC on the placement and location of these boxes is supported. I support the requirement to stop works if nesting penguins or oyster catchers are found within the construction area – if necessary, works can proceed around nesting birds so long as a buffer of 20m radius is maintained.
5. It is preferable for dogs to be prohibited from accessing this pathway due to the significant avifauna values and because of how vulnerable penguins and nesting birds are to predation by dogs. I therefore also support a requirement for all dogs to be on leads. This is essential for wildlife welfare, not only for penguins and shore birds but fur seals and their pups. Condition EM7 states that “best endeavours” shall be used to establish a legal mechanism for the enforcement of this requirement. I consider that an actual confirmation of such a legal mechanism would be preferable to simply “best endeavours” as this is uncertain and difficult to enforce by the Council.
6. I support the avoidance measures proposed to avoid avifauna habitat and the use of ecological screening and plantings to protect sensitive shore bird habitat from disturbance by the public. I also support the use of lighting pointing downward and lighting being minimised to greatly reduce light pollution for seabirds – this is imperative for fluttering shearwater and other species that can be attracted to lights.
7. Notwithstanding the effects on marine ecology underneath the offshore habitat, I support the use of offshore rock islands for secure roosting habitat for shorebirds and seals at high tide – the placement opposite the best beach habitat for quick and close refuge if disturbed is supported. The construction of these platforms prior to the main pathway construction

is also supported as this will allow any disturbed avifauna to relocate to the already established roosting habitat.

8. The proposed predator control programme for the life of the project is supported. This is very important to protect the likely increase of wildlife that the enhanced habitat will attract. Without this the gains would be limited in duration. The installation of rubbish bins is supported. I recommend that at least four bins should be provided for across the length of the proposal rather than just one at each end. This is very important as food waste will attract predators and limit pest control efforts. It will also increase scavenging black backed gull numbers which will cause issues for other shore birds through dominant behaviour.
9. The proposed tall poles incorporated into the ūranga designs for shags and gulls are a good approach for shags, however black back gulls will likely dominate usage and use these vantage point to intimidate and deter use by other coastal birds such as terns.

Herpetofauna and Lizards

10. No surveys for herpetofauna were conducted for health and safety and access reasons, but the Bioweb database was consulted.
11. It is noted that the existing environment is highly modified, however the rock and boulder material which constitutes the existing foreshore is likely to provide quality lizard habitat. Based on recent experiences involving the cycleway constructed at Cobham Drive in very similar habitat that has likely undergone historical modification during road and rail construction. Despite this, that site had some of the higher densities of grass skinks in Wellington (several hundred animals salvaged). There are records of herpetofauna and Raukawa geckos and northern grass skink nearby along this stretch of coast, but not recorded along the coastal strip in question (but there was also no records from Cobham drive despite the very high densities and far more regular usage by commuters). There is a relatively recent Raukawa gecko sighting at Ngauranga Gorge (within c.100-200 of the proposal), and grass skink along the Petone foreshore. The habitat, although artificial is very suitable, and the rail corridor and associated gravels are known refuges at other sites.
12. Notwithstanding this, I consider that the application has appropriately considered the effects on herpetofauna, being mortality and permanent habitat loss during development. I also agree that salvage and translocation of species is appropriate mitigation. However, I have recommended an amendment to the proposed conditions to ensure that salvaging is required across the entire project site – given the significant success in previous projects, and not just limited to certain areas,

Marine Ecology

13. This Project reaches across four categories of ecological environments and habitats which have distinct (but overlapping) ecological values. These are terrestrial, marine, freshwater and avifauna. [AEE p 212]
14. This section contains a summary of information about the marine environment taken from reports prepared for this Project and other sources.
15. I agree with s5.5 of the Ecological Assessment (EA) in Technical Report 9 (TR9), that the proposed cycleway site contains a mosaic of several marine habitat types. These include rocky reefs, cobbles, gravel, sand and shingle beaches (n.b. beaches with gravel, sand,

shingle and cobbles are generally called ‘*shingle beaches*’ and will be referred to that way where possible for simplicity and to avoid repetition). The four main habitats are intertidal (between low and high tide) and subtidal (below low tide) and include hard- and soft-sediment shore types (rocky intertidal, rocky subtidal, soft intertidal, soft subtidal). I agree that due to previous reclamations in the Project area some of the area is modified and some of the hard shore material is artificial. Plants found in the Project area included algae of varying sizes, including macroalgae (some up to 1.5 m tall). Animals found in the Project area that live in and on the seafloor included barnacles, anemones, mussels, sponges, sea squirts, worms, shellfish and snails (fish were not included because they are mobile).

16. Section 5.5.1 of the Ecological Assessment states: “The following marine habitats are present within or adjacent to the Project and identified in the respective schedules of the PNRP (Greater Wellington Regional Council, 2019):
- Korokoro Estuary (Schedule F4: Sites of significant indigenous biodiversity values in the coastal marine area (refer to Map 6).
 - Seal haul outs (Schedule F5: Habitats with significant indigenous biodiversity values in the coastal marine areas).
 - Macroalgae (Schedule F5: Habitats with significant indigenous biodiversity values in the coastal marine areas); and
 - Subtidal rocky reefs (Schedule F5: Habitats with significant indigenous biodiversity values in the coastal marine areas).

Artificial substrate

17. Life in the sea (especially at the coast) is affected by substrate (what it can live in/on). I agree the shoreline in the Project area has been modified several times since the late 1800's to create transport pathways. This includes natural uplift during an earthquake in 1855 and several phases of artificial reclamation, most of which happened between the late 1800's to mid-1950's. I agree this means some of the marine substrate that forms the rocky shore (intertidal and subtidal) in the project area is artificial (e.g., construction rubble).
18. However a modified environment does not necessarily mean low ecological value. In fact, artificial hard substrates are sometimes added to increase biodiversity (e.g., artificial reefs or living seawalls). The Project site is a good example of this, because the plants and animals living on the mix of artificial and natural hard seafloor substrates within the Project footprint have had enough time (decades) to establish communities, such as those recognised in the GWRC PNRP (Schedule F5) as significant indigenous biodiversity (macroalgae and rocky reef).

Values – rocky intertidal shore

19. The results in the EA (TR9) are consistent with what I would expect given the methodology for plants and animals living on the rocky intertidal shore considering the methods used (quadrats). Only epifauna (animals on the surface) were measured; infauna (animals living in the substrate) were not measured.
20. I see TR9 states different methods were used for the Eastern Bays shared pathway intertidal rocky shore survey, which included sampling infauna. That resulted a higher

number of taxa being found in the Eastern Bays, including cryptic species. I would suggest that by not sampling the infauna of intertidal rocky shores in the Project area, some species were not recorded and that additional sampling may result in greater accuracy and perhaps a change in the assessment of effects on marine ecological values. This may be important as some of these beaches may be considered single beaches (they are described as 'rocky, cobble') and they may be for the threatened *Smeagol climoi* (a rare marine slug, or gravel maggot).

Values – rocky subtidal shore

21. The results in the EA are consistent with what I would expect given the methodology for animals living on the rocky subtidal seafloor considering the methods used (transects). Only epifauna (animals on the surface) were measured; infauna (animals living in the substrate) were not measured.
22. The EA briefly described nine species of macroalgae in terms of percentage cover along and across the shore (Figures 15 and 16) but it did not describe the value of the habitat. The Project site is an area that the GWRC PNRP (F4 and F5) mentions, stating macroalgae and rocky reefs are "*habitats with significant indigenous biodiversity values in the coastal marine areas*". I would suggest the value of this habitat has not been fully described in the EA. For example, it is not mentioned that macroalgae can provide important habitat or refuge for other plants and animals, creating three-dimensional structure and thus a richer ecosystem. The EA report showed there were more types of plants and animals nearer the shore than offshore (where there was rockier substrate).
23. I would also emphasise the comment that water clarity is better at the south end of the site (further away from the Hutt River; n.b.,

Values – soft intertidal shores

24. The results in the EA (TR9) are consistent with what I would expect given the methodology for soft intertidal shores considering the method used (benthic core).
25. My concern is that soft sediment habitats were described in EA as "*a mosaic of boulders, cobbles, shingle beach, gravel and sand*". But cores were only taken in the finest sediment available, usually gravel or sand. This means there was no sampling of infauna (animals) that may live among the shingle and other larger stones, which make up a large proportion of the intertidal habitat. That is because it is not possible to sample the animals living in shingle beaches using the benthic core method; the shingle is too large and requires a different sampling method. This means information about life in the shingle beaches was not collected (see section on shingle beaches below for more information).

Values – soft subtidal shores

26. The results are consistent with what I would expect given the methodology for soft subtidal shores considering the methods used.

Values – shingle beaches

27. Shingle beaches have not been clearly defined in the EA however the Landcare website states they are "*comprised primarily of a mixture of sand, water-smoothed gravel (>50%,*

particles 2-64 mm), and cobbles". Terrestrial shingle beaches are a threatened¹ and naturally rare ecosystem². The terrestrial back beach component of shingle beaches (i.e. the part above MHWS) is threatened but the component below MHWS is not. Therefore, 600m² of threatened and naturally rare shingle beach will be affected by the project footprint. However it is noted that much of the route is on or adjacent to reclaimed land, and therefore terrestrial geomorphology is largely artificial.

28. Marine ecology values for shingle beaches are not well described in the EA report because they were not well sampled in either the soft or rocky shore methods. Only epifauna (animals living on the surface) were measured during the rocky intertidal survey. Only sand and gravel were cored in the soft intertidal survey. There was no assessment of animals living within the larger parts of the substrate (cobbles) for shingle beaches. This leaves a gap in knowledge around infauna in shingle beaches. Shingle beaches are noted in as an important foraging habitat for sea/shore birds, but there are no details on what the birds were eating (potentially marine infauna).
29. As mentioned in the rocky intertidal section above, TR 9 notes a different method was used at the Eastern Bays cycleway for this habitat type that did sample infauna and more taxa were found.
30. Smeagol *climoi* is a nationally critical threatened species known only from one small location near Houghton Bay on Wellington's south coast. A related species *S. manningi* is only known from Kaikoura Peninsula. Their biology is poorly known.
31. These slug-like pulmonate molluscs live in shingle on the upper intertidal at or just below the high tide line, preferring well-sorted gravel with low proportions of sand or finer sediments. *S. climoi* is very small (<10mm) and lives up to 30 cm below the surface, meaning this species is easily missed using standard shoreline survey techniques. The Houghton Bay location is very exposed, with a mix of shingle and small cobbles that is unstable and readily moved by wave action during spring tides and especially storm events.
32. In contrast, the intertidal shingle beaches along the proposed cycleway are relatively sheltered and will presumably be influenced by finer sediments and freshwater input from the Hutt River. Thus, while it is possible *S. climoi* may be present along this coast, given this species' apparent very specific habitat requirements and the very different environmental conditions in the harbour compared to the South Coast, the likelihood of *S. climoi* occurring there is considered very low, but cannot be completely discounted.

Values – marine ecology - summary

33. The marine ecology habitat is a complex mosaic of substrates and habitats and is quite variable in quality. From the available information most of the marine ecology value in the Project site appears to be nearer the shore, especially in the subtidal rocky shore area. For example, within 10 m of the shore they found (i) most abundant and rich rocky reef

¹ (Williams, P. A., Wiser, S., Clarkson, B. and Stanley, M. C. 2007. New Zealand's historically rare terrestrial ecosystems set in a physical and physiognomic framework. *New Zealand Journal of Ecology* 31:119–128

² Holdaway, R.J., Wiser, S.K. and Williams, P.A. 2012. Status Assessment of New Zealand's Naturally Uncommon Ecosystems. *Conservation Biology*, Volume 26, No. 4, p 619-629.

- mobile fauna, (ii) most species of macroalgae, and (iii) high diversity index (~2.5) for subtidal soft sediment infauna.
34. This area has artificial and natural substrate (including shingle) with macroalgae beds, which are significant in the PNRP and provide structure, habitat and refuge for other plants and animals.
 35. All results in the EA are by distance from shore or distance along the shore; there is limited information about ecology in relation to depth. At the Project site the seabed slope is steeper at the south end (Nga Ūranga) where it drops quickly to 15m depth at 60m offshore, whereas at the north end (Pito-One) it slopes gently to 5m depth at 140m offshore. Most of the rocky subtidal substrate (larger cobbles and boulders) is nearer the shore; at the south end (where it is steeper) this is closer to the shore, at the north end it extends up to 50 m offshore. This is where most of the plant and animal habitat and life is found. Further offshore the seabed becomes less rocky (smaller cobbles) and more silty/sandy.
 36. Sampling of most of the marine environment was sufficient to understand the ecological values, however the infauna of shingle beaches was not sampled.
 37. I agree with the EA (TR 9) to assess marine values (excluding Pito-One and Korokoro Estuary) as an overall single feature, taking the highest value from each habitat, meaning the marine ecological values are 'high'. I also agree with the AEE overall classification of "high value marine ecosystems".

Freshwater values and effects

38. There are six streams along the pathway:
 - Korokoro Stream – has good freshwater habitat, a freshwater fish community that includes 10 native species (five of these 'At Risk, Declining'), plus kōura (freshwater crayfish) and brown trout. Listed in the Greater Wellington Plan as having significant indigenous ecosystems (habitat for threatened, at risk and migratory freshwater fish)
 - Waihinahina/Horokiwi Stream and Gilbert Bush Stream – both have likely good habitat in their headwater reaches (including for macroinvertebrates), but are highly modified in the lower-mid reaches. This impacts both habitat availability and quality, and fish passage. No fish have been recorded during fish surveys in either stream.
 - Three unnamed streams – all small, steep coastal streams. There haven't been fish surveys in any of these streams. The ecological assessment concludes that there are unlikely to be fish present as the streams are likely to have ephemeral headwaters, and to be intermittent with small flows in the main stems; though notes that banded kōkopu and kōaro are possible in one of the streams. I would note that native fish are often found in some very unlikely habitats (e.g. very small streams, and sometimes isolated pools within streams), so if fish passage through the culverts under SH2 is provided, then these streams could provide habitat for freshwater fish, as well as macroinvertebrates – so do consider them to have freshwater value.
39. As regards instream effects from sediment – other than Korokoro Stream, all works will be right near the stream outlets, where the streams are already culverted, so effects from sediment run-off etc. into the stream are unlikely. However, the sediment control measures in place to reduce run-off to the marine environment will be of benefit for any freshwater impacts that might occur. The works proposed at Korokoro Stream are

- restricted to an upgrade of the existing bridge, with no works in the bed of the stream or on the banks. The sediment control and construction measures (e.g. relating to equipment refuelling) should manage any discharges that may otherwise have potential to adversely affect Korokoro Stream.
40. As regards instream effects from the construction of culverts – the construction methods proposed (diversion of stream flow while culverts are constructed, etc.) are appropriate to manage instream effects in these waterways.
 41. In terms of fish passage – proposed condition EM.4 requires all stream culvert extensions to be designed in accordance with the NZ Fish Passage Guidelines, and is positive. Although the AEE concludes that the streams are unlikely to provide habitat for freshwater fish, anything that increases freshwater habitat or fish access to the streams is beneficial – especially noting that even very small streams can provide good habitat for freshwater fish.
 42. I note that Korokoro Estuary and Pito-One beach have been addressed in a separate part of the EA. The estuary is a mixture of freshwater and marine habitats and contains values like spawning habitat for freshwater native fish. Project values stated in s3.3 (p.47) and Attachment C (Te Ara Tupua Kaitiaki Principles) of the AEE include a ‘mountains to sea’ approach, articulated as: *“Wai Tai, Wai Māori: Ngā wai tuku kiri tai noa atu ki Hinemoana – the connection between the freshwater springs, streams, aquifers, rivers and all waterways that bring with them their life, mouri and mana which eventually mingles together with Hinemoana”*.
 43. I do not agree with the ecological value of Korokoro Estuary and intertidal Pito-One foreshore being assessed as **Low** as stated on p73 of the EA. (TR9). Figure 1 below is Photo 5 from TR9. On the left side is Pito-One beach and on the right is the the entrance to Korokoro estuary. These are very different habitats and I would suggest they are treated separately. Pito-One foreshore is a sand-gravel beach exposed to the harbour. The estuary is more sheltered and is a space where freshwater and marine come together and mix (with a very different salinity from the harbour). The estuary is also part of a valuable continuum that creates habitat for freshwater species that migrate from the stream to the sea as part of their lifecycle.

Table 1: Photo 5 from TR9. On the left side is Pito-One beach and on the right is the the entrance to Korokoro estuary



44. Although it is in an industrialised area, Korokoro Estuary is listed in Schedule F4 of the PNRP is a site of significant indigenous biodiversity value in the coastal marine area. Refer to the freshwater section of this report for more information about ecological values, some of which relate to the estuary (e.g., the Korokoro Stream mouth is a spawning habitat for inanga, it is listed as a river with significant indigenous ecosystems in Schedule F1 of GWRC PNRP, it has diverse and At Risk fish species (some of which migrate to or live in the sea as part of their lifecycle) and it's ecological value is considered to be Very High in the Project EA (TR 9)).

Effects on the marine environment

45. I agree with the list of potential construction and operational phase effects as listed in s8.5 on p.106 of the EA. I also agree that at the scale of the Project footprint, the permanent loss of 4.8 ha of marine habitat is a **High** magnitude of effect (Table 5) and in combination with overall High ecological values (Table 18), the level of the effect is **Very High**.

Magnitude of effect on the marine environment

46. Construction of the cycleway would result in permanent occupation and habitat loss in the CMA as a result of the project footprint (4.8 hectares).
47. An important part of the assessment is to determine the proportion of habitat within the Project footprint compared to similar habitat in Wellington harbour. This information is used with EIANZ Guidelines in the Ecological Assessment as part of the effects management hierarchy to calculate the proportion of habitat lost due to the Project at the Wellington Harbour scale, which then determines the amount of offsetting or compensation required.
48. During initial consultation the Project footprint (4.84 ha) was compared to the whole harbour (89 km²), giving a result 0.05% of the whole harbour. When the EIANZ Guidelines and effect management hierarchy were applied this resulted in a **Negligible** magnitude of effect (Table 5) and **Very Low** effect from permanent loss of marine habitat (Table 6). At the stakeholder workshops, Department of Conservation staff noted that the whole harbour is not the same habitat as the Project footprint (it is much deeper and sandier). We requested the area be compared to similar habitat and recalculated. The Project footprint (4.84 ha) was then compared to all the Wellington shoreline from MHWS to the 5 m contour (1070.8 ha), giving a result of 0.45%. Using EIANZ Guidelines and "effect management hierarchy" this resulted in a revised **Low** magnitude of effect (Table 5) and **Low** effect from permanent loss of marine habitat (Table 6). This recalculation resulted in a change in magnitude of effect from **Very Low** to **Low**, but in my opinion I still do not think it is accurate because I do not think the correct habitat is been assessed.
49. In my opinion, the information around the proportion of Wellington Harbour that is similar habitat to what will be lost due to the Project is not yet adequate and needs to be reassessed. For example, the 5 m contour includes the Eastbourne Platform which is a very large area near the mouth of the harbour that is sandy³, which means it is not similar habitat. A more comparable habitat would be rocky reefs and coarse sediments (boulders, cobbles, gravel and sand) because those are the habitats found at the Project site,

³ Lionel Carter (1977) Sand transport, Wellington Harbour entrance, New Zealand, New Zealand Journal of Geology and Geophysics, 20:2, 335-351, DOI: 10.1080/00288306.1977.10420711

including 'significant' ones according to the GWRC PNRP. Once the amount of similar habitat within Wellington Harbour is determined, the proportion lost within the Project footprint needs to be recalculated and the EIANZ Guidelines and effects management hierarchy need to be reapplied.

National Policy Statement for Freshwater Management 2020

50. I am satisfied that the proposal gives effect to the requirements of the National Policy Statement for Freshwater Management 2020. Firstly, the only in stream works proposed are to extend several culverts which are already diverting water underneath both State Highway 2 and the rail line. The conditions of consent require that the outfalls are designed in accordance with New Zealand Fish Passage Guidelines April 2018 which I support.

New Zealand Coastal Policy Statement 2010

51. The following section sets out a brief assessment of the application against the objectives and policies of the NZCPS. A statutory assessment against the provisions of the NZCPS is provided at section 26.2.1.1 of the Assessment of Environmental Effects ('AEE'). For brevity, where I agree with the assessments I will refer to and adopt parts of the AEE otherwise outlining where I disagree with the conclusions reached.

Te Tiriti O Waitangi [Objective 3 and Policy 2]

52. These provisions set out how the principles of Te Tiriti o Waitangi and kaitiakitanga are to be taken into account. Based on the applicant's cultural impact assessment, the applicant seeks to restore some of the lost cultural connections with this area which have been eroded over time through colonisation, including reclamations, development of infrastructure (railway and state highway) and the natural erosion of the project corridor. The applicant has proposed a suite of cultural mitigation measures and opportunities in an attempt to assist mana whenua with their cultural and physical aspirations for the area which I support and consider is consistent with the NZCPS.

Natural Character [Objective 2, and Policies 13, 14, and 15]

53. Overall, I agree with the applicant's assessment that the proposal gives effect to these provisions. I do however note that the shingle beaches and macro algae rocky reefs and outcrops are a key biotic element of the character and landscape values of the site. One area of tension however where I disagree with the applicant is with their statement that the adverse effects on these features have been appropriately avoided, remedied, and mitigated. This is discussed further above in these comments.

Public Open Space and Walking Access [Objective 4 and Policies 18, 19 and 20]

54. I agree with the AEE that the proposal will provide much greater interconnectivity, public access, and open this currently inaccessible area to the public which will provide significant benefits to the community. I agree that the proposal is consistent with and finds support from these policies

Coastal Hazards [Objective 5 and Policies 24, 25, 26 and 27]

55. I agree with the AEE assessment that the proposal is consistent with these provisions of the NZCPS.

Coastal Environment [Objective 1 and Policies 1, 3 and 4]

56. Overall, I agree with the AEE assessment that the proposal is consistent with these provisions of the NZCPS. However, and as noted before, the permanent loss of significant natural ecosystems in my opinion does not fully align with the need for use and development to sustain and protecting the ecosystems of the coastal environment.

Use and Development [Objective 6 and Policy 6]

57. I agree with the AEE assessment that the proposal is consistent with and finds support from these provisions.

Land held under other acts [Policy 5]

58. I agree with the AEE assessment that the proposal is consistent with Policy 5 in respect of the Honiana Te Puni Reserve.

Water Quality [Objective 1 and Policies 21, 22, and 23]

59. I agree with the AEE assessment that the proposal is consistent with these provisions of the NZCPS, in particular the proposed treatment of stormwater, while not necessarily additional to the requirements of the PNRP or of a significant scale in proportion to the loss, will still be of benefit to an area with reduced water quality.

Heritage [Objective 6 and Policy 17]

60. I agree with the AEE assessment that the proposal is consistent with these provisions of the NZCPS.

Indigenous Biological Diversity [Policy 11]

61. Page 297 of the AEE considers the proposal in light of Policy 11 of the NZCPS. The applicant correctly states that in respect of Policy 11(a) there is a requirement to avoid effects on certain indigenous biodiversity. I agree with their assessment that avoidance of effects is required for the following biodiversity values due to their presence within the project footprint:

- Shingle beaches (threatened and naturally rare ecosystem – Policy 11(a)(iii))
- Caspian tern and reef heron (threatened species – 11(a)(i))
- Black shag, pied shag, little black shag, little penguin, white-fronted tern, variable oystercatcher and the red billed gull (at risk species – 11(a)(i))

62. The ecological values of shingle beaches are discussed elsewhere in these comments, in this section I discuss them in the context of the requirement to ‘avoid’ effects. 600m² of threatened and naturally rare shingle beaches fall within the project footprint. It is noted that originally the proposal was to have revetments along its entire length, however upon discovering the shingle beaches and their value as a threatened ecosystem type, the proposal was redesigned to use a combination of vertical seawalls and groynes in an attempt to avoid the shingle beaches . The applicant states that:

“This design change not only largely avoids the direct loss of those shingle beaches...” [emphasis added]

63. Potential impacts of the proposal include the permanent loss of shingle beaches under the footprint of the vertical seawall, groyne structures, and mortality of any infauna species

during beach nourishment. An area of approximately 600m² of shingle beach is located under the construction footprint. The applicant also proposes to construct rock groynes on these shingle beaches. It is unclear from the assessment how the placement of groyne structures will impact these shingle beaches and the extent of any adverse effects on this ecosystem. It is also possible that beach nourishment of the shingle beaches may have adverse effects on the biodiversity values of the beaches themselves. This is not addressed in the application material.

64. The applicant's ecological assessment states:

“Efforts were made to minimise the area of marine habitat lost to the Project and to avoid higher value area of marine habitat (e.g. rocky reefs and shingle beaches)”

65. I acknowledge that the applicant anticipates long term benefits through beach nourishment and resilience from climate change and (notwithstanding the potential method and limits to nourishment) I support these measures. I also support the re-design which changed the revetment to the seawall structure and the relocation of the switching station, however in my opinion the permanent loss of 600m² of an threatened and naturally rare ecosystem does not constitute an avoidance of effects as required by Policy 11(a) of the NZCPS. This inconsistency is somewhat reduced by the long-term positive benefits of beach replenishment and nourishment. The ecological values of these shingle beaches are discussed at paragraphs 27-32 of these comments.

66. In terms of NZCPS Policy 11(b) I agree with the applicant's assessment of the relevant biodiversity values which are relevant from a policy perspective due to their presence within the project footprint. These values include:

- Macroalgae/cobble/reef habitat (rocky reef ecosystems (11(b)(iii));
- Nesting habitat for variable oyster catcher, black-backed gull, and little penguins (11(b)(ii)); and
- The Korokoro Stream provides migratory habitat for Inanga, tuna, giant kokopu, koaro, banded kokopu, bluegill and redfin bully, and common smelt (11(b)(v))

67. The applicant states that the project has achieved the avoidance of effects, avoidance of significant effects, and avoidance, remediation, and mitigation of other potential effects. I do acknowledge the significant efforts the applicant has made in their design and ecological mitigation measures including:

- Pest control, nesting boxes, six-monthly rubbish clean-ups, seasonal construction conditions and protocols, habitat creation, and screening to protect avifauna.
- Regular rubbish clean-ups
- Lizard salvaging

68. As noted at paragraphs 46 - 49 above, the applicant has not provided adequate information to assess the effects of the proposal at the harbour scale. Once this information is provided, the actual and comparable proportion of the harbour affected by the proposal can be assessed to determine the magnitude of effect. In my opinion the

panel should seek this information to be satisfied that the effects on rocky reef systems are not 'significant' as required by NZCPS Policy 11(b).

Reclamation and de-reclamation [Policy 10]

69. Policy 10(1) of the NZCPS sets out the specific circumstances in which reclamation of land in the coastal marine area is appropriate. These effectively act as a gateway test and a reclamation should be avoided (not occur) if the tests are not met. Policy 10(2) sets out a range of considerations for the design of appropriate reclamations, and Policy 10(3) requires that decision makers have regard to the extent to which the proposed reclamation would provide for the efficient use of infrastructure. Policy 10(4) encourages de-reclamation.
70. The application assesses the proposal against these policy requirements and finds that overall, the proposal meets the gateway test for reclamation, is designed appropriately, and finds support from Policy 10(3) in that if granted, it will directly provide for safe and efficient operation of cycling, walking, and emergency infrastructure, as well as protect the roading and rail infrastructure.
71. The process for selecting the site, the business case, shortlisting, and multi-criteria analysis which the proposal underwent likely represent a considerable amount of analysis of the appropriateness of this site, and the need for reclamation. In my opinion the availability, appropriateness, feasibility, and practicality of landward options were adequately considered as a part of this process. The significant constraints on the landward options would result in considerable hazard risk, ecological impacts, natural character impacts, and potential geotechnical and infrastructure issues. I consider that these constraints make the landward options non-practicable. I agree that the benefits of the reclamation will be regionally significant. Overall, I agree with the assessment that the proposal passes the NZCPS Policy 10(1) gateway tests. I also agree that the design of the reclamation applicant has had particular regard to climate change and sea level rise, the compatibility of the reclamation with the existing shoreline, public access, tangata whenua and cultural impacts and landscape, and natural hazards. In regards to Policy 10(2)(e) I consider that the ability to remedy or mitigate adverse effects on the coastal environment has been considered, but that the significant residual effects on significant marine biodiversity and ecosystems has not been appropriately 'remedied or mitigated'. I acknowledge the efforts the applicant has taken to attempt to mitigate effects on marine ecology, however the significance of the residual impacts in my opinion is a key consideration in whether this reclamation is appropriate. Notwithstanding the significance of the effects, I consider that the proposal is largely consistent with, and finds support from Policy 10 of the NZCPS.

Compensation and Offsetting

72. The applicant has proposed compensation and offsetting measures to attempt to address the significant residual effects of the proposal on marine ecology as part of following the effects management hierarchy. The appropriateness and adequacy of the proposed offsetting and compensation package has been considered and commented on below.

Offsetting and compensation under the Greater Wellington Proposed Natural Resources Plan

73. Policy 32 of the PNRP is directly relevant for the management of effects on biodiversity. The applicant notes that their ecological mitigation and offsetting was guided by the principles in this policy.

“Adverse effects on biodiversity, aquatic ecosystem health and mahinga kai shall be managed by:

- *avoiding significant adverse effects, and*
- *where significant adverse effects cannot be avoided, minimising them, and*
- *where significant adverse effects cannot be avoided and/or minimised they are remedied, and*
- *where significant residual adverse effects remain, it is appropriate to consider the use of biodiversity offsets. Proposals for biodiversity mitigation and biodiversity offsetting will be assessed against the principles listed in Schedule G1 (biodiversity mitigation) and Schedule G2 (biodiversity offsetting).*

74. Schedule G2 sets out the framework for the use of biodiversity offsets, and is currently under appeal by Meridian Energy Ltd, NZ Transport Agency, and Wellington Water Ltd. This framework builds on and implements some of the best practice offsetting principles listed earlier in these comments. There is currently no guidance or framework in the plan for the use of biodiversity compensation. I agree with the applicant’s approach in terms of considering the appropriateness of biodiversity compensation in light of the draft NPS-IB, and the Local Government Guidance, given the lack of guidance in the PNRP.

Compensation vs. Biodiversity Offsetting

75. Environmental compensation is designed to compensate for losses but is not designed to demonstrate a no-net-loss outcome, and therefore is not required to fully account for and balance losses and gains. It is typically a more subjective process than biodiversity offsetting.

76. Biodiversity offsetting is based on a series of widely accepted principles (listed below) that illustrate the level of rigour required which differentiates it from environmental compensation. It is this rigorous process and the objective, quantified evaluation resulting in a measurable no net loss outcome which makes biodiversity offsetting a preferable option to environmental compensation.

Principles of offsetting (and good practice compensation)

77. What differentiates biodiversity offsetting from other forms of impact management is that it requires:

- The mitigation hierarchy to be followed. For example, any predicted biodiversity impacts must first be avoided, minimised and rehabilitated on-site, before any remaining significant residual effects are considered for offsetting;

- explicit measurement and quantitative balancing of biodiversity predicted to be lost and gained; and
- a goal of no net loss and, preferably, a net gain of biodiversity to be reasonably demonstrated and then achieved.

78. The Business and Biodiversity Offsets Programme (**BBOP**) developed ten principles that are expected to be met for a project to be considered a biodiversity offset. The principles underpin offset design and implementation and provide the foundation for expected outcomes from a biodiversity offset. They recognise both ecological equivalence and social interest in biodiversity and acknowledge that societal wellbeing is eroded when biodiversity is lost.

- adherence to the mitigation hierarchy: a biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the mitigation hierarchy;
- limits to what can be offset: there are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected;
- landscape context: a biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach;
- no net loss: a biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity;
- additional conservation outcomes: a biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations;
- stakeholder participation: in areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring;
- equity: a biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair

- and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognised rights of indigenous peoples and local communities;
- h. long-term outcomes: the design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity;
 - i. transparency: the design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner;
 - j. science and traditional knowledge: the design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

Difficulties with marine compensation and offsetting

79. Applicant has stated (section 9.2 of ecological assessment) that compensation is typically a more subjective process than biodiversity offsetting and it is not required to adhere to any of the principles of biodiversity offsetting, especially no-net loss or net-gain objectives. While I agree that it is not a requirement to adhere to the principles – the Maseyk 2018 guidance also states that to improve outcomes for compensation, best practice and the offsetting principles should be followed as much as possible. I also acknowledge that marine offsetting and compensation is an evolving field and is inherently more complex.

Proposed offset – living seawalls

80. In my opinion the proportion of residual effect addressed by the 60m² of living seawalls is almost negligible. When compared to the scale of the lost rocky reef area (44,700m² excluding shingle beaches), the habitat area created by the living seawalls addresses 0.13% of the habitat loss with an unmitigated residual area of 44,640m².

Proposed compensation – dune restoration

81. The applicant has proposed to compensate the significant residual effects of the proposal by planting 800m² of coastal dune vegetation of the Pito-One foreshore located between the Settlers Museum and Hikoikoi Reserve on the Pito-One foreshore habitat with a 5 year maintenance period.
82. The ecological assessment concludes that the proposed dune restoration is commensurate to the loss of 0.33 ha of shingle beach (0.06 of which is threatened) and states that the scale of biodiversity compensation is commensurate as:

The proposed dune revegetation includes the restoration of an area of threatened ecosystem greater than that lost (i.e. 0.8 ha dune restored vs 0.33 ha of shingle beach loss).⁴

83. The applicant has assumed that the total loss of 0.33ha of the shingle beach ecosystem can be compensated by the temporary revegetation of an existing threatened ecosystem. Using the area lost (3300m² of shingle beach habitat) versus area planted (800m²) would equate to compensating for 24.24% of the residual effects of the proposal on shingle beaches with an unmitigated residual area of 2500m² (not including the unmitigated 44,640m² of rocky reef loss).
84. I am uncertain as to whether the dune restoration will provide for long-term outcomes if the only obligation is a 5 year maintenance period, in the event the dunes are washed out or the plantings and dune system degrades (again) the benefits of the compensation will be lost, while the loss of shingle beach will permanent. It is worth noting that the existing foreshore dunes are not devoid of plantings at the moment. This does not factor in the existing condition of the dunes, the impact of trading-up between two ecosystems, and any consideration of additionality.

Proposed compensation – stormwater treatment from SH2

85. The applicant has proposed to treat 11.5ha of SH2 stormwater runoff to improve coastal water quality by removing contaminants and suspended sediments. The measures will remain in place for the duration of the consent. Throughout the stakeholder engagement, the Department of Conservation has been supportive of the concept of improving coastal water quality through treating and reducing the contaminant loads to water entering the harbour. The treatment of water or reduction of contaminants is a practicable way to achieve direct benefits for the affected project area in question, by providing higher quality of water quality and habitat for coastal species.
86. The applicant has acknowledged that “whilst not directly quantifiable, it is our expert opinion that the scale of the proposed compensation is commensurate to the residual effect of permanent loss of marine habitat”. No evidence has been provided to support this statement and no attempts have been made to quantify the trading up of area lost versus quality of habitat improved. As discussed above, the residual effect of permanent loss of marine habitat is approximately 2500m² of shingle beach, and 44,640m² of rocky reef ecosystem. The applicant is relying on this unquantified compensation measure to conclude that the effects on biodiversity have been managed. There has been little transparency around how the applicant has concluded that the compensation is commensurate.
87. Expected conservation outcomes from the proposed compensation have not been measured. It is difficult to reconcile the significance of the values and scale of indigenous biodiversity losses with the benefits and scale of the proposed compensation.
88. The AEE notes that DOC supported the treatment option. DOC’s position was always in support of a far greater scale of stormwater treatment in particular that point sources and diffuse sources of contaminants could be treated at a catchment scale throughout the Hutt

⁴ Page 130 – Technical Report 9

River. Sedimentation from Hutt River has deposited ~4.1 m of silt and continues to put 13-17,500 tonnes/year into the Wellington Harbour; TR 7 – Coastal Processes Assessment). In relation to DOC’s recommendation regarding Hutt River treatment, the application states that “*Sedimentation into the Hutt River from land-use activities a long way up the catchment. Debate between parties about ability to influence these land use changes and the ecological benefit.*”⁵

89. A hydrodynamic model of Wellington Harbour made for GWRC shows water from the Hutt River hugs the coast, circulating an anti-clockwise direction about half the time. This means water from the Hutt River passes directly through the Project site at least half the time. There have been many studies over the last 30 years that have shown contaminants (e.g., sediments, nutrients and heavy metals) washed from the land have negative effects on marine ecosystems (rocky shore and soft sediment). These negative effects can be caused by both water in suspension and sediment depositing on the seafloor. By reducing contaminants from the land there will be a direct improvement on marine ecosystems at the Project site.

Concluding comments

90. Terrestrial effects on avifauna, vegetation, and herpetofauna will be appropriately managed through the avoidance, remediation, and mitigation measures proposed by the applicant. Effects on freshwater habitats and species are also able to be appropriately managed through the proposed mitigation measures.
91. Overall, the proposal is likely to result in a net loss in marine biodiversity values. In particular some areas of marine rocky reef systems, shingle beaches, and intertidal and subtidal habitats will be permanently lost under the project footprint. I acknowledge the areas affected are small relative to the project footprint and the area of similar habitat in the area and overtime the effect is reduced by the long-term benefits of the proposed beach replenishment/nourishment.
92. Adherence to best practice principles and seeking to achieve a no-net-loss or net-gain outcome would in my opinion at least give better effect to Objective 1 of the NZCPS which (among other things) aims to sustain the ecosystems of the coastal environment, but it is acknowledged that there may be limitations on the ability to do so and that the measures described in the application go some way to addressing this.

Proposed conditions of consent / conditions of notices

93. Table 1 below sets out comments on the proposed conditions of consent. I note that the structure of the conditions is first on the notices of requirement, then the land use consents, then the regional consents. Many conditions are duplicated across the notices of requirements and across the numerous resource consents. For brevity, I have commented on the general conditions on the notices of requirement but I would recommend that the relief sought is granted for all similar/duplicated conditions of consent on the same matter to ensure consistency.

⁵ Appendix 5 – Technical Report 9

Table 2: Comments on proposed conditions

Condition reference	Comment	Recommended Change
CA.9	<p>This Coastal Works Construction Environment Management Plan includes the methods for salvage and placement of shingle beach material. I support the inclusion of a reference out to the methodology (hand placed) but also consider that due to the ecological significance of these sites there should also be some input or ability for DOC to comment on this aspect of the plan in a manner similar to the process identified in relation to the ecological management plan. I note that the nourishment is dealt with largely in the construction management plans, it would be beneficial if the shingle beach conditions were contained within the ecological management plan as well.</p>	<p>a) Prior to the Start of Construction, investigations shall be undertaken to identify existing shingle beach material composition (native or weathering revetment) and beach material supply rates. The purpose of the investigation is to identify an approximate portion of shingle beach material which is currently being supplied from the weathering revetment and would therefore be lost once the existing revetment is replaced.</p> <p>b) The investigations shall be used to inform the location, volume and grading of any beach material to be salvaged within the Project footprint, and when and where this material is to be placed during construction.</p> <p>c) <u>The results of these investigations shall be provided to DOC for an opportunity to provide comment</u></p> <p><i>Advice note: the methods to salvage and place beach material during construction are set out in the Coastal Works CEMP (Condition CA.9) and the EMP (Condition EM.6).</i></p>
EM.3	<p>The current wording doesn't allow for salvage and relocation except for those limited areas in Attachment A.</p>	<p>...</p> <p>(e) Measures proposed to avoid, remedy and mitigate adverse effects on resident native lizard populations, including:</p> <p>(i) Where reasonably practicable, avoiding clearance of areas of lizard habitat as</p>

		<p><u>including those</u> identified on the map in Attachment A of these conditions;</p> <p>...</p>
EM.4	I support the inclusion of this condition and the proposed wording.	The extension of the four culverts which convey flows from the intermittent and perennial streams shall be designed and installed in accordance with the National Institute of Water and Atmospheric Research <i>New Zealand Fish Passage Guidelines April 2018</i> unless otherwise agreed with the Manager.
EM.5 (shingle beach)	I note that condition EM6B(e) considers placement of salvaged beach material using hand-held methods, as does section 7.2.4. of the ecological assessment. This is likely a more appropriate method of nourishment to potentially address the risk of any further adverse effects on the shingle beach ecosystem.	<p>Project works in the CMA shall be designed to achieve the following in relation to coastal avifauna:</p> <p>(a) Encourage long-term retention of shingle beaches by placing salvaged shingle beach material during construction <u>by placing material by hand to minimise habitat disturbance</u>, constructing seawalls with rip rap along the coastal edge of the Shared Path and groynes at locations where they would support long-term survival of the retained beaches; and ...</p>
EM.6B (avifauna)	<p>This amendment is intended to ensure that the management of effects on penguin is not artificially constrained by the initially identified potential penguin habitat. The identification of these areas is supported for clarity; however, penguins have also been known to nest in other areas and may move into additional locations prior to works which were not detected in the identification of penguin habitat. At the time of the survey there may be penguins present in other areas where they were not at the time of the initial habitat identification.</p> <p>The amendment to iii. Is intended to ensure that a penguin detection dog is used</p>	<p>The EMP shall contain the following in relation to coastal avifauna:</p> <p>(a) Measures proposed to avoid potential adverse effects of Enabling Works and Construction Works on penguin, including:</p> <ol style="list-style-type: none"> i. Details of potential penguin habitat including the location of that potential habitat as identified on the map in Attachment E and a description of the characteristics of the potential habitat; ii. Results of a field survey <u>of the project footprint</u> undertaken by a Suitably

	<p>prior to the construction of each segment, rather than only the identified areas.</p>	<p>Qualified Person to confirm the location of the potential habitat area(s) <u>identified in Attachment E, and other potential or actual penguin habitat</u>;</p> <p>iii. Within the 24 hours prior to each Enabling Works or each Construction Works activity undertaken in the confirmed potential penguin habitat between 1 July to 30 March, a penguin detector dog shall confirm the presence or absence of active nests or moulting penguin;</p> <p>iv. If an active nest or moulting penguin is discovered in an area within 20 metres of the work site(s), works within this 20 metre buffer shall be delayed and no person or machinery shall enter the buffer area until nesting or moulting is complete;</p> <p>v. The frequency of on-going checks for nesting or moulting birds within the areas shown on the map in Attachment E;</p> <p>(b) ...</p>
<p>EM.8</p>	<p>I support the inclusion of this condition and the proposed wording</p>	<p>In addition to regular maintenance of the Shared Path, and subject to compliance with the Consent Holder’s health and safety obligations, a six-monthly clean-up along the coastal edge shall be undertaken to remove visible accumulated rubbish debris within the rock revetment and coastal foreshore that can adversely affect coastal avifauna and other marine life, including discarded fishing gear.</p>

<p>EM.16</p>	<p>I consider that the monitoring should be for a longer duration (e.g., 5 years) and more frequent (3 monthly) in order to measure the succession and effectiveness of colonisation of the new substrate provided by the living seawall. Six monthly sampling over two years would result in only four rounds of monitoring. Given the experimental nature of the offset, a greater monitoring period and frequency is required.</p> <p>I also reiterate the concern about the inadequate scale of this offset.</p>	<p>(c) The EMP shall include a Biodiversity Offset Management Plan for the Living Seawalls with the following information:</p> <ul style="list-style-type: none"> (i) The specific location(s) where the living seawalls are to be installed; (ii) Baseline information on indigenous biodiversity at the recipient sites; (iii) Areas of living seawall to be created, with a total of at least 60m² of living seawalls; (iv) Proposed maintenance measures to maintain the outcome set out in (a) above; and (v) Details of monitoring at least six <u>three</u> monthly for a duration of two <u>five</u> years.
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