**BEFORE THE WHANGAREI DISTRICT COUNCIL AND NORTHLAND REGIONAL COUNCIL**

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| **IN THE MATTER** | of the Resource Management Act 1991 |
| **AND** | |
| **IN THE MATTER** | of a resource consent application by Northport Limited under section 88 of the Resource Management 1991 for a port expansion project at Marsden Point |
| **APPLICATION NO.** | APP.005055.38.01<br>LU 2200107 |

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# STATEMENT OF EVIDENCE OF IAN ROSS SNEDDON

## (MARINE ECOLOGY – PEER REVIEW)

**24 August 2023**

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## INTRODUCTION

### Qualifications and experience

1. My name is Ross Sneddon.

2. I hold a Master of Science in water pollution control from Middlesex University, London and a Bachelor's degree in chemical and materials engineering from the University of Auckland. I am a member of the New Zealand Coastal Society, a technical group associated with the Institution of Professional Engineers New Zealand (IPENZ).

3. I am an Environmental Scientist at Cawthron Institute ("Cawthron"). I have held this position for 19 years, during which time I have focused primarily on the assessment of ecological effects from physical and chemical stressors associated with discharges to, and developments within, the Coastal Marine Area. In particular, I have conducted assessments, and subsequent monitoring, of effects for both capital and maintenance dredging programmes for several ports nationally.

   (a) I was lead author of the assessment report on marine ecology that was included in Lyttelton Port Company Limited's (LPC) application for resource consents to undertake channel deepening dredging and maintenance dredging in Lyttelton Harbour (Applications). Together, the Applications are to undertake works known as the Channel Deepening Project (CDP). I have conducted nine separate monitoring field surveys for the CDP, including three baseline, four during capital dredging works and two post dredging. These each comprised transect dive surveys at six reef locations, intertidal reef surveys at four locations and soft sediment benthic sampling at 19 stations.

   (b) I was lead author of the assessment report on marine ecology that was included with Port of Napier Limited's (PONL) application for resource consents to undertake capital dredging and construction for the port's No. 6 berth development. I have conducted extensive subtidal transect monitoring of the adjacent Pania Reef (seven surveys at eight locations) and of sediment habitats in the vicinity of the offshore dredge spoil disposal area (four sampling surveys of 22 stations).

   (c) I have been involved in monitoring for Port Nelson Limited's (PNL) maintenance dredging programme since 2004, including the physicochemistry of dredged

material, port and harbour benthic communities, sediment plume tracking and spoil disposal effects.

4. In September-October 2022, I undertook for Northport Ltd a peer review of a draft of the assessment of marine ecological effects (AMEE) by Dr. Shane Kelly and Dr Carina Sim-Smith for the Northport expansion project.[1] My peer review was attached to the AEE as Appendix 12.

5. As well as the finalised AMEE, I have read the relevant parts of the application, including parts of the Coastal Processes Assessment (Appendix 10 of the application); and the s42A Report, including the technical memorandum (marine ecology) by Dr Drew Lohrer comprising Appendix C3 of the s42A report. I have also reviewed draft statements of evidence of Dr Kelly, Mr Reinen-Hamill, and Mr Blackburn, and draft versions of Northport's proposed conditions of consent relating to marine ecology. I have not visited the application site in a professional capacity, but I am familiar with the outer Whangarei Harbour and the surrounding locality.

**Code of Conduct**

6. I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note (2023) and I agree to comply with it. In that regard, I confirm that this evidence is written within my expertise, except where I state that I am relying on the evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

## SCOPE OF EVIDENCE

7. In my evidence, I:

   (a) provide an executive summary of my key conclusions;

   (b) summarise the key findings of my 2022 peer review;

   (c) comment on concerns raised in the s42A Report; and

   (d) comment briefly on Northport's proposed conditions of consent.

[1] The draft AMEE was reviewed as a standalone document, with none of the source data or ancillary reports consulted.

## EXECUTIVE SUMMARY

8. Based on my 2022 peer review and my ongoing involvement with the proposal:

   (a) I generally agree with the methodology of the assessment of marine ecological effects, as descried in the application documents and in Dr Kelly's statement of evidence. In my opinion the assessment undertaken covers a suitable range of ecological receptors (i.e. the relevant effects have been assessed), and is based on a suitable coverage of historical and recent survey data (i.e. there is sufficient data to assess effects).

   (b) I consider that the spatial scales used for the assessment (project footprint; outer harbour and entrance zone ("OHEZ"); and harbour) are appropriate.

   (c) I agree with Dr Kelly's overall effects conclusions, although in several respects I consider his assessment of effects is likely conservative (i.e. over-estimates effects).

9. I agree with Dr Kelly's observation that there is a high level of agreement between his findings and Dr Lohrer's memorandum on several key matters, notwithstanding that some differences of opinion remain. Where there are material differences in opinion between Dr Kelly and Dr Lohrer, I generally agree with Dr Kelly's statement of evidence,[2] including specifically where it relates to his response to Dr Lohrer's memorandum.

10. I have reviewed and had some input into Northport's proposed conditions of consent, which are attached to the statement of evidence of Mr Hood. To the extent they relate to marine ecology, it is my opinion that Northport's proposed conditions are robust and are suitable for appropriately monitoring and managing marine ecological effects.

## SUMMARY OF 2022 PEER REVIEW

11. Below I summarise the methodology and principal findings from my 2022 peer review of the AMEE.

### Review methodology

12. The approach I used in my review was concerned with three broad assessment components:

[2] Namely for the reasons set out in Dr Kelly's statement.

(a) The appropriateness of the marine area and key ecological receptors potentially affected, in the context of the proposed activities and the stated scope.

(b) The appropriateness and comprehensiveness of data sources (quality, currency etc) including historical data and cited references.

(c) A critical appraisal of the data analysis and interpretation to assess the extent to which the conclusions were well-supported by the data and used clear frames of reference.

**Review findings**

13. I did not identify any material concerns with the methodology of the AMEE. I confirmed that the assessment covered a suitable range of ecological receptors. Noting the challenges of compiling a comprehensive characterization of such benthic environments, I found the assessment to be based on a suitable coverage of historical and recent survey data.

14. I concurred with the spatial scales used in the assessment to contextualise effects, namely the project footprint; the outer harbour and entrance zone (OHEZ, as defined in the AMEE); and whole of harbour.

15. I identified where some aspects of the assessment appeared subject to compounding levels of conservativeness (i.e. tending to over-estimate effects), in part based on perceived areas of uncertainty. I questioned whether this may have led to predictions of effects at levels and persistence that were not well supported by historical observations of similar types of activity within the outer harbour. Some aspects of the assessment also appeared to overstate the extent and ecological significance of macroalgal meadows and shell lags as biogenic habitats.

16. I suggested that the qualitative scale of effects magnitude be more clearly anchored within the assessment to specifically stated criteria to enable better understanding of potential impacts by the intended readership. The final version of the AMEE included additional context around the application of the EIANZ[3] framework.

17. I commented that the overlap of the proposed project with areas of dredging and reclamation for the already consented but not yet implemented berth 4 introduced

[3] Environment Institute of Australia and New Zealand.

some complexity and potential confusion to what was being assessed. I understand that these aspects are addressed in some detail in the application documents and in the statements of evidence of Northport's witnesses, including Dr Kelly.

18. I noted that effects occurring outside the construction and dredging footprints will largely be associated with current-advected plumes of resuspended sediments. With regard to channel bed areas well-flushed by tidally reversing currents, I questioned whether a period of five years before the effects from deposition from project-generated sediment plumes become indiscernible might be somewhat conservative (i.e. overestimating the time required), based on my previous experience.

19. Bearing in mind the potential long-term alteration of habitat arising from local changes in hydrodynamics, I further suggested a greater emphasis on *effective recovery* for dredged areas, in terms of equivalence in ecological diversity or production or of foraging habitat for high value species (as opposed to a return to the pre-activity "base condition").

## CONCERNS RAISED IN THE SECTION 42A REPORT

20. I have reviewed Dr Lohrer's memorandum, which is attached to the s42A Report. I have also reviewed a draft version of the statement of evidence of Dr Kelly for Northport, which includes his response to Dr Lohrer's memorandum. I agree with Dr Kelly's observation that there is a high level of agreement between his conclusions and Dr Lohrer's on several key matters, notwithstanding that material differences of opinion remain, including the overall level of effects relating to intertidal sediment habitats and macrofauna, and effects on kaimoana shellfish.

21. Where there are material differences in opinion between Dr Kelly and Dr Lohrer, I generally agree with Dr Kelly's statement of evidence,[4] including specifically as it relates to Dr Kelly's response to Dr Lohrer's memorandum.

22. Below I set out additional detail on some of the issues raised by Dr Lohrer.

### Spatial context of effects and impacted areas

23. I understand Dr Lohrer's rationale for considering the OHEZ a more appropriate context for assessment of the effects on intertidal sediment habitats and macrofauna. However, both Dr Kelly and Dr Lohrer conclude that the magnitude of effect is

[4] Namely for the reasons set out in Dr Kelly's statement.

moderate (Dr Kelly at the harbour scale, and Dr Lohrer at the OHEZ scale). I note that this would make Dr Kelly's assessment nominally more conservative.

24. I agree with Dr Lohrer that the variety of habitats occurring within the OHEZ mean that caution should be exercised when expressing potential impacts spatially in terms of the percentage of an area affected. But while sub-categorising habitats - in terms of water depth, substrate or energy/exposure, for example - can provide greater accuracy, it becomes challenging to collect data at increasing levels of resolution and a level of pragmatism is appropriate and necessary. For instance, while there is some data available for habitat changes across the outer harbour seafloor in channel areas, it is not possible to accurately map these from the compiled information. Regardless, it is my opinion that the level of detail used to characterise the key marine areas in the AMEE does not portray either the intertidal or subtidal zones as spatially homogenous, despite the use of spatial context.

25. Related to the above, I also do not understand Dr Lohrer's reference to the importance of the absolute magnitude of effects.[5] All effects must be evaluated within an appropriate context. Significance always has a relative scale and no assessment can consider magnitude in isolation. The permanent loss of seabed to reclamation represents a small contraction in the size of the system as a whole. The associated loss of ecological productivity must be seen in the context of that system and what the incremental change in scale means to its continuing function.

26. I agree with Dr Lohrer that the loss of small but critical areas can have consequences beyond the area of direct impact; that they may be disproportionately important relative to their size. However, while the areas inside the dredging and reclamation footprints contain typically diverse and productive ecological assemblages, the data compiled by the AMEE does not identify them as disproportionately important to the ecological functioning of the OHEZ or wider harbour. In my opinion, this aspect has been adequately addressed in the AMEE and in Dr Kelly's evidence.

**Declines in kaimoana shellfish**

27. While I accept that there is some uncertainty regarding the longer-term effects of the project on kaimoana shellfish, I do not consider that Dr Lohrer's conclusion of more than minor (moderate) effects is supported by the coastal processes assessment undertaken. The contention that near-shore bed-load propagule pathways may be

[5] Section 5.1.2 of Dr Lohrer's memorandum.

critical to the maintenance of high-density shellfish beds on the banks and that the proposed reclamation represents a significant disruption to this (over and above the existing and consented reclamation) is somewhat speculative in my opinion. I concur with Dr Kelly's evidence that the contribution to the broader spawning or harvestable stocks of pipi from the relatively small areas affected by reclamation would likely be minimal.

28. I concur with Dr Lohrer that there is concern over recent declines in the biomass of shellfish resources on the banks in the OHEZ. Nonetheless, I do not consider that the technical assessments for the current application support an assertion that the project would significantly diminish the likelihood of their recovery.

**Elevated SSC in dredging plumes**

29. When considering the effects of elevated suspended sediment concentration ("SSC") on shellfish and other filter feeders, it is important to note that the reversal in tidal currents means that down-current areas will not be continuously subject to very high levels of SSC, even in the event of a dredger working in a single location over an extended period. All of the bivalve species listed in Dr Lohrer's technical review (pipi, cockles, mussels and scallops) are known to occur in environments more turbid than the OHEZ. Studies of the effects of suspended sediments on these and related species (including those cited in the AMEE) typically show tolerance of quite high concentrations for short periods.

**Effects of sediment deposition from plumes**

30. I agree with Dr Kelly that the modelled deposition from dispersed plumes may be unrealistically conservative (i.e. overstating levels of deposition and therefore related effects). For example, among other things the AMEE notes that *"the models exclude real-world dynamics that will affect dispersal and deposition. For instance, the modelling does not account for any resuspension and redispersal of the sediment, and a static dredging position was used continuously for a month in the model".*[6] It is my opinion that the same hydrodynamic processes that establish shell lag habitats in the channel beds will also serve to ameliorate the accumulation of fine sediments settling from turbidity plumes.

6 Section 6.3.2.2.

31. Dr Lohrer bases most of his concerns of effects on the benthos from sediment deposition from plumes on studies of settlement effects from fine terrigenous sediments. I agree with the AMEE[7] and Dr Kelly's evidence that locally sourced sediments of marine origin are less likely to adversely affect benthic communities when resuspended. It has been my experience from monitoring the effects of dredging and spoil deposition that benthic communities in sandy substrates are quite resilient to plume effects, even in close proximity to these activities.

**Cumulative effects**

32. Whangarei Harbour is the product of well over a century of significant human impact and modification, both directly and via its catchment. Many of these stressors are ongoing. This makes a comprehensive assessment of cumulative effects challenging.

33. Dr Lohrer states that the AMEE does not specifically address interactions or otherwise compounding effects between the nine effect types identified by the AMEE (referred to by the s42A report as "accumulative effects"). In my opinion, any such interactive effects (beyond or cascading from berth 5 activities alone) will likely be temporary and minor at the scale of the OHEZ.

34. In my opinion, the main concern with regard to cumulative effects is the potential coincidence or temporal proximity of the Northport dredging and reclamation activities to that of the Channel Infrastructure dredging project. This is because the sediment plume envelopes from the two projects will likely overlap spatially. If the scheduling of the two projects has them occur in close succession, effects from the earlier event may be exacerbated before significant recovery of benthic habitats has occurred. In this regard, Northport's proposed conditions prevent the commencement of capital dredging for its proposed expansion project during or within six months of a capital dredging event (over a certain volume) authorised under Channel Infrastructure's resource consents. I support this restriction, as it will serve to limit the potential cumulative ecological effects from the two projects.

## CLIMATE CHANGE

35. The timescales of the project are such that compounding effects from climate change are unlikely to materially affect the assessed impacts of the construction, dredging and reclamation activities while they are occurring. Such considerations are more

[7] Section 6.3.2.2.

relevant to interactions with the port structures and altered hydrodynamics/coastal processes over the longer term, which are assessed in the statement of evidence of Mr Reinen-Hamill. Any assessment of ecological outcomes from such interactions must be grounded in predictions regarding coastal processes. On the basis of Mr Reinen-Hamill's evidence, I agree with Dr Kelly that the climate change/sea level matters raised in Mr Lohrer's memorandum are unlikely to materially change the overall conclusions regarding the ecological effects of the proposal.

36. I acknowledge that raised sea temperatures or marine heat waves are likely to more severely affect ecological systems that are already stressed. But while it is possible that a marine heat wave may coincide with project implementation, I do not believe that disturbance effects from the project will persist in the longer term to the point that this represents a significant additional risk.

## PROPOSED CONDITIONS

37. I have reviewed and had some input into Northport's proposed conditions of consent, which are attached to the statement of evidence of Mr Hood.

38. The proposed conditions relating to the real-time monitoring of turbidity and ecological assurance monitoring are consistent with those implemented for Lyttelton Port's CDP and Port of Napier's No.6 berth project. Based on my direct involvement in both of these earlier projects, including the outcomes from extensive ecological assurance monitoring, I consider Northport's proposed approach to these aspects to be current best practice. It is my opinion that the proposed conditions are suitable to appropriately monitor and manage marine ecological effects.

**Ross Sneddon**
Cawthron Institute

24 August 2023