

**BEFORE THE GREATER WELLINGTON REGIONAL COUNCIL AND HUTT  
CITY COUNCIL  
EASTERN BAYS SHARED PATH PROJECT**

Under the Resource Management Act 1991

In the matter of applications for resource consents by Hutt  
City Council under section 88 of the Act, to  
carry out the Eastern Bays Shared Path Project

---

**STATEMENT OF EVIDENCE OF FLEUR ELIZABETH MATHESON (SEAGRASS)  
ON BEHALF OF THE APPLICANT**

30 November 2020

---

**BUDDLE FINDLAY**  
Barristers and Solicitors  
Wellington

Solicitors Acting: **David Allen / Libby Cowper / Esther Bennett**  
Email: david.allen@buddlefindlay.com / libby.cowper@buddlefindlay.com /  
esther.bennett@buddlefindlay.com  
Tel 64-4-499 4242 Fax 64-4-499 4141 PO Box 2694 DX SP20201 Wellington 6140

## TABLE OF CONTENTS

QUALIFICATIONS AND EXPERIENCE .....	3
BACKGROUND AND ROLE .....	4
SCOPE OF EVIDENCE .....	5
EXECUTIVE SUMMARY .....	5
METHODOLOGY .....	5
EXISTING SEAGRASS .....	6
POTENTIAL EFFECTS ON SEAGRASS .....	8
STEPS TAKEN TO ADDRESS POTENTIAL ADVERSE EFFECTS.....	10
RESPONSE TO SUBMISSIONS .....	12
RESPONSE TO COUNCIL OFFICERS SECTION 42A REPORTS .....	13

## QUALIFICATIONS AND EXPERIENCE

1. My full name is **Dr Fleur Elizabeth Matheson**. I am an Aquatic Biogeochemist and Research Programme Leader at the National Institute of Water and Atmospheric Research ("**NIWA**").
2. My evidence is given on behalf of Hutt City Council ("**HCC**") in relation to its applications under section 88 of the Resource Management Act 1991 ("**RMA**") for resource consents for the Eastern Bays Shared Path Project ("**Project**").
3. I have the following qualifications and experience relevant to the evidence I shall give:
  - (a) I have an MSc (1<sup>st</sup> Class Hons) in Environmental Planning and Biology from the University of Waikato, New Zealand and a PhD in Physical Geography from the University of Durham, United Kingdom.
  - (b) I have 18 years of experience as a scientist employed by NIWA in Hamilton, New Zealand. I am a member of NIWA's Aquatic Plants Team and a NIWA Freshwater and Estuaries Centre Research Programme Leader.
  - (c) I have conducted research on seagrass ecosystems since 2002. This has included supervision of two PhD and two undergraduate student research projects on black swan grazing effects, sediment-effect thresholds and seagrass reproductive ecology.
  - (d) From 2010 to 2016 I led the seagrass ecology, transplants and biodiversity benefits component of a Ministry for Business, Innovation and Employment ("**MBIE**") funded research programme on "Aquatic Rehabilitation" (C01X1002). From 2008 to 2017 I led seagrass restoration trials in Whangarei and Porirua Harbours in collaboration with local authorities, industry and iwi.
  - (e) I have authored eight journal papers, six reports, one information guide and twelve national and international conference presentations on seagrass. In 2020 I co-authored a review of seagrass restoration in Australia and New Zealand with a group of international seagrass experts.
  - (f) I am a member of the New Zealand Marine Sciences Society.
4. I confirm that I have read the 'Code of Conduct' for expert witnesses contained in the Environment Court Practice Note 2014. My evidence has been prepared in compliance with that Code. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

## BACKGROUND AND ROLE

5. I was not involved in the Project during the preparation of the Assessment of Effects on the Environment ("**AEE**"). However, I was subsequently engaged by HCC in July 2019 to give further consideration to monitoring and addressing the impact of sedimentation and changes in hydrodynamics on seagrass in Lowry Bay.
6. I prepared a memorandum report for HCC addressing seagrass effects, dated 29 July 2019, that was subsequently provided by HCC to Greater Wellington Regional Council ("**GWRC**") (as Annexure 2F to the application).<sup>1</sup>
7. I have relied on the assessment of ecological effects on coastal vegetation and avifauna and seagrass survey reports prepared by Dr Fred Overmaars (Appendices C1 and C2 to the AEE) to provide me with information on the existing state of seagrass beds in the Eastern Bays area and the mitigation measures initially proposed.
8. I have relied on the *Coastal Physical Processes Assessment* prepared by **Dr Michael Allis** (Appendix E to the AEE) to provide me with information on the anticipated effects of the Project works on water turbidity.
9. I have also reviewed the measures proposed in the *Beach Nourishment Design and Effects Assessment* prepared by **Richard Reinen-Hamill** (Appendix F to the AEE).
10. In preparing my evidence, I have:
  - (a) familiarised myself with the Lowry Bay area and I have visited the seagrass site prior to the hearing;
  - (b) reviewed the following documents (in addition to those mentioned above):
    - (i) the summary of scope of evidence prepared by Dr Megan Oliver dated February 2020 regarding environmental concerns for intertidal and subtidal ecology; and
    - (ii) the memorandum 6 response prepared by Stantec on behalf of HCC and provided to WRC on 22 October 2020; and
  - (c) reviewed (in draft) the evidence of **Dr Allis, Mr Reinen-Hamill and Caroline van Halderen** (including the updated proposed consent conditions appended to the evidence of **Ms van Halderen**).

---

<sup>1</sup> Dr Fleur Matheson "*Mitigating the effects of the Eastern Bays Shared Path Project on seagrass in Lowry Bay, Wellington Harbour*" <<http://www.gw.govt.nz/assets/Resource-Consents/Eastern-Bays-Shared-Path/Annexure-2-F-Matheson-Seagrass-Report.pdf>>

## **SCOPE OF EVIDENCE**

11. The purpose of my evidence is to address the potential effects of the Project on seagrass and the measures proposed to ensure protection of the seagrass in Lowry Bay. These recommendations are included in the proposed consent conditions attached to **Ms van Halderen's** evidence.
12. My evidence addresses:
  - (a) the current occurrence of seagrass in the Eastern Bays and Te Whanganui-a-Tara / Wellington Harbour, as documented in Appendices C1 and C2 to the AEE;
  - (b) the potential effects of the Project on the seagrass as described in Appendix C1 to the AEE;
  - (c) steps taken to address potential adverse effects on seagrass, through the proposed monitoring and other measures described in Appendices C1 and F to the AEE, Annexure 2F and included in Appendix A to the evidence of **Ms van Halderen**; and
  - (d) responses to submissions and the section 42A reports.

## **EXECUTIVE SUMMARY**

13. Seagrass has been identified in three locations in Lowry Bay, near the Project footprint.
14. Construction activities and the proposed beach nourishment pose a low potential risk of adversely affecting the seagrass. Measures are proposed (including those which I have recommended) and are reflected in the proposed conditions of consent to avoid adverse effects on seagrass in Lowry Bay.

## **METHODOLOGY**

15. As noted earlier, I have reviewed Appendices C1 and C2 to the AEE. I summarise below the methodology that the authors used for the survey of seagrass that was undertaken in the intertidal and subtidal zones at Point Howard, Lowry Bay and York Bay, and the Hutt River Estuary, in December 2018.
16. The authors carried out the survey by:
  - (a) investigating information on previous seagrass records in the Project area and elsewhere in Te Whanganui-a-Tara / Wellington Harbour;
  - (b) identifying the areas to be surveyed: approximately 740m of sand and gravel beaches at Point Howard, Lowry Bay and York Bay beaches, and 800m on the western side of the Hutt River Estuary. The seaward

boundary was set at 60-80cm below spring low tide levels (survey by snorkelling was used at Point Howard);

- (c) undertaking the physical surveying at spring low tides;
  - (d) walking the survey area in a zigzag pattern parallel to the shore;
  - (e) mapping boundaries of seagrass areas with high precision GPS;
  - (f) sampling ten quadrats subjectively located to represent seagrass cover variability;
  - (g) recording observations and collecting data where seagrass was found, including cover variability and boundaries of seagrass areas; and
  - (h) briefly investigating (on 9 January 2019) the frequency of flowering by inspecting seagrass shoots in the beach wrack for flowering.
17. Further details on the survey methodology can be found in Appendix C2 to the AEE. It is my view that seagrass survey methodology used was appropriate.

## **EXISTING SEAGRASS**

### **Overview**

18. Seagrass was found at Lowry Bay, but not at Point Howard, York Bay or Hutt Estuary. Appendix C2 to the AEE sets out more detail for why these other areas may not be suitable for seagrass and I agree with this reasoning. The lack of seagrass at Point Howard and York Bay was attributed to higher wave energy and coarser substrate. Hutt Estuary formerly had an area of seagrass habitat, but this was lost as a result of reclamation for marina development.

### **Seagrass in Lowry Bay**

19. Three seagrass occurrences were found at south Lowry Bay, all in the low intertidal and shallow subtidal zones. From north to south, these had areas of 150m<sup>2</sup>, 1,620m<sup>2</sup> and 170m<sup>2</sup> respectively (a total of 1,940 m<sup>2</sup>), see **Figure 1** below.

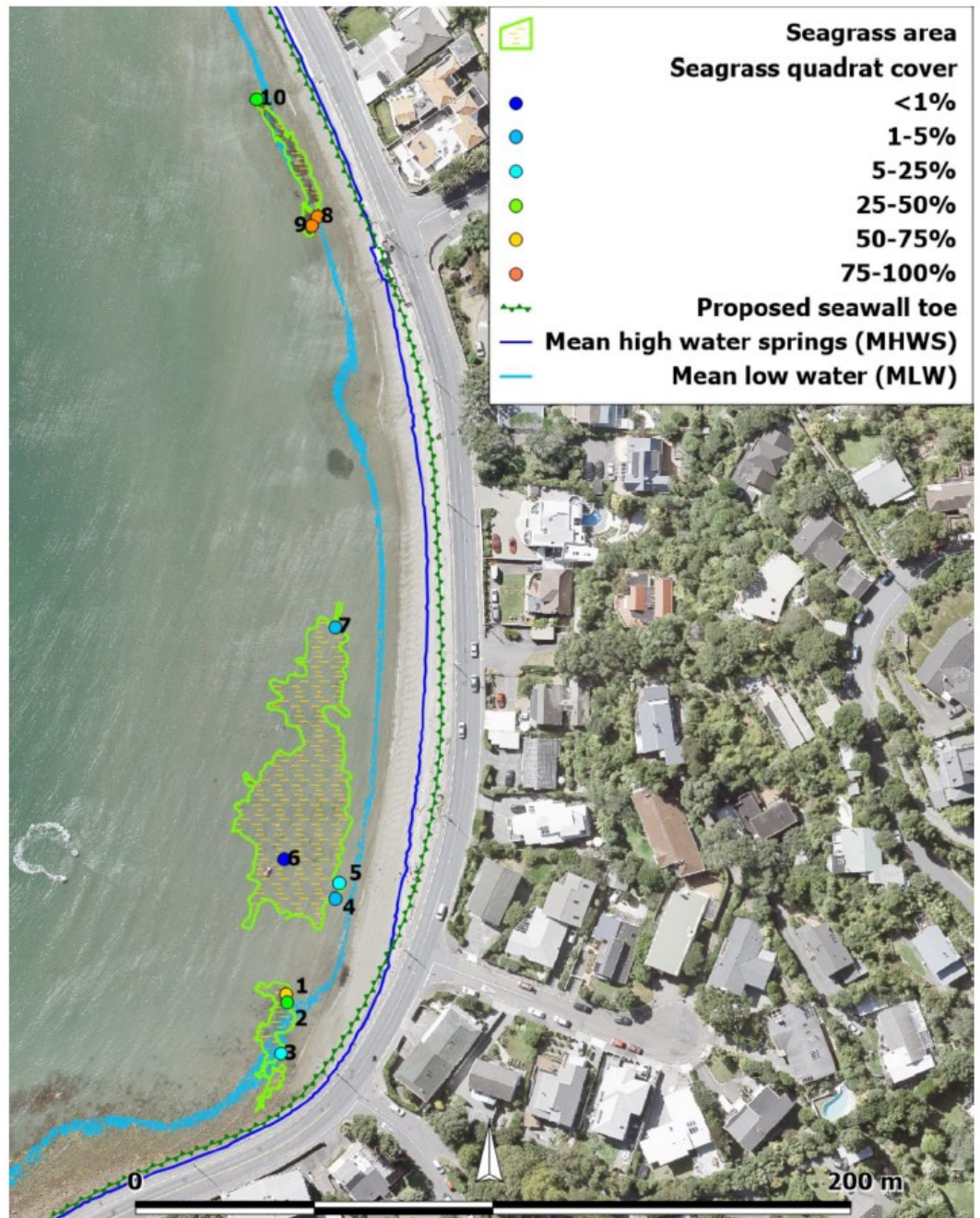


Figure 1 - Location of seagrass and seagrass survey quadrants, south Lowry Bay, December 2018.<sup>2</sup>

20. The northern occurrence had high density seagrass (typically 75–100% cover); the central occurrence had low density and patchy seagrass (<1% to 5–25% cover), and the southern occurrence had a range of cover densities.
21. Three flowering shoots were found at Lowry Bay, one adjacent to each of the three seagrass occurrences. Flowering shoots were a low proportion of the total number of shoots observed but are significant because sexual reproduction facilitates dispersal, enhances genetic diversity, and is an

<sup>2</sup> This is Figure 4-1 in Appendix C1 to the AEE.

indicator of seagrass health because it is correlated with seagrass bed density.

22. The seagrass in Lowry Bay is the only marine vascular flora in the Project area not derived in some way from human agency.
23. Photographs of the northern and central seagrass occurrences can be found in Figure 4-2 and Figure 4-3 of Appendix C1 to the AEE.
24. Further details on the existing seagrass can be found in Appendices C1 and C2 to the AEE.
25. Lowry Bay is now the single known location for seagrass remaining in Te Whanganui-a-Tara / Wellington Harbour. Substantial populations remain elsewhere in the Region, including at nearby Pāuatahanui Inlet. The extent of seagrass habitat in a number of human-impacted estuaries and harbours around New Zealand has declined in the last 40 to 80 years. The seagrass beds at Lowry Bay are a listed habitat with significant indigenous biodiversity values in the coastal marine area in Schedule F5 of GWRC's Proposed Natural Resources Plan ("**PNRP**"). Policy 11 of the New Zealand Coastal Policy Statement ("**NZCPS**") also requires the avoidance of adverse effects on seagrass as a listed At Risk indigenous taxon.

#### **POTENTIAL EFFECTS ON SEAGRASS**

26. The seagrass occurrences in Lowry Bay are located mostly between 10 and 55m from the toe of the proposed curved seawalls, although the southern-most occurrence is as close as four metres. The proposed construction zone (5m wide at curved seawalls) overlaps with a very small part of the southern-most occurrence (2m<sup>2</sup>) and elsewhere lies 5 to 50m away, see **Figure 2** below.



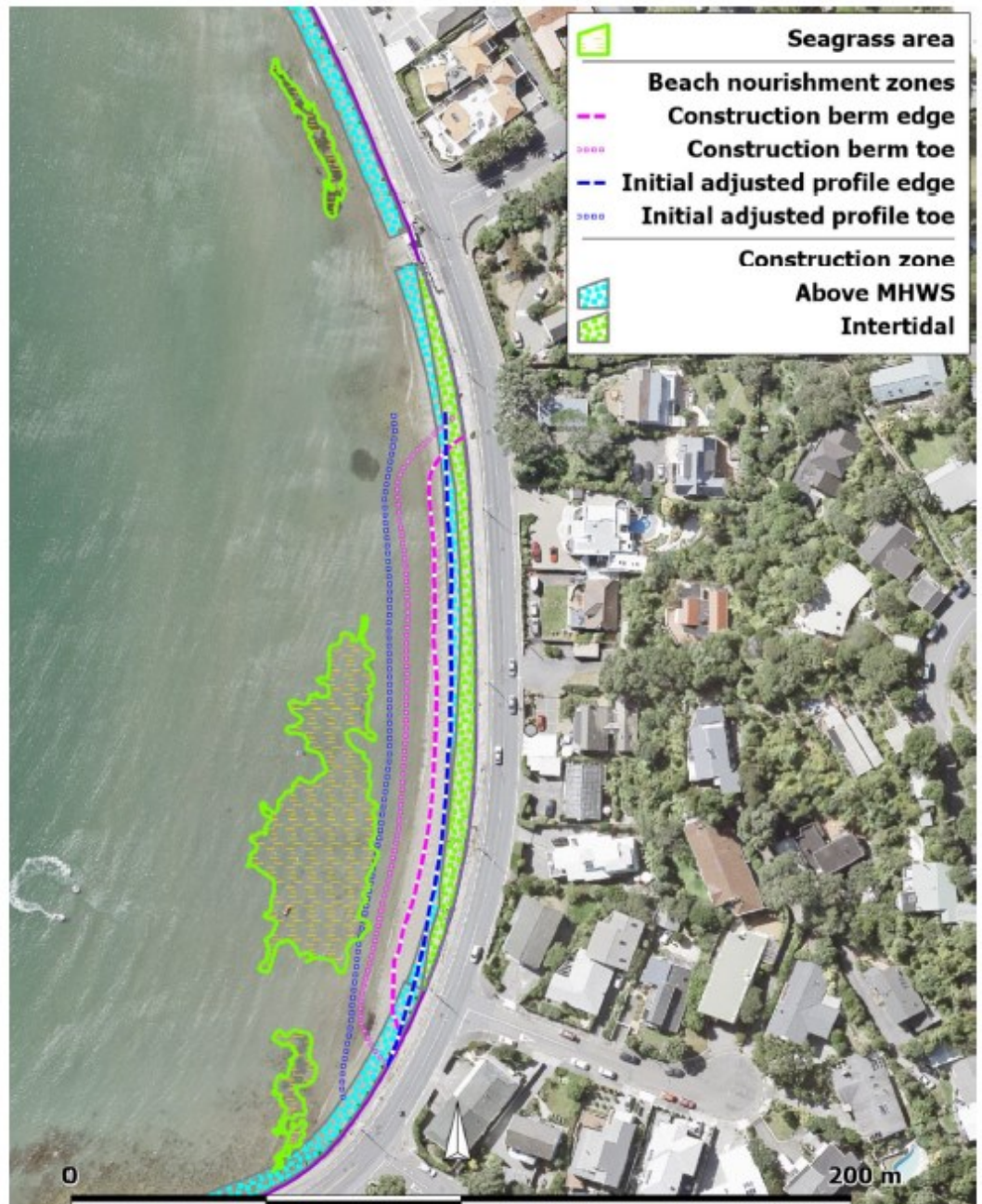


Figure 2 – The proposed seawall construction zone and beach nourishment zones near seagrass beds at Lowry Bay.<sup>3</sup>

27. The risk to the seagrass in the construction zone is considered to be temporary. Effects will be avoided by physically demarcating the site (as discussed below).
28. Following beach nourishment, movement of the beach profile to flatten its slope is likely to result in the seaward movement of sand and some encroachment seaward of the existing beach toe. This process is expected to occur over a period of weeks to months largely during higher energy onshore events (storms). The beach areas adjacent to the placement areas will likely increase in sediment depth due to longshore drift and this may also

<sup>3</sup> This is Figure 5-1 in Appendix C1 to the AEE.

manifest as the seaward movement of the beach in these areas, with an associated reduction in beach volume from the constructed placement area. This process is likely to occur over a period of months to years.

29. The toe of the proposed beach nourishment construction berm lies 2 to 4m at its closest from the largest (central) seagrass bed in Lowry Bay, and the toe of the initial adjusted profile (some weeks to months after construction) adjoins and includes a very small part (7m<sup>2</sup>) of the central seagrass bed, see **Figure 2** above.
30. The risk to the seagrass within and adjoining the beach nourishment adjusted profile is considered to be temporary and small. As discussed below, steps will be taken to avoid adverse effects on seagrass arising from beach nourishment activities.

### **STEPS TAKEN TO ADDRESS POTENTIAL ADVERSE EFFECTS**

31. Potential adverse effects on the south Lowry Bay seagrass beds from Construction Works and beach nourishment will be avoided in accordance with proposed conditions EM.11 (seagrass avoidance measures) and EM.13 to EM.18 (Beach Nourishment Plan ("**BNP**") and Beach monitoring and management – beach nourishment).
32. This includes measures that I have recommended as follows:
  - (a) Proposed condition EM.11 requires that the seagrass beds are appropriately marked during Construction Works and beach nourishment to avoid any potential adverse effects.
  - (b) Monitoring of seagrass beds in south Lowry Bay is required before and after Construction Works and beach nourishment.
33. The intent of the monitoring is to confirm that the beach nourishment works have not resulted in any net loss of seagrass extent and cover through unforeseen physical encroachment into the seagrass beds, increased turbidity or altered hydrodynamics.
34. Monitoring requires mapping the perimeter of each seagrass bed and assessing the average plant cover within each bed immediately before works commence, immediately after works have been completed and 1 year after the completion of the beach nourishment works.
35. Monitoring results must be provided to the Manager, Environmental Regulation, GWRC within 1 month of completion.
36. The requirements of proposed condition EM.11 are consistent with the recommendations I made in the memorandum report for HCC dated August 2019 (Annexure 2F).

37. Proposed conditions EM.13 to EM.18 set out requirements in respect of the proposed beach nourishment, including for the preparation of a BNP. Condition EM.14 includes a construction methodology, to be included in the BNP, to limit potential adverse effects associated with beach nourishment. This includes the following components, most of which were recommended in the Appendices C1 and F to the AEE and which I consider relevant to seagrass and support:
- (a) separation and disposal offsite of silts and clays in beach excavation sediments;
  - (b) use of beach nourishment sediments that are similar or slightly coarser than in situ sediments, that will maintain the existing profile without spreading onto seagrass beds;
  - (c) excluding fine sediments from beach nourishment sediments;
  - (d) only undertaking beach nourishment in the winter months between June and August;
  - (e) forming the high tide construction beach with a slightly over-steepened profile;
  - (f) only depositing as much sediment on the beach as can be transferred along the placement area in the day of placement;
  - (g) only transferring and shaping the beach profile during lower tide levels in calm conditions, such that the formed toe does not extend much beyond mean low water springs;
  - (h) minimising the working area and mobilisation of sediment;
  - (i) avoiding the placement of beach nourishment materials no further south than the centerline of Gill Road at the southern end of Lowry Bay;
  - (j) forming and shaping a steeper profile within the existing beach footprint; and
  - (k) placing imported beach sediment along the entire designated placement area rather than in one discrete location.
38. These requirements are additional to the specific obligation set out in proposed condition EM.11 to avoid adverse effects on seagrass.
39. I also concur with statements in Appendix C1 to the AEE that the beach nourishment, provided that it carefully avoids affecting the seagrass beds, may ultimately prolong their existence in the face of sea level rise.

40. **Table 1** below sets out proposed measures to address potential effects on seagrass and the level of effects taking into account those measures.

**Table 1 – Seagrass, eelgrass, rimurēhia (*Zostera muelleri* subsp. *novazelandica*) in the Project Area**

<b>Location</b>	Lowry Bay
<b>Abundance</b>	Three seagrass beds
<b>Conservation status</b>	At Risk – Declining, extreme fluctuations
<b>Ecological value</b>	High
<b>Potential effects</b>	Construction disturbance, sedimentation and partial burial, turbidity
<b>Magnitude of potential effects</b>	Moderate
<b>Measures to address (principal)</b>	Isolation of site within construction zone; separation and disposal offsite of silts and clays in beach excavation sediments; use of similar or slightly coarser sediments that will maintain existing profile without spreading onto seagrass beds; excluding fines from beach nourishment sediments; minimise risk of wave overtopping of sediment control measures; undertake beach nourishment at Lowry Bay in winter.
<b>Level of effects taking into account those measures</b>	Possible minor change adjoining beach nourishment sites within existing seagrass dynamics; no direct adverse effects on the seagrass beds and possible positive effect for the northern seagrass bed. Seagrass has some capability to respond to sea level rise; without future intervention it is at high risk of being squeezed out of its natural depth range at Lowry Bay.

41. Taking into account the measures and conditions proposed, including those which I have recommended, I consider that the Project will avoid adverse effects on the existing seagrass beds in Lowry Bay.

## **RESPONSE TO SUBMISSIONS**

42. I have reviewed the two submissions that relate to seagrass and provide a brief response to these submissions below.

### **Department of Conservation (161)**

43. The Director-General considers that the proposal does not take a precautionary approach consistent with Policy 3 of the NZCPS and it does not adequately address the potential adverse effects on coastal vegetation (in particular, seagrass).
44. The Director-General considers that any effects on seagrass need to be avoided in accordance with Policy 11 of the NZCPS, and Policies P31, P32, P40 and P41 of the PNRP.
45. The Director-General supports the intent of HCC to avoid adverse effects on seagrass, however these measures need to be included as conditions of the consents if they be granted.
46. The Director-General seeks conditions to be included to ensure that potential risks to seagrass are avoided, not just reduced, as required by the conditions proposed by HCC.

### **Royal Forest and Bird Protection Society of New Zealand Inc (170)**

47. The Royal Forest and Bird Protection Society similarly seeks decline of the application unless the design and conditions of consent can be improved to avoid adverse effects on seagrass as set out in the NZCPS and provide appropriate mitigation and remediation.
48. In response to the above submitters I consider that the updated, proposed conditions EM.11 and EM.14, in Appendix A to the evidence of **Ms van Halderen**, are sufficient to avoid adverse effects on seagrass.

### **RESPONSE TO COUNCIL OFFICERS' SECTION 42A REPORTS**

49. The GWRC section 42A report notes that the recommendations contained in Annexure 2F appropriately resolves concerns around adverse effects on seagrass.<sup>4</sup> These recommendations are consistent with proposed conditions EM.11 and EM.14. The GWRC section 42A report then concludes that:
  - (a) based on the information provided by HCC and the proposed conditions, direct effect on seagrass will be avoided;<sup>5</sup> and
  - (b) subject to the effective implementation of the recommended conditions, potential effects on seagrass can be avoided or otherwise minimised such that adverse effects are likely to be less than minor.<sup>6</sup>
50. However, the GWRC section 42A report also notes that:<sup>7</sup>

---

<sup>4</sup> WRC section 42A report at 38 (section 8.5.1).

<sup>5</sup> WRC section 42A report at 90 (section 12.8).

<sup>6</sup> GWRC section 42A report at 91 (section 12.8).

<sup>7</sup> GWRC section 42A report at 91 (section 12.8).

*“Dr Oliver recommended periodic visual assessment of sand deposition near and around the meadows would be useful to assess how the nourishment material is settling in and around the meadows. I agree with Dr Oliver and have therefore recommended a condition requiring monthly visual assessment of the seagrass beds. The results of these visual assessments shall be provided to GWRC as soon as is practicable”.*

51. I consider that the recommended visual assessment of sand deposition as it relates to seagrass provides an additional measure of protection to avoid adverse effects on seagrass and support its inclusion in the consent conditions. I note that beach nourishment will be a one-off activity, and consider that a one-off visual inspection following beach nourishment would be appropriate. This is reflected in **Ms Van Halderen's** proposed condition EM.11.

**Fleur Elizabeth Matheson**

**30 November 2020**