

**BEFORE THE INDEPENDENT HEARINGS PANELS APPOINTED TO HEAR AND MAKE
RECOMMENDATIONS ON SUBMISSIONS AND FURTHER SUBMISSIONS ON PROPOSED PLAN
CHANGE 1 TO THE NATURAL RESOURCES PLAN FOR THE WELLINGTON REGION**

UNDER the Resource Management Act 1991 (the
Act)

AND

IN THE MATTER of Hearing of Submissions and Further
Submissions on Proposed Plan Change 1 to
the Natural Resources Plan for the
Wellington Region under Schedule 1 of the
Act

**REPORTING OFFICER RIGHT OF REPLY OF DR MEGAN CLAIR
MELIDONIS**

ON BEHALF OF GREATER WELLINGTON REGIONAL COUNCIL

**HEARING STREAM 2 – OBJECTIVES, ECOSYSTEM HEALTH AND
WATER QUALITY POLICIES**

14th MAY 2025

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INTRODUCTION

- 1 My full name is Megan Clair Melidonis. I am a Senior Coastal Scientist at Greater Wellington Regional Council (**the Council**).
- 2 I have prepared this statement of reply evidence in respect of the matters raised during the hearing of matters in Hearing Stream 2 – Objectives, ecosystem health and water quality policies of Proposed Plan Change 1 to the Natural Resources Plan for the Wellington Region (**PC1**).
- 3 I listened to submitters in Hearing Stream 2, read their evidence and tabled statements, and the written submissions and further submissions relevant to the Hearing Stream 2 topic.

QUALIFICATIONS AND EXPERIENCE

- 4 My qualifications and experience are set out in paragraphs 7 to 11 of my technical evidence for this topic, dated 28 January 2025. I repeat the confirmation given in paragraph 6 of that report that I have read and agree to comply with the Code of Conduct for Expert Witnesses.

SCOPE OF REPLY

- 5 This Statement of Reply Evidence follows Hearing Stream 2 held on 7 April to 15 April 2025, and addresses:
 - 5.1 The specific questions posed by the Hearings Panels (**the Panels**) in Minute 7 that relate to coastal ecology; and
 - 5.2 Additional information requests made by the Panels during Hearing Stream 2 that were not captured by Minute 7.

RESPONSE TO MATTER RAISED IN PARAGRAPH 28 OF MINUTE 7

- 6 In paragraph 28 of Minute 7, the Panels request that I provide a summary of ‘natural sedimentation levels’ particularly for the Onepoto Arm and Pāuatahanui Inlet to explain why sedimentation targets proposed in my technical evidence are higher than proposed in PC1. Paragraph 75 in my primary evidence provides a summary of how Natural Sedimentation Rates (**NSR**) were set, while paragraph 73 discusses ecological relevance of

sedimentation rate targets.¹ The table below summarises the different NSR calculated by the NIWA sediment load estimator and Mr Oldman in his primary evidence, respectively.²

Table 2. Summary of NSR calculated for Te Awarua-Porirua Harbour.

Source	Onepoto Arm	Pāuatahanui Inlet	Whole Harbour
NIWA sediment load estimator	-	-	0.8 mm/y
Oldman 2025	0.7 mm/y	1.2 mm/y	1 mm/y

7 The proposed PC1 sedimentation rate targets of 1 mm/year in the Onepoto Arm and 2 mm/year in the Pāuatahanui Inlet did not account for NSR, which resulted in the PC1 targets falling close to the NSR levels listed in Table 2 above. Sediment losses from land enter freshwater bodies and infill estuaries naturally over time and it is important to set realistic estuarine targets that account for this process.

8 When determining NSR, it is important to take historical data into account at the location under consideration. The NIWA model did not do this, but rather calculated a harbour-wide NSR using a national model that was not place-based and did not consider localised NSR sediment core data. In paragraphs 34 to 39 of Mr Oldman’s primary evidence, a more accurate calculation of NSR is provided by considering these localised data.

9 As discussed in paragraph 75 of my primary evidence, I consider the following 5-year rolling mean coastal sedimentation rate objectives for Te Awarua-o-Porirua Harbour to be consistent with the best available guideline of NSR + 2mm as set out in the Australia and New Zealand Fresh and Marine Water Quality Guidelines (ANZG 2018):^[1]

9.1 2.7 mm/year in the Onepoto Arm and,

9.2 3.2 mm/year in the Pāuatahanui Inlet

10 I consider these targets to be appropriate for protecting benthic invertebrate communities within Te Awarua-o-Porirua from detrimental effects of excessive sediment burial.

ADDITIONAL MATTERS THAT AROSE DURING THE HEARING

11 On Day 3 of Hearing Stream 2 (9 April 2025), Commissioner McGarry requested that the most recent sedimentation rate 5-year rolling mean for both the Onepoto Arm and the

¹ Technical evidence of Dr Megan Melidonis (Coastal Ecology) on Behalf of Greater Wellington Regional Council (dated 28 February 2025)

² Technical evidence of Mr John Oldman (Load reductions for Te Awarua-o-Porirua) on Behalf of Greater Wellington Regional Council (dated 28 February 2025)

Pāuatahanui Inlet are provided. These values have been added to the last column of the table below as an addition to Table 6, paragraph 77 in my primary evidence.

Table 2. Five-year rolling means for the Onepoto Arm and Pāuatahanui Inlet calculated over the period 2013 to 2025. Orange indicates where the proposed PC1 Table 9.1 objectives are exceeded but the ANZG 2018 guideline is met. Red indicates where SAR does not meet the proposed PC1 objectives or the ANZG Guidelines.

5-year rolling mean (mm/yr)	2013-17	2014-18	2015-19	2016-20	2017-21	2018-22	2019-23	2020-24	2021-25
Onepoto Arm	-3.7	-1.6	-1.0	4.7	4.7	4.6	5.0	6.0	4.6
Pāuatahanui Inlet	6.2	5.7	3.8	3.9	4.1	1.7	2.3	2.4	8

RECOMMENDATION TO AMEND ATTRIBUTES LISTED IN COASTAL TABLES 8.1 AND 9.1 OF PC1

Recommendations in respect of Table 9.1

- 12 In Table 4 of my primary evidence, I have identified two minor technical errors in relation to the macroalgal and ‘muddiness’ subtidal attributes in the Onepoto Arm and Pāuatahanui Inlet, which require amending as recorded in the Right of Reply evidence of Ms O’Callahan.
- 13 As per Table 4 of my primary evidence, the coastal objectives and targets tabled by Ms O’Callahan during Hearing Stream 2 included macroalgae and the spatial extent of mud as attributes in Table 9.1 for the subtidal areas in the Onepoto Arm and Pāuatahanui Inlet. However, the macroalgae attribute is not applicable in a subtidal environment in Te Awarua-o-Porirua as species attached to rock, sediment or debris only exist in the intertidal where sufficient light penetrates the water for a prolonged time. In addition, free-floating species have only been noted in intertidal areas where localised nutrient inputs exist (e.g. outfalls, waterfowl). This attribute should, therefore, be removed from the ‘subtidal’ columns in Table 9.1. Similarly, the spatial extent of mud (first row pertaining to ‘muddiness’ in coastal objective tables) is not measurable in the subtidal environment as it depicts the areal extent of sediment across an intertidal estuarine area and should, therefore, be removed from the table.
- 14 The unit of measurement for the spatial extent of mud as an indicator of ‘muddiness’ was incorrectly transcribed in Ms O’Callahan’s rebuttal evidence from Table 4 in my primary evidence. As explained in footnote 4 on page 17 of my primary evidence, “Previous work on ecological breakpoints and subsequent analysis of national data indicates that the most diverse and abundant macrobenthic communities occur in sediments with mud

concentrations of <25%. Therefore, sediments >25% mud were reclassified as ‘mud-elevated’, which is indicative of likely ecological degradation.” As noted above, this attribute should be removed from the ‘subtidal’ columns in Table 9.1 and the unit of measure for intertidal areas should be changed from >50% to >25% in Table 9.1. This matter, and that in paragraph 12 above, have been addressed in Appendix 1 of Ms O’Callahan’s Right of Reply evidence.³

Recommendations in respect of Table 8.1

15 For the same reasons as noted above, the unit of measure for intertidal areas should be changed from >50% to >25% in Table 8.1. This matter has been addressed in Appendix 1 of Ms O’Callahan’s Right of Reply evidence.

16 I also note that in Table 8.1 the combination of Te Whanganui-a-Tara Harbour targets together with those of estuaries flowing into Te Whanganui-a-Tara Harbour into the same column is not appropriate. The Harbour is a deeper subtidal dominated, longer residence time estuary (DSDEs) with current state and targets distinct from shallow, short residence time tidal river estuaries which are found elsewhere in the Whaitua. Therefore, Te Whanganui-a-Tara Harbour and Te Whanganui-a-Tara estuaries should be placed in separate columns in the table. This has been addressed in Appendix 1 of Ms O’Callahan’s Right of Reply evidence.

17 In paragraph 112.4 of my primary evidence, I state that the macroalgae attribute is of limited relevance in Wellington Harbour. This is largely due to increased water mixing potential in the Wellington Harbour compared to the more limited mixing potential in smaller, shallow estuaries. As such, the Council does not measure macroalgae in Wellington Harbour and current state data is not available. As availability of current state data does not preclude a “maintain” attribute from Table 8.1, a target for this attribute is relevant and should be included.

Other provisions

18 On review of the PC1 objectives, I noted that the meaning of the term ‘benthic invertebrate’ referred to in WH.O3 and P.O3 may be inconsistent with my definition of benthic invertebrates in paragraph 93.6 of my primary evidence. To be clear, the objectives should

³ Right of Reply Evidence of Ms Mary O’Callahan on Behalf of Greater Wellington Regional Council (dated 28 March 2025)

relate to **benthic and intertidal** invertebrate communities, which includes soft-sediment, sand beach, and rocky communities.

DATE: 14 May 2025

Megan Melidonis

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SENIOR ENVIRONMENTAL SCIENTIST

**GREATER WELLINGTON REGIONAL
COUNCIL**

REFERENCES

[1] Australian and New Zealand Governments and Australian state and territory governments (ANZG). 2018. Australian and New Zealand guidelines for fresh and marine water quality. Governments and Australian state and territory governments, Canberra, Australia.