

## Before the Fast-track Panel

**Under:** Fast-track Approvals Act 2024

**In the matter of:** FTAA-2511-1150 – Bream Bay Sand Extraction Project

**Statement of advice:** Samuel Casey Morgan

Coastal Processes

National Manager- Coastal. LDE Ltd.

Date: 19 May 2026



Department of  
Conservation  
*Te Papa Atawhai*

**Te Kāwanatanga  
o Aotearoa**  
New Zealand Government

## **Introduction**

1. My full name is Samuel Casey Morgan. I am National Manager- Coastal at LDE Ltd., based in Gisborne.

## **Instruction**

2. I have been requested to provide expert advice on behalf of the Department of Conservation (DOC) on the Bream Bay Sand Extraction Project Fast-track application.

## **Qualification and Experience**

3. I hold a Master of Science Degree (Hons) in Marine Science, specialising in Marine Geosciences, from the University of Auckland (UoA).
4. I hold a General Environmental Practitioner Certification in the fields of coastal processes and coastal management under the Environment Institute of Australia and New Zealand scheme.
5. In 2008, I started at the Rodney District Council in an operational role undertaking the maintenance and development of coastal assets within the district. Prior to this, I was involved in research and teaching at the UoA and University of Wollongong, as well as research at the Elkhorn Slough Estuarine Research Centre in California.
6. Between 2009 and 2011, I worked for Davis Coastal Consultants on a range of coastal management and engineering projects. Following this, I was employed by Auckland Council as a Senior Coastal Specialist from August 2011 to January 2016, and then with AR & Associates, as an Associate - Coastal Scientist between 2016 and early 2018.
7. While at 4Sight Consulting Limited from 2018 as Principal Coastal Consultant, I managed a range of coastal management projects and provided coastal science inputs. Part of this role involved the review of coastal processes aspects for resource consent applications, including technical reviews of the America's Cup basin and wharf extensions at Ports of Auckland.
8. I joined WSP NZ as a Technical Principal - Coastal Adaptation in October 2022. In this role I am primarily involved in the development of coastal management responses to coastal hazard risk. Whilst in this role I represented Auckland Council as a coastal processes expert in the Pakiri Beach sand mining application through Environment Court proceedings including expert conferencing.
9. I recently joined LDE Ltd. to oversee a range of coastal engineering and science projects.
10. I have a good understanding of the coastal processes of wider Hauraki Gulf and Bream Bay. Work that is especially relevant to this application includes:
  - a. Pakiri sand mining Environment Court Case
  - b. Beach monitoring data analysis for Auckland Council

## **Code of conduct**

11. Whilst it is acknowledged this is not an Environment Court Proceeding, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in the preparation of this advice. Unless I state otherwise, this advice is within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

## **Scope of advice and expert opinion**

12. My expert advice relates to the following:

- a. Adequacy of the Applicant's assessment of coastal processes, including identification of any matters that have not been assessed or have been insufficiently characterised.
- b. Adequacy of the Applicant's assessment of effects on coastal processes with specific reference to any effects that are incomplete, understated, or not addressed.
- c. Adequacy of the Applicant's proposed mitigation, rehabilitation and management measures.
- d. Alternative mitigation or management approaches, where appropriate, including my recommended or preferred measures where these differ from those proposed by the Applicant.
- e. Comments on conditions

## **Material Considered**

13. In preparing this advice I have reviewed the following documents as part of the substantive application:

- a. Attachment Eight: Tonkin & Taylor Ltd, Te Ākau Bream Bay Sand Extraction: Coastal Process Effects Assessment. Prepared for McCallum Bros Ltd. January 2026.
- b. Attachment Twenty-Nine: Environmental Monitoring Management Plan for the Te Ākau Bream Bay Sand Extraction Site. Updated 14 May 2026.
- c. Draft technical report of Dr. Tony Beauchamp relating to shore birds and Tara iti impacts from the proposed Bream Bay Sand extraction.
- d. Professor Mark Dickson, University of Auckland. Review letters to Northland Regional Council. Dated 21 September 2025 and 4 March 2026
- e. Joint Statement of Evidence from Richard Reinen-Hamill and Edward Beetham on behalf of McCallum Brothers Limited in Response to Minute 4 Further Information Request (RFI 1) (Coastal Processes), Dated 14 May 2026

## Proposal Description

14. McCallum Bros Ltd (MBL) is proposing to extract sand from an offshore area within Te Ākau Bream Bay. The sand extraction application area is located in the central part of Te Ākau Bream Bay, west of the Northport anchorage area, and south-west of both the harbour shipping channel and the rocky reef to the north of the anchorage area.
15. The proposed extraction area covers 15.4 km<sup>2</sup>, extending approximately 7 km alongshore and 2.2 km offshore, and comprises 77 (1,000 m × 200 m) cells. The site is located at least 4.7 km from the shoreline.
16. The proposed extraction volumes are:
  - 150,000 m<sup>3</sup> per annum for the first 3 years.
  - Maximum sand extraction volume per 1,000 m x 200 m cell not to exceed 5,000 m<sup>3</sup> per annum.
  - Maximum rate of 15,000 m<sup>3</sup> per month for the first 3 years.
  - 250,000 m<sup>3</sup> per annum for the remaining 32 years of the 35 year consent being applied for.
  - Maximum rate of 25,000 m<sup>3</sup> per month from year 4 of the consent.
  - Total maximum volume over the 35 years of 8,450,000 m<sup>3</sup>.
17. Extraction depths range between -22m and -34m, with the landward boundary extraction depths varying between -22m and -25.6m.
18. It is proposed to use a cutter suction dredge with operational procedures to avoid repetition of extraction lines and creation of excavation trenches.

## Basis of Assessment

19. The Tonkin + Taylor coastal processes impact assessment has been undertaken by examining the position of the proposed extraction area relative to the system's Depth of Closure (DoC) and Depth of Transport (DoT). Broadly, the DoC represents the offshore limit of beach interaction with waves and sediment transport.
20. The rationale for this approach being that if sand is extracted from deep enough water the risk of impacts on local coastal processes and the upper and dry beach areas are significantly reduced.
21. This is consistent with the approach applied to the assessment of coastal processes through the Pakiri Beach sand extraction Environment Court expert conferencing and presentation of evidence.
22. In general, at Pakiri the "offshore" extraction area<sup>1</sup> was found to be seaward of the inner DoC, outer DoC (average) and DoT. Had more detailed analysis of the annual outer DoC

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<sup>1</sup> Noting applications were made to extract sand from three areas at Pakiri — the "in-shore" extraction area was proposed to be within 5 m – 15 m depth, the "mid-shore" area was proposed to be within 15 m – 25 m depth and the "offshore" area was proposed to be within 25 m – 40 m depth.

been undertaken this may have indicated that at times the lower shoreface boundary may be situated within the extraction area.

23. For the Te Ākau Bream Bay application the information identifying DoC and DoT was used as the basis for the assessment of potential effects following UK best practice guidance (BMAPA<sup>2</sup>/Crown Estate (2013)).
24. In general, the estimate of the outer DoC is considered to be the most conservative of the three beach boundaries presented in the effects assessment. Accordingly, it has been the focus of this assessment.
25. I note this is a system where extraction has not occurred previously and little detailed information about coastal processes regime is available. Accordingly it is my opinion that a precautionary approach should be taken to determining the appropriateness of sand extraction within the system.
26. The primary potential coastal processes effect of concern from the proposed extraction activity is degradation of the upper beach and 'dry beach' areas. A reduction in sand supply to these areas could result in a reduction in recreational amenity, natural character and key habitat for at-risk and threatened species.
27. Accordingly, the key areas of concern are:
  - Is proposed sand extraction at a depth where more regular interaction and sand movement occurs and the material is more likely to reach the upper beach?
  - Is the quantity of sand being extracted enough to impact the beach and shoreline regardless of the depth it is being extracted from?
  - What is the timeframe for sand from the outer limits of the outer DoC and deeper to reach the upper shoreface, the surf zone and then the beach itself?

## Site Description

28. Te Ākau Bream Bay is considered to be a moderate energy coastline subject to Maximum Significant Wave Heights in the order of 6 m predominately from the east-northeast to east, with shelter provided by Whangarei Heads to the north and Great Barrier Island and Coromandel Peninsula to the south.
29. It is a meso tidal system with a spring tidal range of 2.2 m<sup>3</sup>.
30. Sand deposits in the embayment are relic from when the Waikato River mouth was situated at the base of the Firth of Thames and delivered to the wider Hauraki Gulf basin.
31. As sea-level started to rise approximately 16,000 years ago these sediments became reactivated by coastal processes, and as sea-level stabilised 6-8,000 years ago the

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<sup>2</sup> British Marine Aggregate Producers Association

<sup>3</sup> meso-tidal range refers to a coastal or estuarine environment where the difference between high and low tide—the tidal range—typically falls between 2m and 4m

modern coastal geomorphic landforms developed. In some cases, reoccupying relic landforms.

32. There are no significant non-biogenic sand sources within the system.

### Outer Depth of Closure Definition

33. The outer DoC was calculated using the Hallermeier equation which uses annual significant wave height and period as primary inputs.

34. Tonkin + Taylor for their assessment used a mean significant wave height and period based upon wave modelling using 45 year hindcast data. The modelling aligns reasonably well with publicly available data sets.

35. This was applied across several parts of the embayment to reflect changing wave conditions across the bay and extraction site.

36. The results of this analysis are presented in the table below.

Table 1: Results of Outer DoC across different profiles within Te Ākau Bream Bay

Profile	$\bar{H}_s$ (m)	$\bar{T}_s$ (s)	Outer DoC (mRL)
Profile 1	0.75	8.9	-15.9
Profile 2	0.83	8.9	-17.9
Profile 3	0.85	8.9	-19.2
Profile 4	0.90	9.0	-22.2
Profile 5	0.91	9.0	-20.8
Bay average	0.85	9.0	-19.1

37. Tonkin + Taylor also examined the variance in changing wave conditions over the modelled period by calculating the annual outer DoC for each of the 45 years modelled.

38. This resulted in some increases in wave height and period, with mean wave height varying year-to-year from 0.75 m to 1.1 m, and mean wave period from 8.5 s to 10 s.

39. This resulted in annual outer DoC ranges from -14 mRL to 19 mRL on Profile 1, and from 19 mRL to 27 mRL on Profile 4.

40. 91% of annual outer DoC values (5 profiles × 45 years) lie landward of the proposed extraction area; in all cases the mean outer DoC is landward of the proposed extraction area.

41. Profile 4 had the most annual events within the extraction area (14 occurrences, 31% of years).

42. Comparison of the average outer DoC with bathymetric survey was undertaken to see if there was alignment with calculations and observed conditions of the site.

43. Examining the bathymetric and grain size data presented in the assessment there does appear to be marked changes in bathymetry and in the case of Profile 4 this aligns with a slight coarsening of the sediment. This is shown by the red arrow in the figure below.
44. This type of observation would typically indicate a change in physical processes that signify a boundary between coastal systems (e.g. lower shoreface to offshore).

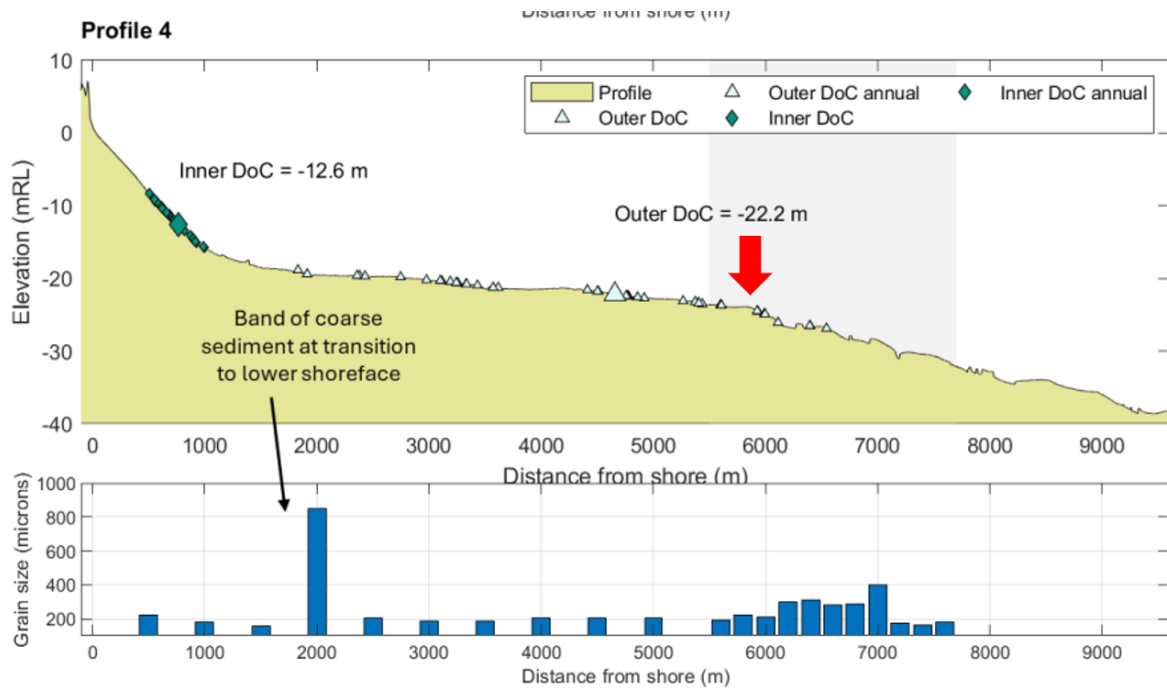


Figure 1: Respective DoC locations and sediment grain size along Profile 4 intersecting the proposed extraction area.

### S53 Matters specific advice

Is the proposed extraction deep enough so not to affect the beach?

45. It is important to note that concepts such as DoC (and DoT) are theoretical boundaries in a dynamic natural system, and as such there will always be a degree of uncertainty.
46. Regardless of theoretical boundaries there is still likely to be some small amount of sediment exchange across the outer DoC from the offshore area.
47. This has been recognised by the applicant in their response to Minute 4 Further Information Request (RFI 1) (Coastal Processes) Dated 14 May 2026 where they discuss the landward movement of finer sediments (albeit infrequent) during extreme events in paragraphs 42, 48 and 49 .
48. The Mangawhai-Pakiri Sand Study estimated approximately 12,000m<sup>3</sup> of landward (net) sand movement from across the outer DoC boundary in the development of its sediment budget.
49. Calculating the Morphodynamic Depth of Closure, as suggested by Professor Mark Dickson, may be useful in resolving the boundary of the lower shoreface. Further detailed modelling of the system's hydrodynamics and sediment transport regime,

complemented by the deployment field instruments and measurements could also help refine the outer limit of the beach system or a sediment budget for the system.

50. But in reality, the extraction area generally sits at the edge of or outside of the outer DoC and that level of refinement is perhaps not required.
51. Because of this the likelihood of effects being realised on the upper shoreface and dry beach are considered to be low.
52. But the likelihood of effects being realised would be further reduced should the extraction activity be shifted to beyond the deepest Annual Outer DoC, being 27m, presented in the application material.

Is the proposed extraction quantity enough to impact the beach despite the extraction depth?

53. No sediment budget is available for Te Ākau Bream Bay to be able to consider the scale of extraction activity in the context of the wider system.
54. As there is no sediment budget available, I have considered the change in seabed depth from the extraction, and if it will change enough to impact the physical processes that are operating to transport sand landward at the extraction depths.
55. The quantity of sand being extracted over the 35-year term will on average result in a potential 0.55 m lowering of the seabed (at an average of ~1.6cm/yr) across the entire proposed extraction area.
56. I note that given the use of cell extraction, replenishment of extracted areas is likely and an observed 0.55m lowering of the seabed as a result from extraction activity would seem unlikely.
57. The proposed maximum annual extraction from a single cell would result in a lowering of the seabed by 2.5 cm. I note Tonkin + Taylor in the RFI dated 14 May 2026 have corrected a miscalculation in this matter, originally quoting 4cm lowering which would result from 8000m<sup>3</sup> extracted across a 200,000m<sup>2</sup> cell.
58. This degree of lowering is thought to be in line with regular natural fluctuations resulting from changing weather and tidal conditions.
59. Further, this degree of change and fluctuation is considered to be within the envelope of change observed in the upper beach, surf zone and dry beach.
60. Overall, the quantity of sand being extracted is not considered to be of an amount that would offset the outer DoC (or close to) extraction depths.

How long would it take for sand from the proposed extracted area to reach the shoreline?

61. For sand from the extraction area to reach the beach it must first move across the lower shoreface, the inner DoC and across the surf zone. All of which will have their own complex dynamics contributing to landward transportation (or not) of sand.

62. Under average conditions sand from the extraction area (albeit from inside or outside the annual outer DoC) would not be mobilised, and any onshore transport would be limited to rare extreme events.
63. Accordingly, sand from the extraction area is expected to take several decades, or longer, to reach the upper and dry beach, whether or not extraction occurs.
64. Therefore, should any effects from the extraction activity arise these should be able to be detected through monitoring in the lower shoreface, inner DOC and surf zone, and corrective action taken prior to impacts on the upper and dry beach are realised.

#### Areas of specific concern- tara iti

65. It is understood from Dr. Beauchamp's draft evidence that the dry beach is of importance for tara iti (*Sternula nereis davisae*) in terms of roosting and nesting.
66. As noted above the likelihood of the dry beach being impacted by the extraction activity is low.
67. Dr. Beauchamp also highlighted the importance of the Waipu and Ruakaka estuaries/river mouths as breeding and management sites for tara iti.
68. Estuarine entrances and rivermouths are highly dynamic features with numerous processes contributing to their geomorphology and associated changes.
69. The likelihood of the proposed extraction activity have a discernable impact on these features is very low.
70. However, I understand from Dr. Beauchamp that the potential impacts on tara iti (if the foredunes or estuaries were impacted by the extraction activity) are high.

#### Areas of specific concern- Climate Change and Sea-level rise

71. The applicant has considered potential impacts of climate change and sea-level rise.
72. I agree that the outer DoC will shift landward as a result of increased water depths from sea-level rise. However, this could be offset by an increase in mean wave heights, which Tonkin + Taylor have allowed for with a 5% increase in the assessment.
73. On balance and taking into account the location of the extraction area relative to the outer DoC boundary, it is my opinion that climate change and sea-level rise will not increase the likelihood of effects from the proposed extraction.

### **Conditions Review**

74. I do not think that Condition 23 and the triggers for increasing the extraction quantity are conservative enough given the potential consequences.
75. This is because there is a reliance on understanding the natural processes as a part of the trigger and the proposed monitoring program does not have an established baseline dataset of change in these areas to make an informed decision in this regard. Note: a baseline dataset would take several years to establish.

76. Accordingly, and following a precautionary approach, I would recommend that should the proposed bathymetric monitoring demonstrate successive lowering of the shoreface in the control sites being detected across the three-year assessment period then extraction be restricted to beyond the maximum Annual Outer DoC (27m). This approach avoids establishing what natural processes might be and provides a simpler condition to enforce.
77. Should the proposed bathymetric monitoring demonstrate continued lowering of the shoreface in the control sites when extraction is being undertaken beyond the maximum Annual Outer DoC (27m) the works should be reviewed.
78. Given the lack of current knowledge about the degree of seabed fluctuations in any of the control sites or extraction area I do not think linking the amount of change to the margin of error is appropriate (being +/-0.15m). It would be more appropriate for the trigger to be enacted should successive annual lowering over three years of the seafloor in the any of the control areas be measured over the assessment period.
79. I think monitoring and analysis of all the control sites should cover the entire area as indicated in Figure 1 in the Environmental Monitoring Management Plan. This is as opposed to the analysis of data based upon the profiles as indicated in Figure 2 of the plan.
80. I do not agree with reducing the frequency of bathymetric monitoring as suggested in Section 6.2 of the Tonkin + Taylor report, as there is an expected lag on any potential effects. Further, I think consistency in the monitoring period is required to enable adequate analysis.
81. Within the RFI response dated 14 May 2026 the rationale for reducing the initial annual monitoring after 6 years was that a baseline for future analysis would be established and monitoring on a 3-yearly basis would then be adequate. I do not think 6 years is necessarily an adequate amount of time to establish a baseline in this setting. Furthermore, a 3 year monitoring period may lead to lags in the identification of actual changes rather than potential natural fluctuations.
82. I do not think \$5000 per year is sufficient to cover the costs of monitoring. I would expect the cost of monitoring of Bream Bay beaches to be in excess of \$25,000 per year for biannual surveys.
83. I would instead think that annual drone monitoring (or other beach wide method) undertaken by the consent holder would be sufficient to highlight any erosion or accretion trends when analysed in conjunction with the NRC data set. Further, should beach wide erosion be measured in the monitoring data I would recommend that the frequency of monitoring be increased to quarterly to highlight any potential seasonal fluctuations. I would think analysis of this data could easily be included into the Sand Extraction Monitoring Reports. This would be additional to the bathymetric monitoring proposed in Environmental Monitoring Management Plan with the amendments as discussed in paragraphs 74 – 81 above.

84. Due to the dynamic nature of coastal processes monitoring, methods that are able to survey the beach in its entirety should be employed. As sub-aerial and bathymetric monitoring methods improve with time the methods and frequency of monitoring techniques should be reviewed to reflect this. I would think inclusion of this review could easily be included into the Sand Extraction Monitoring Reports.

### **Conclusions / Recommendation**

85. There is some ambiguity regarding the position of the outer DoC. This reflects inherent uncertainty in the DoC concept, rather than any deficiency in the assessment undertaken.

86. Regardless it is apparent that the landward extent of proposed extraction area is at a depth where interaction with the wider beach system is very limited.

87. Therefore the likelihood of the proposed extraction activity having a discernable impact on the coastal processes and beach system is low.

88. However, given the Threatened–Nationally Critical conservation status and sensitivity of tara iti to potential habitat change I understand the consequence of potential effects to be high.

89. This is reinforced by proximity of the Waipu River mouth to the central portion of the extraction area, which has been shown to have the greatest variance in the annual DoC position.

90. Accordingly, I think a robust monitoring program with suitable triggers established to halt or alter the works needs to be put in place.

91. Should the conditions incorporate the points discussed above it is my opinion that the risk of potential effects on coastal processes is low and can be adequately managed.