

**1.0 TECHNICAL MEMO – COASTAL PROCESSES**

<b>To:</b>	Stacey Sharp & Blair Masefield, Beca (consultant planners)
<b>From:</b>	Doug Treloar, Senior Principal Coastal Engineer, Stantec
<b>Date:</b>	1 August 2023

**1.1 Statement of Qualifications and Experience**

My name is Philip Douglas Treloar. I currently have the role of Senior Principal Coastal Engineer with Stantec in Sydney, Australia. I have been employed by Stantec and its predecessor bodies as a coastal/met-ocean engineer since 1980.

I have over 40 years of coastal and port engineering experience. My qualifications are:

- BE (Hons) 1966, ME (1967) University of Adelaide
- PhD 1970 Queens University, Canada
- F I E Aust.

With more than 40 years of industry experience, I have provided professional services in major coastal and port projects, including investigations, data analysis, numerical modelling and environmental design criteria preparation. My expertise lies in wave climate, siltation and current field investigations, estuarine numerical modelling and sediment transport investigations for infrastructure design, hazards investigations and environmental impact assessments.

I have been at the technical forefront of coastal erosion and storm tide investigations and numerical modelling throughout Australia, with some experience in New Zealand, having had significant involvement with studies for local government for development planning in terms of coastal erosion hazard definition and storm tide inundation for the following coastal and estuarine sites.

In addition to my experience in Australia, I have also worked internationally in New Zealand, Fiji, Papua New Guinea, Indonesia, Namibia, Philippines, Timor-Leste, Vanuatu and the Maldives on coastal projects that have involved erosion and or inundation risks investigations.

I confirm that the statements made within this memorandum are within my area of expertise and that I am not aware of any material facts that might alter or detract from the opinions I express. Whilst acknowledging that this consenting process is not before the Environment Court, I have read and agree with the Code of Conduct for Expert Witnesses as set out in the Environment Court Consolidated Practice Note 2023. The opinions expressed in this memorandum are based on my qualifications and experience and are within my area of experience. Where I rely on the evidence or opinions of another, my statements will acknowledge that.

## 2.0 APPLICATION DESCRIPTION

Applicant's Name:	Northport Limited (Northport)
Activity type:	<b>Land Use (s9), Coastal Permit (s12), Water Permit (s14), Discharge Permit (s15)</b>
Purpose description:	Northport seek to construct, operate, and maintain an expansion of the existing port facility to increase freight storage and handling capacity, and transition into a high-density container terminal.
Application references:	Northland Regional Council: APP.005055.38.01 Whangārei District Council: LU2200107
Site address:	Ralph Trimmer Drive, Marsden Point, Whangārei

## 3.0 SITE AND PROPOSAL DESCRIPTION

### 3.1 Site and Environmental Setting

A description of the subject site and surrounding environment was provided in section 4.0 of the Assessment of Environmental Effects (AEE) entitled: *Application for resource consents for the expansion of Northport*, prepared by Reyburn & Bryant, dated 6 October 2021.

### 3.2 Proposal

The proposal is as described in Section 3.0 of the AEE and depicted on the design drawings attached as Appendix 3 of the application (referenced in Section 2.3 below).

I note the following key elements of the proposal:

- Construction of a 11.7ha reclamation to extend the existing Port facility to the east, increasing the overall berth length to 700m
- Dredging of approximately 1.72 million m<sup>3</sup> of material to construct the reclamation and extend/deepen the existing swing basin
- Construction activities within the coastal environment, including pile-driving (via vibro and top-driven impact hammers), construction of seawalls and abutments, and discharge of decant water
- Discharge of operational stormwater from the extended and existing Port
- Construction of a high tide bird roost to the west of the existing Port facility.

The memorandum is limited to the consideration of matters relating to coastal processes.

### 3.3 Reference documents

The following application documents have been reviewed and inform this technical memorandum.

#### Application

- Assessment of Environmental Effects entitled: *Application for resource consents for the expansion of Northport*, prepared by Reyburn & Bryant, dated 6 October 2021 (henceforth referred to as AEE)
- Design Drawings entitled: *Northport – Proposed Reclamation and Dredging*, prepared by WSP, sheets C01 – C04, plan set dated 18 August 2022
- *Coastal Processes Assessment*, prepared by Tonkin +Taylor, dated September 2022
- *Hydrodynamic, Morphodynamic, and Dredge Plume Modelling Reports*, prepared by Met Ocean Solutions, dated August 2022.

#### s92 Request for Information

- Supplementary coastal processes supplementary memo prepared by Tonkin+Taylor, dated 22 May 2023 (henceforth referred to as s92 Response)
- Draft NRC conditions of consent, working drafts, dated 21.04.2023.

## 4.0 REASON FOR CONSENT

### 4.1 Reasons for Consent

A list of resource consents sought (as per the application documents as lodged), are summarised in Sections 1.5 – 1.7 of the AEE, and are as amended by the s92 Response.

### 4.2 Overall Activity Status

Overall, the resource consent is considered as a **Discretionary Activity**.

## 5.0 TECHNICAL ASSESSMENT OF APPLICATION AND EFFECTS

### 5.1 Assessment of Effects on the Environment

The T+T Coastal Processes Assessment identifies and assesses the following effects:

- Construction effects of the reclamation and dredging, from:
  - Reclamation and seawalls – negligible outside of the footprint
  - Dredging – minor.
- Long term effects of the reclamation, associated with:
  - Occupation – permanent extinguishment of local coastal processes by

virtue of the proposal

- Waves – minor
- Currents and sediment transport – moderate within the area bounded by the eastern extent of the Port and Channel Infrastructure NZ ('CINZ') jetty
- Water level – nil
- Expected changes to the inner harbour (nil), entrance channel (minor), ebb tide shoal and Mair Bank (minor), and open coast shoreline (nil)
- Effects on existing and future coastal hazards (minor) and tsunami risk (unlikely to change as a result of the proposal).
- Coastal processes effects from the proposed high tide bird roost in the short term/construction (negligible) and long-term/occupation and sand top ups (potentially beneficial).

With regard to mitigation, the T+T Assessment identifies the following proposed mitigation:

- Capital dredging monitoring, as recommended by 4Sight (earlier marine ecology assessment)
- Long-term monitoring, by way of intertidal and subaerial survey in addition to the existing hydrographic surveys undertaken to provide a comprehensive topographic and bathymetric data set for coastal shoreline monitoring. The T+T Assessment also recommends:
  - Surveys are carried out after each stage of the development is completed and at least annually for a period of not less than five years.
  - The bird roost will require more detailed assessment to confirm performance and the requirements for top-ups.
  - Sediment sampling and analysis of surficial sediments within the eastern end of Marsden Bank could also be carried out to confirm any change in sediment properties that may potentially affect ecology in this area.
  - The swing basin will need to be infrequently dredged as part of the port operations, acknowledging that this area is already subject to annual survey.
  - Pre and post dredging surveys should be retained by the consent holder in a compatible format to augment this data set and information of the volumes and locations of deposition of both the capital and maintenance dredging recorded.

With the exception of the matters raised in Section 6.0 below, I consider that the T+T assessment utilises an appropriate assessment methodology and I generally concur with the conclusions reached. In response to matters raised in submissions, I recommend amendments to the proposed mitigation to better manage potential adverse effects on coastal processes.

## 5.2 Conclusion

Overall, subject to recommended conditions, adverse effects on coastal processes are

assessed as being minor.

## 6.0 TECHNICAL RESPONSE TO MATTERS RAISED IN SUBMISSIONS

### 6.1 Sediment Plumes

Relevant submissions: e.g. 146b, 158

In response to matters raised in the above referenced submissions relating to sediment plumes, I note:

- The MOS (2022) modelling demonstrates that the main areas of increased suspended solids concentrations are within the deeper channel areas of Whangārei Harbour. The analyses are comprehensive in terms of SS source terms and plume structure.
- In my experience, there is also a risk of SS plumes from the reclamation site, unless adequate containment/settlement precautions are undertaken. This source does not seem to have been discussed, but turbidity monitoring from this source is proposed in the conditions and this is supported. There appears to be no assessment of heavy metals in the sediments.

### 6.2 Effects on the Marsden Bay and Blacksmiths Creek Areas

Relevant submissions: e.g. 32, 146b, 158, 176, 183

In response to matters raised in the above referenced submissions relating to effects on the Marsden Bay and Blacksmiths Creek Areas, I note:

- The proposal will result in accretion to the east of the reclamation area, toward the CINZ facility.
- There seems to be no wave climate and shoreline sediment transport modelling as distinct from the Delft3D morphological modelling and there is no data to indicate how shoreline changes arising from the construction of the existing Port may have stabilised – particularly within the Marsden Bay and Blacksmiths Creek area – and whether this shoreline is in dynamic equilibrium. The wave model SWAN is mentioned, and T+T (2022) mention monitoring in Section 7.2, but I have not sighted wave modelling and longshore transport analyses for the Marsden Bay area.
- Potential impacts on channels at Marsden Point and the Blacksmiths Creek DOC wildlife refuge are not well defined. Also, there is no thorough investigation of the effects to the Marsden Bay area overall, noting that T+T did not do so for this application because the site is east of existing development.
- T+T and MOS do not appear to have thoroughly assessed the effects of the proposed intertidal bird roost area on the Marsden Bay, Marina Entrance channel and Blacksmiths Creek areas.

I recommend amendments to the Applicant’s proposed conditions of consent relating to the long-term coastal shoreline monitoring of the Marsden Bay and Blacksmiths Creek Area to address these matters.

**6.3 Coastal Processes and / or High Tide Provisions**

Relevant submissions: e.g. 164a, 165

In response to matters raised in the above referenced submissions relating to effects on coastal processes and/or relating to the high tide bird roost, I note:

- In terms of coastal processes and the bird roost area, sea level rise will affect these areas and shoreline form in Marsden Bay – long term ongoing changes. Tonkin + Taylor (2022) seem only to have considered SLR in terms of port design levels.
- Stantec advise that MOS and T+T do not seem to have quantified existing morphological changes in the general Marsden Bay area, and then any changes to those ongoing processes that would arise from Northport’s proposed port development works – including ongoing maintenance for access to Blacksmiths Creek, and the Marina entrance channel, if attributable to the proposed works.
- Stantec advise that in their opinion there is a lack of assessment in these areas in the resource consent application prepared for Northport.

**6.4 Motukiore Island and CINZ Jetty**

Relevant submissions: e.g. 184 and CINZ 176

- Stantec advise that they agree that a build-up of sand is likely at the eastern end of the new reclamation.
- Generally, the jetty (pile supports), will not have an identifiable effect on the hydrodynamics/coastal processes of this area. Pile driving will not cause identifiable SS plumes. CINZ require an independent assessment and ongoing collaboration with Northport with respect to accretion.

**7.0 STATUTORY CONSIDERATIONS**

**7.1 Resource Management Act 1991**

Relevant statutory considerations under the RMA include:

- Section 105 RMA – restrictions relating to discharge and coastal permits
- New Zealand Coastal Policy Statement
- Regional Policy Statement for Northland
- Proposed Regional Plan for Northland (Appeals Version)

- Operative Regional Coastal Plan.

## 7.2 Duration and Review of Consents

The Applicant seeks 35 years durations for the regional consents.

## 8.0 RECOMMENDATION

### 8.1 Adequacy of Information

Despite the lack of detailed assessment identified for the matters outlined above, the above assessment is based on the information submitted as part of the application. It is considered that the information submitted is sufficient to enable the consideration of the above matters on an informed basis.

### 8.2 Recommended Conditions and Advice Notes

Should consents be granted, the following Conditions and Advice Notes are recommended to avoid, mitigate or remedy environmental effects attributable to the proposal and to implement mitigation measures proffered by the Applicant.

#### Conditions and Advice Notes

It is recommended that the following matters are addressed within conditions.

1. Marsden Bay Coastal Processes Monitoring

This area includes eroding shorelines, navigation channels and the Bird Roost. There is a need to baseline historical shoreline changes and navigation channel siltation.

The Bird Roost needs to be considered in terms of its durability, maintenance and effects on the local coastal processes. Historical aerial images may provide advice on shoreline erosion. Residents seek access to monitoring data.

Should ongoing adverse effects be identified by the monitoring data, then there will be a need to determine the causes – as best as is possible. The Applicant should undertake detailed pre- and post-works surveys of these areas to describe the current condition and immediate post-works formations. The appropriate survey locations and frequency need to be agreed before works commencement. Determining the cause(s) would require numerical wave, current and morphological modelling calibrated using survey data. This process is associated with a fair degree of uncertainty, but provides valuable insights. There will be a need to determine a percentage of the deleterious effects that can be attributed to this Consent proposal, if any.

This can be followed by an agreed remedial action plan.

2. Dredged Spoil SS Plumes and Contamination

There appears to have been no heavy metals investigations of the area proposed for dredging. Moreover, the SS plume investigations are only related to the dredging process.

There needs to be consideration of likely SS plumes that would likely form at the discharge point and the effects of those plumes. The Proponent should collect some seabed sediment samples in the proposed dredging area and test them for heavy metals content and then assess the likely concentrations in the dredged spoil discharge in terms of ANZECC (2018).

Perhaps ten samples spread over the dredging footprint. Surface samples are more likely to be affected, if any are.

3. Turbidity monitoring

I have reviewed the Crude Shipping project turbidity conditions and they appear suitable for application to this project. I offer initial thoughts on the setting of the turbidity levels below for consideration,

Collect a sample of discharge from the outlet pipe at a point prior to discharge into the CMA and measure the NTU twice a day, on flood and ebb tides. In terms of adopting a practical, economical approach that is similar to the Whangārei port dredging SS requirements, it would be appropriate to follow the above procedures for 1 month – 2 sites, flood and ebb, once a week, using a ‘standard’ NTU instrument and collecting bottle samples at the same time and location for laboratory analysis; and then also using a LISST-AOBS Super-Turbidity Sensor instrument that records both NTU and mg/L directly in the field.

Once confident that the Proponent has a reliable process and data set, continue recording using the LISST instrument(s) pre- and during works.

There will be a need to agree where to record SS, but Mair Bank and near the Marina Channel entrance in Marsden Bay are candidate sites. This decision would need an ecologist to offer an opinion, I believe.

**Applicant’s Proposed Conditions of Consent**

With regard to the Applicant’s proposed conditions of consent, I make the following amendments as indicated with red text.

**Discharge of reclamation decant water**

60. Reclamation construction decant water must be discharged to coastal water via pipeline with an outlet(s) that is:

- (a) adjacent to the active reclamation edge; and
- (b) at least 1 (one) metre below the ‘present’ water level.

**The Applicant is to undertake a heavy metals sediment contamination assessment, as described above under Condition 1.**

61. Monitoring of the reclamation construction decant discharge must occur as follows:

- (a) On a daily basis during decant discharge, the consent holder must measure the outlet discharge turbidity in NTU and compare this value with the turbidity trigger



value of [xxxxx] NTU.

This trigger value may be 10 NTU, to be agreed, above the ambient 'immediately' upstream, near-surface, measured turbidity in the morning at the time of dredging commencement, and then again 1 hour after a 'turn of the tide' – flow direction reversal. The direction of upstream changes with tide reversal.

- (b) If the measured turbidity exceeds the trigger value in (a), the consent holder must:
  - (i) Implement management practices to reduce the turbidity of the discharge, including undertaking SS sampling prior to the commencement of works to establish background turbidity conditions – 10m north of the 'water's edge'. Analyse SS bottle samples taken at the same time as these NTU readings, at the same 'spot', and have them analysed in a NATA registered soils laboratory to establish a local NTU-TSS relationship.

62. The consent holder must provide the results of sampling completed under Condition 61 upon request.

63. If a discharge sample collected in accordance with condition 61 exceeds the NTU concentration limit the following must occur:

- (a) The consent holder must immediately cease the discharge and implement any management practices required to reduce the NTU/TSS concentration of the decanted discharge, after which the discharge may recommence. This may typically be a reduction in dredging rate;
- (b) Within one (1) hour of resuming the discharge, the consent holder must re-measure the outlet discharge turbidity in NTU to reassess for compliance with condition 61; and
- (c) If compliance with 61 is not achieved, the consent holder must undertake further management measures to reduce the NTU/TSS concentration of the decanted discharge and inform the Council within 48 hours.

### **Discharge of stormwater during construction**

64. The discharge of stormwater from the reclamation and/or wharf area while under construction must only be:

- (a) into the decant discharge system;
- (b) directly into coastal water; or
- (c) into the existing canal and pond-based stormwater system.

65. Any construction stormwater discharge system(s) discharging directly to coastal water must be designed to achieve a NTU concentration of [xxxxx] at the point of discharge for all rainfall events up to and including the 1 in 20-years storm event.

## **SANDBANK RENOURISHMENT AREA GEOMORPHOLOGICAL MONITORING AND MAINTENANCE**

119. The consent holder must commission land, intertidal and subtidal geomorphological surveys of the Sandbank Renourishment Area and the CMA within [50m] of the Sandbank Renourishment Area.

120. The monitoring required by condition 119 must be undertaken every two years for the first ten (10) years following the construction of the Sandbank Renourishment Area, and thereafter every five years. **Will this frequency be sufficient to retain the function? What about after a significant storm event?**

121. Within three (3) months of each survey required by condition 119, the consent holder must provide to the Council for certification a report by a suitably qualified and experienced coastal processes expert addressing the following:

- (a) the geomorphological performance, in terms of erosion and accretion changes, of the Sandbank Renourishment Area; and
- (b) the efficacy of potential periodic renourishment “top-up(s)” through the placement of additional sand/material, including a recommendation on whether such top-up(s) are necessary to achieve the purpose of the Sandbank Renourishment Area; and, if so, the proposed details for such top-up(s) or any changes to a current top-up(s) regime (including the location, volume, and frequency of proposed additional sand deposition).

122. Where a report certified under condition 121 recommends Sandbank Renourishment Area top-up(s), top-up(s) to the initial Sandbank Renourishment Area must be undertaken in accordance with the latest certified report using similar, clean sediment nourishment sediment

123. Conditions 119-122 apply on an ongoing basis unless an alternative initiative to the Sandbank Renourishment Area is implemented for the purpose of providing additional roosting habitat for Tōrea pango (Variable oystercatcher) and Tūturiwhatu (New Zealand dotterel), in which case conditions 119-122 shall cease to apply.

*Advice note: Any alternative initiative for the purpose of providing additional roosting habitat for Tōrea pango (Variable oystercatcher) and Tūturiwhatu (New Zealand dotterel) may require additional resource consents.*

## **COASTAL PROCESSES SHORELINE MONITORING**

124. The consent holder must commission dry-land, intertidal and subtidal surveys to a depth of 10m below Chart Datum, where practicable, of the following areas to monitor for potential long-term coastal geomorphological changes associated with the development authorised by these consents:

- (a) Marsden Bay;
- (b) The shoreline from Northport to Mair Bank (inclusive), including the Channel

Infrastructure jetty area and

- (c) The Marsden Cove Marina channel seaward of the first private berth at transect intervals of 50m out to the channel drop-off .
- (d) Blacksmiths Creek channel – two transects 50m apart near the seaward end of the training wall / groyne at the creek mouth

Surveys are to be undertaken to the local LINZ horizontal datum and vertical port datum (CD) – to be agreed.

125. The monitoring required by condition 124 must be undertaken:

- (a) Within three months following the completion of each Dredging Stage;
- (b) Annually for a period of five years following the completion of the construction of the reclamation and wharf development authorised by these consents.

Surveys may be by calibrated echo sounder and Total Station Survey and combined to a common datum

126. A report describing the surveys required by conditions 124 and 125 must be provided to the Council within 20 working days of their completion. This report must be prepared by a qualified coastal engineer/scientist and be independent of the Proponent and Respondents. The report must quantify changes in channel depth, the horizontal movement of shoreline contours, mean sea level and 2m above mean sea level. On the basis that the proponent engages a suitably qualified entity to undertake a morphological processes investigation of this area prior to commencement of works, the report is to discuss observed changes in the context of that report and propose mitigation/adaptive planning measures – sand back-passing, beach nourishment, groynes and other structures. Discussions will then be required – Proponent, Council and Respondents/Residents, to determine an agreed way forward, including funding.

<b>Memo prepared by:</b>	Philip Douglas Treloar, Senior Principal Coastal Engineering, Stantec
<b>Date:</b>	26 July 2023
<b>Memo reviewed and approved for release by:</b>	Blair Masefield, Technical Director, Beca Limited
	On behalf of the Whangārei District Council and Northland Regional Council
<b>Date:</b>	2 August 2023