

# APPENDIX 23

## TERRESTRIAL NOISE AND VIBRATION ASSESSMENT

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**MARSHALL DAY**  
Acoustics



**NORTHLAND SHIPYARD AND DRYDOCK  
APPENDIX 23 TERRESTRIAL NOISE AND  
VIBRATION ASSESSMENT**

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Project: **NORTHLAND SHIPYARD AND DRYDOCK**

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## SUMMARY

Marshall Day Acoustics Limited has assessed airborne noise from the proposed Northland Shipyard and Drydock Project at Marsden Point, Whangārei. The Project is listed in Schedule 2 of the Fast-track Approvals Act 2024 and involves the construction and operation of a new drydock or ship lift facility immediately west of Northport's existing container terminal. This report addresses operational and construction airborne noise effects.

The dominant operational noise source is hull maintenance blasting, particularly wet abrasive blasting and ultra high pressure (UHP) water blasting. Blasting is proposed to be restricted to 7am–6pm, Monday to Saturday. We assessed noise levels from two facility configurations (floating drydock and ship lift), with two vessel sizes (230 m and 70 m) representing four and eight blasting crews operating respectively. With appropriate mitigation, all scenarios comply with the Regional Plan for Northland permitted noise limits, which we recommend are adopted as a condition of consent.

To achieve compliance for wet abrasive blasting, the floating drydock relies on the shielding provided by its wing walls, with no additional mitigation required. For small vessels on the hardstand, compliance is achieved through operational controls (e.g. blasting method substitution, crew numbers and location, and scheduling during favourable wind conditions). For large vessels where blasting is elevated with direct line of sight to Marsden Bay dwellings, localised screening is required where operational controls alone are insufficient. UHP and HP water blasting and vacuum abrasive blasting are sufficiently quiet to comply in all scenarios.

Internal vessel work (e.g. fitting, turning, painting) and other sources such as compressors, generators, and vehicle movements are insignificant compared to blasting and are proposed to occur 24/7 on-site. They are predicted to be at least 20 dB below blasting levels and will not materially affect the existing noise environment. Compliance with both the daytime and night-time noise limits is predicted for these noise sources.

Although blasting noise levels are compliant with the noise limits in the Regional Plan for Northland when appropriate mitigation and management are in place, noise effects may still occur due to the character of blasting and the increased noise levels anticipated during the day from blasting. Blasting produces a sustained, high-energy broadband hiss that is distinctly different in character from existing port noise, and is likely to attract greater community attention than an equivalent level from general port operations. At Marsden Bay, mitigated wet abrasive blasting and UHP water blasting produce rating levels in the 45–55 dB  $L_{day}$  range, with effects assessed as Perceptible to Noticeable. At Reotahi, predicted levels are at or below the existing ambient environment for all scenarios, with effects assessed as Perceptible at most.

The Shipyard Noise Management Plan – Appendix 9L (NMP) is proposed as a condition of consent. The NMP will provide a framework for compliance monitoring, best practicable option assessment, community engagement, and complaints management. Blasting and grinding will be restricted to 7am – 6pm, Monday to Saturday. With the mitigation measures described above in place, we consider the noise effects from drydock operations to be manageable. The NMP provides a robust framework to ensure these measures are implemented, monitored, and adapted over time.

Construction noise is also predicted to comply with the permitted standards provided any night-time dredging is carefully managed.

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## 1.0 INTRODUCTION

The Ministry of Business, Innovation & Employment (**MBIE**) has engaged Marshall Day Acoustics Limited (**MDA**) to assess noise from the proposed Northland Shipyard and Drydock Project at Marsden Point, Whangārei (**the Project**). The Project involves the construction and operation of a new drydock or ship lift facility (**the facility**) immediately to the west of Northport's existing container terminal. It is listed in Schedule 2 of the Fast-track Approvals Act 2024 (**FTAA**).

This is the terrestrial noise and vibration assessment for the Project. However, vibration is predicted to readily comply with all relevant standards. So much so, it is unlikely to be perceptible in any nearby building, so is not considered in any further detail in this assessment. Underwater noise is addressed in a separate specialist report.

This report was authored by Laura McNeill<sup>1</sup> and reviewed by Craig Fitzgerald<sup>2</sup>. Both are suitably qualified experts who have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 and agree to comply with it. This report is within their respective areas of expertise, except where they state that they rely on the evidence of another person. They have not omitted material facts that might alter or detract from the opinions expressed.

## 1.1 Project Description

The development and operation of a marine maintenance operations facility abutting the western side of the existing Northport port facility at Marsden Point, Whangārei Harbour. The project includes a reclamation, vessel haul-out system, and associated wharf structures, dredging, and supporting infrastructure.

Key components of the project include:

- reclamation of approximately 9.5ha
- a 'cutout' to the reclamation where a vessel haul out system is to be located, being a floating drydock or potentially shiplift or other lifting mechanism
- construction of a piled wharf structure to accommodate vessels either temporarily (before/after haul out), or for extended periods where works not requiring haul out can be undertaken
- dredging stage one: capital and maintenance dredging associated with construction and ongoing operation of the marine maintenance operations facility, including a berth pocket and a vessel turning basin to provide for safe navigation
- dredging stage two: capital dredging to ensure sufficient volume of dredge spoil is available to construct both the NDD and Northport's Vision for Growth development.
- fixed plant and buildings to accommodate marine maintenance activities and materials sufficient working & laydown areas for marine maintenance operations, including the ability to transfer vessels to hardstand

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<sup>1</sup> Laura McNeill holds a BSc (Hons) in Geography and Environmental Science and is a member of the Acoustical Society of New Zealand and the Resource Management Law Association. Laura has over 15 years' experience in acoustic consulting in New Zealand and the United Kingdom, specialising in noise assessments for major transport infrastructure, including airports, railways, roads and ports. Laura has provided expert evidence for Council Hearings.

<sup>2</sup> Craig Fitzgerald holds a Bachelor of Engineering (Mechanical) from the University of Auckland and is a Chartered Engineer registered with the Engineering Council (UK). Craig is a member of the Acoustical Society of New Zealand, the Institute of Acoustics (UK), and the Resource Management Law Association. Craig has over 19 years' experience in acoustic consulting, specialising in noise and vibration assessment for large infrastructure projects, port noise management, and underwater noise from marine activities. Craig has provided expert evidence in numerous consent hearings, mediations, and Environment Court proceedings.

- access to and around the marine maintenance operations facility, including a landside area for staff carparking
- public access around the edge of the reclamation to a public fishing platform

The marine maintenance operations facility is to provide vessel maintenance, repairs, and servicing, including but not limited to cleaning, painting, and repair of commercial and naval vessels, including Cook Strait ferries and Royal New Zealand Navy logistics vessels, along with other vessels such as international freight vessels and super yachts. The facility has design capacity to accommodate vessels ~50m to 230m in length with displacement between 500t and 28,000t. The facility will be based on normal working hours of 7am-6pm but the capacity to operate 24/7/365 where required, subject to appropriate restrictions on noise-generating activities.

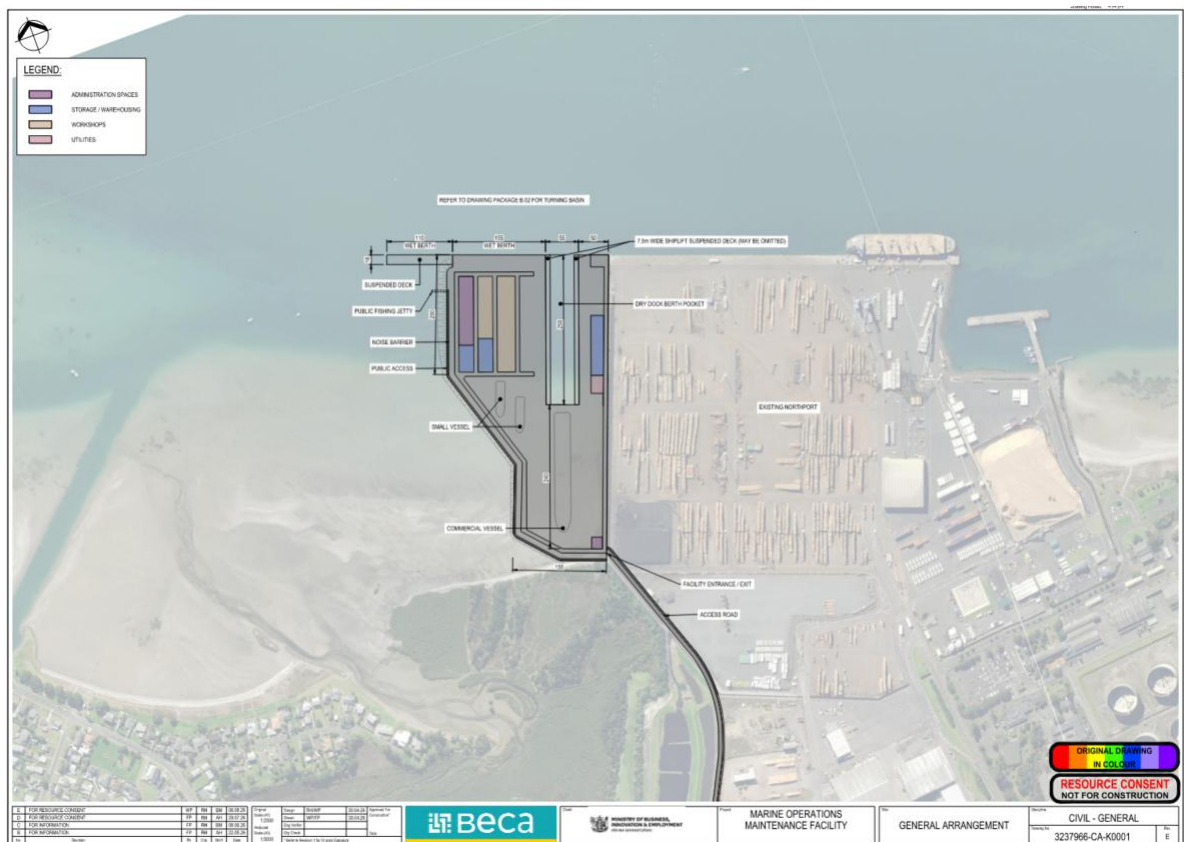
The location of the facility has been carefully selected for functional and operational requirements, including the need for deep water access, sheltered harbour conditions, proximity to existing port services, sea and land transport links, and integration with established and proposed marine and land-based industrial infrastructure.

The project is listed in Schedule 2 of the Fast-track Approvals Act 2024 as having significant regional or national benefits.

## 1.2 Site Layout

The concept design is shown in Figure 1.

**Figure 1: Northland Shipyard and Drydock Concept Design Drawing<sup>3</sup>**



Northport has a 4 m high noise wall on its western edge to mitigate noise received by dwellings in Albany Road and beyond. Similarly, a 4 m high noise wall is proposed on the western edge of the facility and there are several buildings proposed to support landside infrastructure approximately

<sup>3</sup> Beca Limited *General Arrangement*, Drawing 3237966-CA-K0001 Rev E, dated 6 August 2026

8 m high. These structures will effectively screen noise sources near ground level (e.g. vehicles, pumps) but may be less effective when noise sources are elevated (e.g. blasting and grinding).

The floating drydock design includes wing walls approximately 17 m tall on the eastern and western sides of the berth pocket. The wing walls will provide some noise shielding to residential communities for ships that are worked on in the drydock. Large vessels may also be transported longitudinally onto the hard stand, in which case, they have similar noise emissions to those described for the ship lift option below.

For the ship lift option, ships would be moved onto the hardstand to the south for all works, then maintained, primarily relying on the proposed site perimeter noise wall for noise mitigation.

### 1.3 Proposed Activities

The Preferred Operator and its contractors will undertake a range of activities at the facility, including hull maintenance such as blasting and grinding, internal vessel refit and repair, and painting.

Drydock blasting noise is predicted to be the loudest activity by a significant margin. Therefore, we primarily focus on blasting noise to inform this effects assessment. MBIE have proposed to restrict the timing of blasting operations from 7am to 6pm Monday to Saturday to mitigate noise in the evening and night-time period, and provide respite on Sundays. In practice, blasting operators do not blast continuously across a shift for two key reasons:

- WorkSafe controls<sup>4</sup>: WorkSafe New Zealand limits active blasting hours to manage hand-arm vibration exposure and reduce the risk of occupational conditions such as Raynaud's disease.
- Shift patterns: This facility will have a more intensive double shift pattern with the first shifts running from 6am-2pm and the second shift running from 2pm-10pm. A typical shift for a blasting operator includes daily briefings, equipment setup and pack-down and structured breaks. Therefore, the blasting is inherently intermittent between 7am and 6pm. We understand that the representative cumulative duration of blasting nozzle discharge would be less than 5 hours per day.

#### 1.3.1 Blasting Types

There are several types of blasting used for different applications. Table 1 summarises the blasting types and their usage. Blasting is generally undertaken on the ship hull and is generally focussed on the part below the water line.

**Table 1: Blasting Types**

| Blasting type                      | Wet or dry | Medium | Usage              |
|------------------------------------|------------|--------|--------------------|
| Open dry abrasive blasting         | Dry        | Garnet | Rarely             |
| Wet abrasive blasting              | Wet        | Garnet | 25% of dockings    |
| Ultra High Pressure Blasting (UHP) | Wet        | Water  | 15-20% of dockings |
| High Pressure Blasting (HP)        | Wet        | Water  | Preferred          |
| Vacuum abrasive blasting           | Dry        | Garnet | Preferred          |

The blasting types are described as follows, generally from loudest to quietest:

<sup>4</sup> WorkSafe New Zealand, Model Code of Practice: Abrasive Blasting, available at: [https://cdn.prod.website-files.com/65d2d0c66e4a0177aedef76e7/682e785a39ffad68ac23163f\\_guidance\\_-\\_abrasive\\_blasting%20\(003\).pdf](https://cdn.prod.website-files.com/65d2d0c66e4a0177aedef76e7/682e785a39ffad68ac23163f_guidance_-_abrasive_blasting%20(003).pdf) [accessed June 2026].

- **Open dry abrasive blasting:** Rarely used. It is not a representative activity (outlier). If dry abrasive blasting is still necessary, encapsulation is mandatory for air quality discharge reasons (shrink wrap over scaffold). The encapsulation must be upgraded to ensure effective noise barriers are used where there is line of sight to the community interface.
- **Wet abrasive blasting:** Generally using garnet as the medium and used in approximately 25% of dockings. This activity is the focus of the noise modelling (Section 4.0).
- **Ultra High Pressure (UHP) water blasting:** Used in approximately 15-20% of dockings for full coating removal and surface preparation, capable of stripping all coatings and rust back to bare steel. 40,000 PSI is the highest pressure.
- **High Pressure Blasting (HP) water blasting:** Typically used for cleaning light to moderate fouling and removing only loose paint and light surface rust where preserving the existing surface profile is acceptable. A PSI of 5,000 to 10,000 PSI is generally used for this type of work.
- **Vacuum abrasive blasting:** Preferred method of bare steel prep. Uses sucker trucks, typically 4–5 trucks operating continuously with 8–10 on rotation for a smaller vessel (70 m) and potentially double for a large ship (230 m).

### 1.3.2 Docking duration

Vessel duration in the drydock is highly variable, ranging from around three weeks for routine commercial dockings, to eight months or more for major naval refits. We understand that a representative duration is three weeks, structured approximately as:

- 1 week blasting (continuous daytime working)
- 1 week painting
- 1 week ancillary activities

### 1.3.3 Number of blasting crews

We understand the typical number of blasting crews operating on a ship would be three to five at any one time. There is the possibility that up to eight crews could operate on a larger ship at one time, but this would not occur regularly given the complexity of managing so many work fronts.

What is more likely is having the eight blasting crews spread between multiple ships. The hardstand enables up to three ships to be docked at once which could increase the requirement for blasting. Noise modelling presented in Section 4.0 includes scenarios with four and eight blasting crews to represent each scenario.

## 1.4 Scope of Assessment

Noise contours have been modelled for wet abrasive blasting operations. Representative scenarios for both a large vessel (230 m long) and a small vessel (70 m long) have been modelled to predict the noise emissions.

The noise contours are based on existing measurement data from other drydock operations in New Zealand. Wet abrasive blasting is the loudest blasting method proposed to be used on a regular basis. Open dry abrasive blasting is usually louder than wet abrasive blasting, but is used rarely, and thus is not considered a representative activity (i.e. an outlier).

For other blasting methods, noise levels have been informed by recent sound power measurements of UHP and HP water blasting taken at a Babcock facility, and previous measurements of vacuum blasting undertaken at comparable facilities elsewhere in New Zealand. These methods are inherently quieter than wet abrasive blasting. Since the noise level differences of the different methods are known, predicted receptor levels can be estimated by applying these corrections to the modelled wet abrasive blasting results.

## 2.0 EXISTING ENVIRONMENT

### 2.1 Overview

The facility is proposed in the Whangārei Harbour west of Northport. There are four distinct receiving environments near the facility which are described below. Figure 2 shows a map of the four receiving environments and closest sensitive receptors in Marsden Bay and Reotahi:

- Marsden Bay is a coastal settlement on the southern side of Whangārei Harbour, approximately 400 m west. Existing dwellings are in the WDP 'General Residential Zone'.
- Reotahi is a coastal settlement on the northern side of the Whangārei Harbour, approximately 1.3 – 1.5 km from the drydock operations. Existing dwellings are in the WDP 'Settlement Zone Residential Sub-Zone'.
- WDP Port and Industrial Zones to the east and south are not noise sensitive (e.g. Northport, Marsden Point import terminal and the Carter Holt LVL Plant).
- WDP Open Space Zones at the coastal interface are occupied by the public during the day.

Figure 2: Map of Existing Environment



The existing environment includes the physically existing noise environment, together with any unimplemented consents where it appears likely they will be given effect to. In this case, Northport have recently obtained a consent for a container terminal expansion to the east.

This assessment relies on information included in the Northport noise assessment for the container terminal expansion<sup>5</sup>. By doing so, we can provide a consistent description of both the physically

<sup>5</sup> MDA report Rp 002 R07 20200547, 'Northport Container Terminal Expansion Noise Assessment', dated 29 Sep 2022, attached as Appendix 4 of the consent application, and our subsequent supporting expert evidence on terrestrial noise.

existing noise environment and the wider legal existing environment inclusive of consented Northport operations.

The residential interface receiving environments have been established through several measurement campaigns over the years, with the last in 2023. The results were summarised in the Northport noise assessment<sup>5</sup> and supporting evidence. Supplementary attended measurements were undertaken in April 2026 for this Project. The measurement positions are shown in Figure 2 above.

They confirm that the noise environment remains consistent with previous measurement campaigns, with no material change in Northport activities. Both historic and current measurements of the noise environment are detailed in the following sub sections.

## 2.2 The physically existing noise environment

### 2.2.1 Historic noise environment

Historic representative noise levels in Reotahi, including contributions from refinery and port activities during slightly downwind propagation conditions, were measured above 45 dB  $L_{A10}$  and/or 45 dB  $L_{Aeq}$  for more than 40 years. The total noise level includes contributions from port, refinery, community, and environmental noise sources (e.g. animal calls, wind in trees and wave noise). The combination of components varies by receiver location, port/refining activities, time of day, and weather conditions. Note that the  $L_{A10}$  and modern  $L_{Aeq}$  measurement descriptors are generally interchangeable for port and refinery ‘hum’.

Most measurements have been undertaken at night, when ambient noise from other sources such as waves, birds, and general environmental noise is lower, allowing port noise to be measured more accurately. As the port operates 24 hours a day, seven days a week, the measured levels of peak period operations at night are generally representative of the same activities during the day too, which is the critical period of consideration for blasting noise. In summary:

- 1981<sup>6</sup>: Wakelin Consultants Limited reported refinery noise levels in Reotahi ranging from 40 to 52 dB  $L_{A10}$ , with a mean of 45 dB  $L_{A10}$ . The wide range in noise levels likely represented the range of environmental and operating conditions.
- 1991<sup>7</sup>: MDA measured refinery activities and calculated representative noise contributions of 47 – 48 dB  $L_{A10}$  in Reotahi and Marsden in downwind conditions.
- 2018<sup>8</sup>: MDA measured representative port and refinery noise levels of 47 dB  $L_{Aeq}$  (and 47 dB  $L_{A10}$ ) in downwind conditions at night. The port contribution was estimated to be 43 dB  $L_{Aeq}$ . Outside observed short-term monitoring intervals, the long-term port noise contributions were difficult to isolate and quantify. Total noise levels ranged from the high 30s to the low 50s dB  $L_{Aeq}$  during individual 15-minute intervals, consistent with the range mentioned in the earlier monitoring reports. Periods of high winds are easily excluded, but periods subject to enhanced propagation under temperature inversion conditions are more difficult to identify, not common, but more likely on calm winter nights.
- 2023<sup>9</sup>: Channel Infrastructure stopped refining activities at their site in June 2022, but the refinery site continues to operate as a petroleum products import and distribution facility.

<sup>6</sup> Wakelin Consultants Limited (July 1981), titled ‘*The impact of noise from an industrial plant upon a rural area, Marsden Point case study*’

<sup>7</sup> MDA report 178911RA 1991191A ‘Marsden Point Oil Refinery Noise Survey’ (May 1992)

<sup>8</sup> MDA report Rp 001 20180532 ‘Refining NZ and Northport Noise Measurements’ (25 Oct 2018)

<sup>9</sup> MDA report Rp 004 20200547 ‘Northport Noise Monitoring 2023’ (04 Aug 2023)

Following this operational change, MDA measured continuous noise levels for one month spanning May and June 2023 at two locations in Reotahi and one location in Marsden. The results were supplemented with attended measurements. In summary:

- o Channel Infrastructure ship unloading activities dominated the noise levels received in Norfolk Reserve (Reotahi) under slight downwind conditions and with no ships or audible activities at Northport. The total noise level was 45 dB  $L_{Aeq}$  and background noise level 42 dB  $L_{A90}$ . The Channel Infrastructure noise contributions were comparable to those measured in 2018. A ship was present at Channel Infrastructure on approximately half of the days during the 2023 monitoring period. Therefore, Channel Infrastructure noise remains relevant to the total ambient noise levels received in Reotahi.
- o The long-term unattended monitor at 131 Reotahi Road measured representative night-time noise levels of 42 – 45 dB  $L_{night}$  during busy operating periods and downwind conditions. The comparable levels at a monitor at 28 Albany Road in Marsden were typically four decibels lower. It was determined that the port noise model remained representative of busy periods under common weather conditions.
- o Port noise complaints were correlated with high noise events (e.g. ‘bangs’). Port noise events were regularly audible, but loud events between 65 and 75 dB  $L_{AFmax}$  were rare and not representative of typical operations.

## 2.2.2 Current noise environment

Attended noise measurements were undertaken in Marsden Bay and Reotahi during the morning, afternoon and night-time, on 29-30 April 2026. The measurements were undertaken to review if the existing noise environment remains consistent with the 2018 and 2023 campaigns. A detailed summary of the measurements is contained in Appendix C.

Figure 2 shows the three locations where measurements were undertaken: outside 26 Albany Road in Marsden Bay, at the Norfolk Avenue Playground in Reotahi, and outside 21 Beach Road in Reotahi. These positions are consistent with the measurement positions used in the 2018 and 2023 measurement campaigns. A log ship (the Sierra Guardian) was berthing overnight, and measurements were undertaken before and after the ship berthed.

During the afternoon, before the ship had berthed, but with general port activities occurring, measured noise levels at the Albany Road position ranged between 40 and 42 dB  $L_{Aeq(15min)}$ .

Overnight, with the Sierra Guardian berthed, levels at Albany Road increased to 43 – 44 dB  $L_{Aeq(15min)}$ .

At the Reotahi positions, pre-berthing levels in the evening were 33 – 35 dB  $L_{Aeq(15min)}$  rising to 41 dB  $L_{Aeq(15min)}$  during vessel arrival at night.

Overall, the 2026 measurements are consistent with the prior measurement campaigns and confirm that the existing noise environment has not materially changed, and the calibrated SoundPLAN port noise model remains representative of current peak period port noise emissions for the existing environment. It also shows that daytime and night-time noise levels from port activities are relatively consistent with the 24/7 nature of port activities at times. This shows that previous measurements of busy night-time periods can also provide a good baseline for understanding port noise levels during the daytime.

## 2.3 Consented Northport activities

The activation of the container terminal expansion consent would trigger various condition obligations, including a transition to assessment of Northport noise using New Zealand Standard 6809:1999 Acoustics – Port noise management and land use planning (the Port Noise Standard). The Port Noise Standard is specifically developed to manage port noise.

The existing noise environment inclusive of consented Northport activities, can be summarised as follows:

- By 2035, the closest dwellings in neighbouring communities are predicted to receive port noise levels of up to 54 dB  $L_{dn(5\text{ day})}$  in Marsden and 58 dB  $L_{dn(5\text{ day})}$  in Reotahi during a busy period with downwind conditions. The annual average noise levels from a fully developed New Zealand port are typically 3 – 5 decibels lower than the peak period. Sound insulation obligations for existing dwellings apply to Northport when levels reach 55 dB  $L_{dn(5\text{ day})}$ . Accordingly, this mitigation threshold is predicted to be triggered in Reotahi, but not in Marsden.
- The external daytime port noise levels at the most exposed dwellings in Marsden and Reotahi are predicted to be 48 and 51 dB  $L_{day}$  respectively by 2035 (a typical increase of 5 decibels). These levels are well below WDP permitted limits (Section 3.1), appropriate for residential use, and would not influence conversation voice level or materially impact general amenity in outdoor spaces, but general annoyance would increase.
- The external night-time port noise levels are predicted to increase to 47 and 51 dB  $L_{night}$  by 2035 for the most exposed dwellings in Marsden and Reotahi respectively. Port noise levels would be more audible inside bedrooms on busy nights and intrusive at times with open windows.

### 3.0 PERFORMANCE STANDARDS

#### 3.1 Regional Plan for Northland

The water space is regulated by the Regional Plan for Northland (RPN). Appendix B1 shows the proposed drydock is almost exclusively located within the 'Marsden Point Port Zone'. A small part of the south-western edge is located in the 'General Marine Zone'.

The RPN relevant noise rules from RPN C1.8.22 are included in Appendix B2. In summary, the following noise limits apply to noise received at the notional boundary of any noise sensitive activity, which in this case, is the closest dwellings in the Marsden Bay and Reotahi communities:

- Day: 55 dB  $L_{Aeq(0700-2200)}$
- Night: 45 dB  $L_{Aeq(2200-0700)}$  and 75 dB  $L_{AFmax}$

The Albany Road dwellings at the Marsden interface are the closest, and therefore most critical, compliance assessment location.

#### 3.2 Whangārei District Plan

Northport is on adjacent land, regulated by the Whangārei District Plan (WDP) 'Port Zone'. The proposed facility currently sits within the CMA and is therefore not directly subject to WDP provisions. However, once the proposed reclamation is complete, the facility will be on land, and the relevant WDP provisions would otherwise apply. The noise limits under the WDP Port Zone are consistent with those in the RPN, so do not affect the conclusions of this assessment regardless.

The relevant WDP zoning of the port land and receiving community is shown in Appendices B3 and B4. The associated noise rules from WDP NAV-R2 and NAV-R3 are included in Appendix B5. The Port Zone noise limits are essentially the same as those in the RPN (Section 3.1).

#### 3.3 Drydocks

##### 3.3.1 Lyttelton drydock

The Lyttelton drydock is one of two large scale drydocks in New Zealand (along with Devonport discussed in Section 3.3.2). The drydock is owned by Lyttelton Port Company (LPC) and operated by an independent company. We understand that the activities undertaken as at the Lyttelton drydock are broadly similar to those proposed at the new facility, albeit a wider range of vessels are contemplated (e.g. larger vessels).

The closest residential dwellings are within 100 m of the Lyttelton drydock and overlook the site without effective noise screening.

The Lyttelton drydock is controlled by rules in the Christchurch District Plan (CDP) for the *Specific Purpose (Lyttelton Port) Zone*. No noise limits apply to LPC port activities in CDP 13.8.4.2.6, but CDP 13.8.6.7.1.C.ii requires management in accordance with the Port Noise Standard:

*Develop noise modelling, monitoring and measurement procedures that follow the concepts in NZS 6809: 1999 Acoustics – Port Noise management and land use planning, for the purpose of preparing a Port Noise Contour Map that shows contour lines in 1dB increments from 55dB Ldn to 70dB Ldn inland of the Specific Purpose (Lyttelton Port) Zone. This Port Noise Contour Map is to be attached to the Port Noise Management Plan and is to be regularly updated as required by the Port Liaison Committee and at the expense of the owners and operators of the Port of Lyttelton. The model for the Port Noise Contour Map shall be reviewed at least once every two years to determine whether it needs to be updated.*

The Port Noise Standard defines *port noise* as:

*“means noise generated within a port, and includes noise from handling of cargo and passengers; operation of machinery and equipment; ships at berth; maintenance, repair, storage and administration activities; and vehicle rail traffic only when it relates to port activities and is inside the port. Noise from vessels not at berth is excluded, as is noise associated with construction of permanent port facilities. Construction work should be evaluated using NZS 6803”.*

The definition of port noise does not mention drydock activities so is assessed as a separate industrial noise source. Aligned with this, water and grit blasting activities are specifically excluded from the LPC port noise contours in accordance with CDP Appendix 13.8.6.7.1.C.iv:

*In developing the Port Noise Contour Map, recognise that noise from water and grit blasting at the drydock facilities is excluded and instead noise from the water and grit blasting operation is managed by controlling the hours of operation*

Instead, LPC’s *General Notice to vessels using the Drydock and Slipway*<sup>10</sup> sets specific noise controls focused on the restricted daytime hours for blasting, grinding and other noisy activities. The relevant controls are reproduced below:

**Noise**

Activities that generate loud noise are restricted to certain operating times to ensure there is minimal impact to the community. Blasting and painting, loud music, grinding and other noisy activities must be undertaken between the following hours:

1. 7.30am to 5.30pm Monday to Friday
2. 7.30am to 12.30pm Saturday
3. Sunday / Public Holidays – no noise is permitted

LPC does not allow the use of noisy reverse alarms and requires other forms of warning system.

The Lyttelton drydock noise controls provide an established reference for managing noise effects from drydock activities in, or adjacent to, port operations.

### 3.3.2 Devonport drydock

The Devonport drydock is the largest in New Zealand, located at the Devonport Naval Base and operated by Babcock. Like the Lyttelton drydock, there are dwellings within 100 m. However, a large cliff provides topographical screening to nearby dwellings to reduce received noise levels significantly. Furthermore, we understand that the Navy owns the buildings most exposed to drydock noise on the south side of Calliope Road (the closest sensitive receivers).

The Devonport drydock is subject to two sets of noise controls in the Auckland Unitary Plan (AUP). Coastal Defence Zone rule F7.6.2 applies to noise from activities within the drydock, and Designation 4308 (Minister of Defence) controls supporting yard activities on the adjacent land. Both have a

<sup>10</sup> <https://www.lpc.co.nz/our-services/dry-dock/>

consistent set of noise limits applying at the residential interface generally aligned with the RPN and WDP rules:

- Monday to Saturday: 55 dB  $L_{Aeq}$  (0700 – 2200)
- Sundays: 50 dB  $L_{Aeq}$  (0900 – 2000)
- All other times: 45 dB  $L_{Aeq}$  and 75 dB  $L_{AFmax}$

Babcock operates in accordance with a Noise Management Plan<sup>11</sup> (NMP) developed specifically for the Devonport Naval Base. The NMP framework generally aligns with the relevant noise management plan recommendations in Section 8 of the Port Noise Standard. It includes a range of general noise mitigation and management measures, and a specific control on the hours of high noise activities such as blasting and grinding (generally aligned with the Lyttelton drydock, refer Section 3.3.1):

*Where practicable, work activities that generate higher levels of noise are to be undertaken during Weekdays and Saturdays between 0730 - 1800 when higher noise limits apply. Any work activities that generate high noise levels should be minimised or work discontinued at night time and weekends whenever possible.*

### 3.3.3 Noise Management Approach

Both Lyttelton and Devonport demonstrate that drydock noise, particularly blasting, is managed as a distinct industrial noise source, separate from general port operational noise. In both cases, noise effects are principally controlled by restricting high noise activities to the daytime period.

## 4.0 MODELLING METHODOLOGY

### 4.1 Noise Model

A noise model has been prepared using SoundPLAN, an internationally recognised computer noise modelling programme. SoundPLAN uses a digital topographical terrain map of the area as its base. Each noise source is located at an appropriate height above the digital map and the software then calculates noise propagation in multiple directions, allowing for buildings, topography, shielding, reflections, and meteorological conditions.

The noise model uses, and extends, the model developed and calibrated for the previous Northport Vision for Growth work<sup>5</sup>. That model was calibrated against 2018 and 2023 measurement data (Section 2.2) and has been updated to incorporate the proposed drydock and associated noise sources. The model accounts for distance attenuation, shielding, ground absorption, topography, atmospheric conditions and air absorption.

The SoundPLAN model uses the calculation algorithms of ISO 9613-2: 2024 'Acoustics – Attenuation of noise during propagation outdoors – Part 2: General method of calculation'.

The model relies on the following geo-referenced base data:

- Topographical contours at 20 m intervals (supplemented by 1 m contours from the Northland Regional Council's Open Data website from June 2022)
- Cadastral boundaries
- Building outlines (building heights not available; a generic height of 4.5 m was used)
- Street numbers and names
- Geo-referenced aerial imagery

<sup>11</sup> BMS-07091 NMP, last reviewed 29 Jan 2025

The noise contours from this model are obtained by computer interpolation between calculated grid points at 10 m intervals, ensuring at least one data point on each parcel of residential land, and at a height of 1.5 m above ground level.

## 4.2 Drydock Model Inputs

### 4.2.1 Topography

The Digital Ground Model has been updated to incorporate the drydock reclamation area. The drydock will be at the same elevation as the existing port hardstand.

### 4.2.2 Buildings

Several large buildings are proposed on the hardstand to the west of the berth pocket. These buildings have been entered into the noise model at a height of 8 m.

A representative ship has been added to the noise model as a building to account for shielding of point sources from receivers on the far side of the vessel, and to ensure reflections between the floating drydock wing walls and the ship's hull are modelled accurately. The assumed height and width of the ship is 35 m high x 230 m long for the large ship and 15 m high x 65 m long for a smaller vessel.

### 4.2.3 Noise barriers

The 4 m noise barrier around the western edge of the facility has been included in the model which provides screening for vehicle movements and equipment at ground level.

### 4.2.4 Ground absorption

The model uses an average ground absorption factor of 0.2 across the reclamation area, water, mangrove area and foreshore, to account for the sound-absorbing properties of the ground surface. A ground factor of 0 represents hard ground (reflective) and 1 represents soft ground (absorptive). A value of 0.2 is representative of the primarily reflective surfaces expected within a port environment.

## 4.3 Blasting Noise Sources

Table 2 summarises the sound power levels for the blasting types detailed in Section 1.3.1. The level and spectral shape is derived from our noise measurements at other New Zealand maritime facilities.

**Table 2: Noise sources used in the operational noise models – blasting**

| Noise Source                       | Sound Power Level (dB L <sub>WA</sub> ) |
|------------------------------------|-----------------------------------------|
| Wet abrasive blasting              | 125                                     |
| Ultra High Pressure Blasting (UHP) | 120                                     |
| High Pressure Blasting (HP)        | 115                                     |
| Vacuum abrasive blasting           | 107                                     |

We have modelled four blasting crews (four point sources) on a smaller vessel (70 m), eight blasting crews (eight point sources) for a large ship (230 m), with all operating for five hours between 7am to 6pm. For the floating drydock, we have assumed that the point sources are located in the berth pocket. For the ship lift, the point sources are located to the south on the hardstand.

The height of the blasting sources was modelled as 4-8 m for a small vessel and 5-10 m for a large ship. This range accounts for both the freeboard height above the waterline and the portion of the hull below the waterline that requires abrasive blasting.

Blasting sources have been placed at the ship sides, bow, and stern to simulate blasting across the full hull perimeter. This arrangement means some point sources are shielded from a community receiver position while others have direct line of sight.

#### 4.4 Operational Scenarios

Four scenarios have been assessed, combining two facility configurations with two vessel sizes:

- Option 1a: Floating drydock, large vessel (230 m), eight blasting crews
- Option 1b: Floating drydock, small vessel (70 m), four blasting crews
- Option 2a: Ship lift, large vessel (230 m), eight blasting crews
- Option 2b: Ship lift, small vessel (70 m), four blasting crews

The key difference between configurations is that the floating drydock's 17 m wing walls provide shielding to blasting activities on the vessel hull, whereas vessels on the ship lift hardstand have less equivalent screening. Large vessels may be transported longitudinally onto the hard stand, in which case, they have similar noise emissions to those described for the ship lift option below.

The 4 m noise barrier proposed around the western edge of the facility will provide screening for vehicle movements and equipment at ground level. Due to the relative heights, it will be less effective for screening noise from elevated blasting activities for Marsden Bay residences.

#### 4.5 Noise Contours

The Rating Noise Level is compared with the noise limits. The Rating Noise Level is the measured noise level in any interval, inclusive of relevant adjustments. Relevant adjustments are:

- Special audible character (**SAC**): In our experience, blasting noise has a distinct 'hiss' that is noticeably different in character compared to components of the existing noise environment (e.g. port noise, coastal environmental noise and community activities). Therefore, it will likely be observed to have SAC and a +5dB adjustment would be applied in accordance with NZS 6802:2008 clause 6.3.
- Duration: The hours of blasting would be restricted to 7am to 6pm. Within this period, the cumulative duration of each blasting noise source is up to 5 hours of the 15-hour daytime period (refer Section 1.3). Therefore, a duration adjustment of -5dB would be applied in accordance with NZS 6802:2008 clause 6.4.

The SAC and duration adjustments are equal and opposite, so cancel out. Therefore, the modelled blasting noise contours are directly representative of the Rating Noise Levels, enabling direct comparison with the noise limits.

## 5.0 ASSESSMENT OF NOISE LEVELS

### 5.1 Wet Abrasive Blasting

Appendix D includes the predicted noise contours at 1.5 m above ground/water level for the four scenarios summarised in Section 4.3. Table 3 summarises the results at the most exposed receivers in Marsden Bay and Reotahi.

**Table 3: Key noise predictions for wet abrasive blasting activities at closest receivers (pre mitigation)**

Red = above noise limit / Green = below noise limit

| Location                                         | Daytime Rating noise level<br>( $L_{Aeq}$ ) | Daytime noise limit<br>( $L_{Aeq}$ ) |
|--------------------------------------------------|---------------------------------------------|--------------------------------------|
| <b>Option 1a: Floating drydock, large vessel</b> |                                             |                                      |
| 38 Albany Rd, Marsden Bay                        | 55                                          | 55                                   |
| 126 Reotahi Rd, Reotahi                          | 45                                          | 55                                   |
| <b>Option 1b: Floating drydock, small vessel</b> |                                             |                                      |
| 38 Albany Rd, Marsden Bay                        | 54                                          | 55                                   |
| 126 Reotahi Rd, Reotahi                          | 45                                          | 55                                   |
| <b>Option 2a: Ship lift, large vessel</b>        |                                             |                                      |
| 38 Albany Rd, Marsden Bay                        | 60                                          | 55                                   |
| 126 Reotahi Rd, Reotahi                          | 45                                          | 55                                   |
| <b>Option 2b: Ship lift, small vessel</b>        |                                             |                                      |
| 38 Albany Rd, Marsden Bay                        | 56                                          | 55                                   |
| 126 Reotahi Rd, Reotahi                          | 41                                          | 55                                   |

In Reotahi, the predicted noise levels are well below 55 dB  $L_{Aeq}$  for all scenarios.

In Marsden Bay:

- Options 1a and 1b are below the 55 dB  $L_{Aeq}$  permitted limit due to the shielding provided by the floating drydock wing walls.
- Options 2a and 2b, which represent the ship lift scenarios and floating drydock option once a vessel is moved south onto the hardstand for maintenance, are 1 – 5 decibels above the 55 dB  $L_{Aeq}$  permitted limit. This is due to the lack of effective shielding for blasting that has line of sight to the Marsden community.

To enable compliance for wet abrasive blasting on the hardstand, a range of reliable measures are available and detailed in Section 7.0. For small vessels, the 1 decibel margin is readily achieved through operational controls, such as substituting quieter blasting methods, limiting the number of crews with direct line of sight to Marsden Bay, or scheduling wet abrasive blasting to avoid downwind conditions. For large vessels, the same controls apply supplemented by localised screening where blasting is elevated with direct line of sight to Marsden Bay dwellings. Vessels within the floating drydock comply without additional mitigation due to the shielding provided by the wing walls.

## 5.2 Other blasting

Other blasting methods are noticeably quieter than wet abrasive blasting and would not require at source mitigation using noise barriers. Based on the sound power levels in Section 4.3:

- Ultra High Pressure Blasting (UHP) – 5 dB quieter
- High Pressure Blasting (HP) – 10 dB quieter
- Vacuum abrasive blasting – 18 dB quieter

With these reductions, all other types of blasting would readily comply with the 55 dB  $L_{Aeq}$  permitted level without mitigation.

## 5.3 Other activities on site

All other activities are much quieter, and would not materially elevate cumulative noise levels during blasting.

## 6.0 ASSESSMENT OF NOISE EFFECTS

### 6.1 Character of noise

The existing noise environment described in Section 2.0 comprises many character components:

- Environmental noise, such as wind and waves
- Port noise, such as the ‘hum’ of ship and equipment engines or intermittent noise events from container and log handling
- Community noise, such as road traffic and domestic activities
- Other industrial noise components, such as Channel Infrastructure

Blasting introduces a new character component. It produces a ‘hiss’ with a distinctive high-frequency character. The blasting nozzle also discharges intermittently as the operator repositions or reviews the effectiveness of the section just completed. This combination of unfamiliar character and intermittent operation means blasting noise is likely to attract greater community attention than an equivalent measured level from general port operations.

The combination of applicable SAC and duration adjustments are specifically included in the modelling methodology (Section 4.3). In short, the SAC and duration adjustments are equal and opposite, so cancel out. Therefore, the modelled blasting noise contours are Rating Noise Levels, enabling direct comparison with the noise limits.

### 6.2 Daytime amenity

Daytime noise effects are primarily associated with outdoor amenity.

The following categories provide a relationship between daytime Rating noise levels ( $L_{day}$ ) and noise effects in the Marsden and Reotahi communities (including residential gardens, parks, and beach areas):

- **45 – 50 dB:** Comparable to future port noise levels (Section 2.3). Blasting is audible at times, primarily when activity intensity is high, sea state is low, and receivers are downwind of port operations. Well below permitted noise limits and comparable to a quiet suburban environment. The drydock noise effects would be **Perceptible**.
- **50 – 55 dB:** Noticeably above port noise levels (Section 2.2), but still compliant with the 55 dB  $L_{day}$  permitted noise limit, which is typical for a suburban, coastal, or rural production interface. Potential for masking distant sounds (e.g. bird calls). Would not influence conversation voice

effort or materially affect general amenity in outdoor domestic spaces, but general annoyance increases. The noise effects would be **Noticeable**.

- **55 – 60 dB:** Significantly above existing port noise levels, and marginally to noticeably above the residential noise limit of 55 dB  $L_{day}$ . Generally, above the upper desirable noise levels for residential activity involving an outdoor living component. Some natural sounds would be masked by blasting noise. Busy days would be intrusive and annoying to a considerable proportion of the residential population. The noise effects would be **Noticeable to Significant**.
- **60 – 65 dB:** Significantly above the residential noise limit of 55 dB  $L_{day}$ . Well above the upper desirable noise levels for residential activity involving an outdoor living component. Outdoor amenity would be seriously compromised. The noise effects would be **Significant**.

In Reotahi, blasting noise would be clearly perceptible on occasion. The occasions would primarily relate to intervals of high intensity wet abrasive blasting in light downwind conditions (i.e. towards Reotahi). Blasting noise is less likely to be perceptible in other weather conditions, during other quieter forms of blasting, or lower intensity of blasting activities.

In Marsden Bay, the blasting noise would be clearly perceptible to potentially significant, depending on the same factors described above. The use of effective noise barriers for wet abrasive blasting noise (Section 5.1) would mitigate the range of potential noise effects, but they would still be noticeable during intensive intervals under downwind conditions.

In practice, there will be periods of respite where blasting is not occurring and quieter activities occur, such as internal vessel work, fitting, turning, and painting.

### 6.3 Night-time Effects

Outdoor blasting, hammering and grinding will not occur at night.

Internal vessel work (e.g. fitting, turning) and quiet outdoor activities (e.g. logistics and painting) may occur at night. They are predicted to be at least 20 decibels lower than predicted blasting noise levels during the day.

The residual drydock activities would not materially elevate the existing noise environment at residential receivers. Therefore, while potentially still audible at times, the noise environment is predicted to continue to be controlled by other activities (e.g. a combination of Port, Channel infrastructure, other industrial sites, community and/or environmental noise sources).

## 7.0 NOISE MANAGEMENT

### 7.1 Noise Management Plan

A draft drydock NMP is included in Appendix 9L of the application documents. The NMP will:

- Ensure drydock operations comply with the relevant noise limits
- Provide a framework for the measurement, monitoring, assessment, and management of noise
- Identify and adopt the best practicable option (BPO) for the management of noise effects
- Require engagement with the community and timely management of complaints
- Restrict outdoor blasting, hammering and grinding activities to the hours of 7am to 6pm, Monday to Saturday

The NMP will apply at all times. It would be considered a 'living document' that is expanded and updated as appropriate.

## 7.2 Mitigation

The BPO measures include:

- Prioritise quieter forms of blasting where practicable
- Prioritise the scheduling of wet abrasive blasting during favourable meteorological conditions where practicable (i.e. when Marsden Bay is not directly downwind of the blasting). Northport operates an established local model for this approach ([www.northport.co.nz/weatherfeed](http://www.northport.co.nz/weatherfeed)).
- Use effective noise barriers where practicable, especially for wet abrasive blasting activities with line of sight to Marsden Bay. The effective use of noise barriers is detailed in the draft NMP.
- Use low-noise nozzle types (e.g. Snake Bite XQ or Blast Force Silencer) where appropriate
- Undertake noise monitoring at the community interface to verify predicted noise levels

A combination of operational controls and localised screening provides a reliable and flexible pathway to compliance, verified through the monitoring and reporting framework in the NMP.

## 8.0 CONSTRUCTION NOISE

### 8.1 Construction Noise Rules

The RPN rule C1.8.22 (Appendix B2) requires that Construction noise must be measured and assessed according to New Zealand Standard NZS 6803:1999 “Acoustics – Construction Noise”. The noise limits apply at 1 m outside the façades of noise sensitive receivers, the closest of which are the dwellings in Albany Road, Marsden.

The long-term construction noise limits are summarised in Table 4. The key noise limit is 70 dB  $L_{Aeq}$  during the normal daytime works period, Monday to Saturday. A noise limit of 45 dB  $L_{Aeq}$  applies at night, while transitional limits of 55 – 65 dB  $L_{Aeq}$  apply during morning and evening periods.

**Table 4: Construction noise levels for noise sensitive activities<sup>12</sup> (e.g. occupied dwellings)**

| Time of week                | Time period | dB $L_{Aeq}$ | dB $L_{AFmax}$ |
|-----------------------------|-------------|--------------|----------------|
| Weekdays                    | 0630 – 0730 | 55           | 75             |
|                             | 0730 – 1800 | 70           | 85             |
|                             | 1800 – 2000 | 65           | 80             |
|                             | 2000 – 0630 | 45           | 75             |
| Saturdays                   | 0730 – 1800 | 70           | 85             |
|                             | 1800 – 0630 | 45           | 75             |
| Sundays and public holidays | 0730 – 1800 | 55           | 85             |
|                             | 1800 – 0630 | 45           | 75             |

<sup>12</sup> The RPN defines noise sensitive activity as ‘Any dwelling, visitor accommodation, boarding house, marae, papakāinga, integrated residential development, retirement village, supported residential care facility, care centre, lecture theatre in a tertiary education facility, classroom in an education facility, and a healthcare facility with an overnight stay facility.’

## 8.2 Construction Methodology

A draft Construction Methodology<sup>13</sup> has been prepared by Beca which contains a high level construction methodology for the project. A detailed construction methodology is not available at this design stage. This assessment uses the representative assumptions based on our experience from similar port construction projects in New Zealand and details from the draft Construction Methodology.

The facility will be constructed over approximately three years.

The construction will require the following main components:

- Dredged turning circle including berthing area
- Dredged lift device pocket
- Reclamation of seabed for hardstand and facilities, contained by:
  - o Piled quay walls
  - o Sloped rock revetments
- Open piled finger pier jetty for berthing on the northern face
- Potential dredge area for western perimeter berthing face
- Road access including the provision of services and utilities to the site
- Paving, drainage, lighting and utility provision across the site
- Associated buildings and facilities.

In general, piling will easily be the loudest construction activity, so is the focus of the daytime assessment. Vibro hammer is the primary pile driving method, with a proportion of piles socketed with an impact hammer. Impact and vibro pile driving would be limited to daylight hours to enable effective marine mammal observation. This timing limitation also has the benefit of mitigating community annoyance associated with the character of the impulsive impact pile driving. Pile driving noise levels can be variable, so we have provided conservative and more representative predicted noise levels via upper and lower ranges. Periods of low activity and inactivity are generally much quieter and are not addressed further.

In our experience, large concrete pours often commence before dawn, and dredging activities can operate 24 hours per day. Therefore, both these activities would be assessed against the night-time criteria. Dredging is predicted to be both the loudest and longest duration activity of the two at night, so our secondary focus is potential night-time dredging. The Beca Construction Methodology indicates two dredging methods are proposed:

- Backhoe dredger (BHD): An excavator that digs up sediment from a stationary pontoon
- Trailing suction hopper dredger (TSHD) or Trailing cutter suction dredger (TCSD)

Most other general construction activities will be indistinguishable from normal port activities during the day and night.

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<sup>13</sup> Beca, Marine Operations Maintenance Facility – Construction methodology (Initial draft) April 2026

### 8.3 Construction Noise Levels

The project extents are approximately 400m – 800m from the closest dwellings in Marsden Point and 1.3 – 1.5km from the closest dwellings in Reotahi. Table 5 presents the representative levels received from intensive construction activities at these setback distances without any specific mitigation measures.

**Table 5: Construction noise levels at 1m from a building facade**

| Equipment                          | Sound Power<br>(dB L <sub>WA</sub> ) | Façade Noise Level (dB L <sub>Aeq</sub> ) |                    |                    |                     |
|------------------------------------|--------------------------------------|-------------------------------------------|--------------------|--------------------|---------------------|
|                                    |                                      | 100m                                      | 400m <sup>14</sup> | 800m <sup>15</sup> | 1.3km <sup>16</sup> |
| Vibratory pile driving:            |                                      |                                           |                    |                    |                     |
| - upper range                      | 116                                  | 71                                        | 59                 | 53                 | 49                  |
| - lower range                      | 106                                  | 61                                        | 49                 | 43                 | 39                  |
| Bored piling:                      |                                      |                                           |                    |                    |                     |
| - upper range                      | 111                                  | 66                                        | 54                 | 48                 | 44                  |
| - lower range                      | 105                                  | 60                                        | 48                 | 42                 | 38                  |
| Impact pile driving (contingency): |                                      |                                           |                    |                    |                     |
| - upper range                      | 123                                  | 78                                        | 66                 | 60                 | 56                  |
| - lower range                      | 114                                  | 69                                        | 54                 | 50                 | 47                  |
| General construction activities:   |                                      |                                           |                    |                    |                     |
| - Long reach excavator             | 106                                  | 61                                        | 49                 | 43                 | 39                  |
| - Concrete truck and pump          | 103                                  | 58                                        | 46                 | 40                 | 36                  |
| Dredging:                          |                                      |                                           |                    |                    |                     |
| - TSHD/TSCD                        | 112                                  | 67                                        | 55                 | 49                 | 45                  |
| - BHD                              | 110                                  | 65                                        | 53                 | 47                 | 43                  |

Key findings are that we predict:

- 48 – 66 dB L<sub>Aeq</sub> from piling at the closest dwelling, complying with the daytime limit of 70 dB L<sub>Aeq</sub>
- 47 – 49 dB L<sub>Aeq</sub> from dredging at 800 m. Depending on the proximity, and timing of dredging, there is potential to infringe the 45 dB L<sub>Aeq</sub> night-time limit in downwind conditions.

Dredging will be prioritised between 6.30am and 8pm, Monday to Friday, and between 7.30 and 6pm on weekends to ensure dredging complies with the permitted noise limits. Alternatively, scheduled to avoid downwind conditions (to Marsden and Reotahi communities) and noise monitoring undertaken to demonstrate compliance.

While we have focussed on the representative worst case piling noise levels, if two piling rigs were driving piles simultaneously, the predicted cumulative noise level could be slightly higher (e.g. 1 – 3

<sup>14</sup> Closest activity to the closest dwelling in Albany Rd, Marsden

<sup>15</sup> Furthest activity to the closest dwelling in Albany Rd, Marsden

<sup>16</sup> Closest activity to the closest dwelling in Reotahi

decibels). This is generally an indiscernible change in level. What may be more apparent is the potential increase in piling noise duration with two rigs operating.

#### 8.4 Construction Noise Effects

- Day: Daytime construction activities are predicted to readily comply with the permitted noise limits. However, they may be noticeable at times due to the character of noise (e.g. pile driving).
- Night: All potential night-time activities are predicted to comply with the night-time noise limits and would be largely indistinguishable from normal port activity, including excavation, dredging, equipment/material deliveries and concrete pours.

#### 9.0 CONDITIONS OF CONSENT

We propose two conditions of any consent granted. The first provides certainty on noise limits, aligned with the permitted noise rules in the RPN (Section 3.1). The second requires a Noise Management Plan (NMP) to control noise effects regardless of compliance with the noise limits, including limiting the timing of blasting between 7am and 6pm (Section 1.3).

##### 1. Noise limits

Noise must be measured in accordance with New Zealand Standard Acoustics – Measurement of Environmental Sound (NZS 6801:2008) and assessed in accordance with New Zealand Standard Acoustics – Environmental Noise (NZS 6802:2008), and comply with the following noise limits at the notional boundary of any noise sensitive activity:

| Time (Monday to Sunday) | dB LAeq (15 min) | dB LAfmax      |
|-------------------------|------------------|----------------|
| 0700 to 2200 hours      | 55               | Not applicable |
| 2200 to 0700 hours      | 45               | 75             |

##### 2. Noise Management Plan

A Noise Management Plan (NMP) must be prepared by a suitably qualified person and submitted to Council for certification before the commencement of drydock activities on site. The NMP must:

- Ensure drydock operations comply with the relevant noise limits in Condition 1
- Provide a framework for the measurement, monitoring, assessment, and management of noise
- Identify and adopt the best practicable option (BPO) for the mitigation and management of noise effects
- Require engagement with the community and timely management of complaints (including through participation in the Community Liaison Group).
- Restrict outdoor blasting, hammering and grinding activities to the hours of 7am to 6pm, Monday to Saturday

## 10.0 CONCLUSION

The dominant noise source is hull maintenance blasting, particularly wet abrasive blasting and UHP water blasting. Blasting is proposed to be restricted to 7am–6pm, Monday to Saturday.

With appropriate mitigation, blasting noise can comply with the Regional Plan for Northland permitted noise limits, which we recommend are adopted as a condition of consent. To achieve compliance with the noise limits, wet abrasive blasting within the floating drydock relies on the wing wall shielding, and wet abrasive blasting on the hardstand relies on operational controls and, for elevated blasting on large vessels with direct line of sight to Marsden Bay dwellings, localised screening where required. UHP and HP water blasting, and vacuum abrasive blasting, are sufficiently quieter.

Internal vessel work (e.g. fitting, turning, painting) and other sources such as compressors, generators, and vehicle movements are insignificant compared to blasting and are proposed to occur 24/7 on-site. They are predicted to be at least 20 dB below blasting levels and will not materially affect the existing noise environment. Compliance with both the daytime and night-time noise limits is predicted for these noise sources.

Although blasting noise levels are compliant with the noise limits, noise effects may still occur due to the character of blasting and the increased noise levels anticipated in the daytime from blasting over and above the existing noise environment.

A Noise Management Plan (NMP) is proposed as a condition of consent. The NMP will provide a framework for compliance monitoring, best practicable option assessment, community engagement, and complaints management. Blasting and grinding will be restricted to 7 am to 6 pm, Monday to Saturday. With the mitigation measures described above in place, we consider the noise effects from drydock operations to be reasonable.

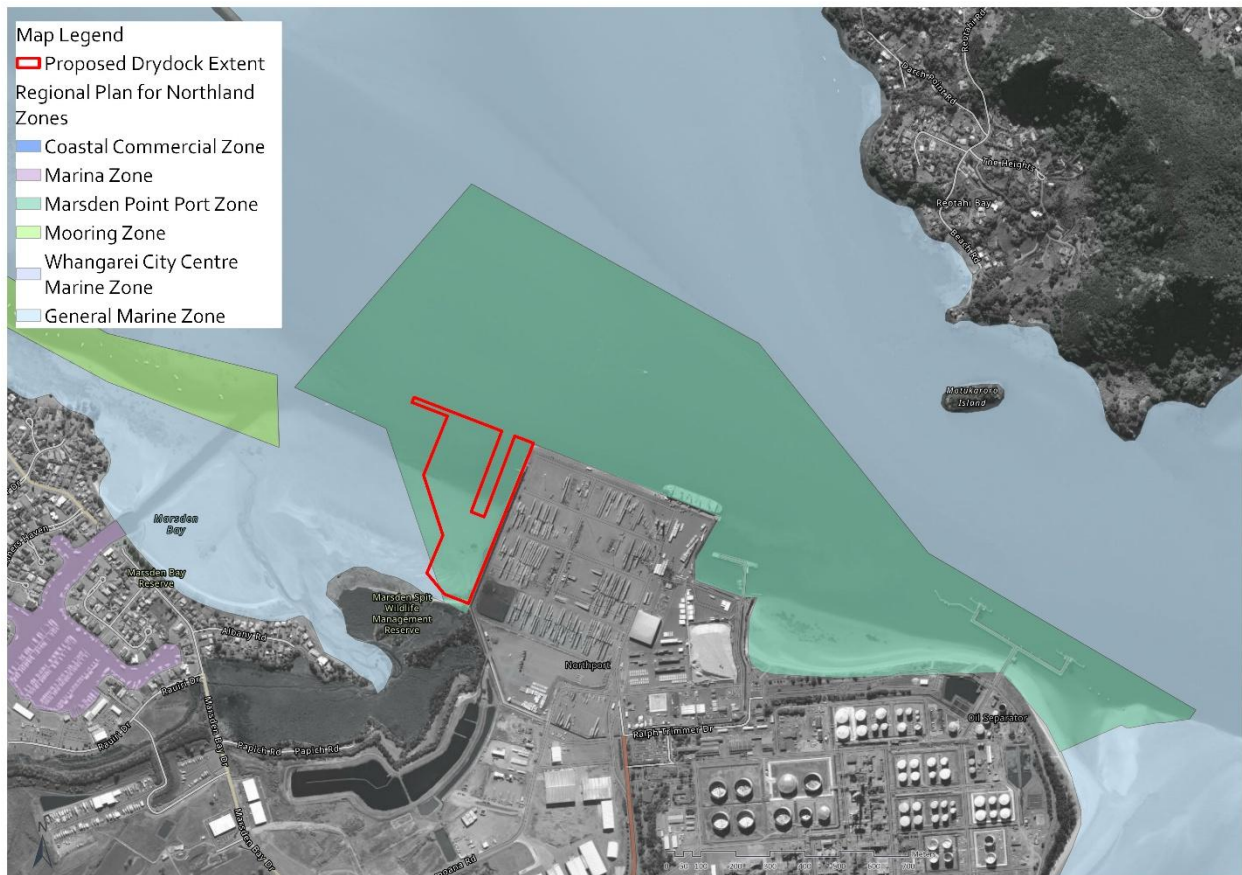
Construction noise is also predicted to comply with the permitted standards provided any night-time dredging is carefully managed.

## APPENDIX A GLOSSARY OF TERMINOLOGY

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NZS 6801:2008</b>                   | New Zealand Standard NZS 6801:2008 <i>“Acoustics – Measurement of environmental sound”</i>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>NZS 6802:2008</b>                   | New Zealand Standard NZS 6802:2008 <i>“Acoustics – Environmental noise”</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>NZS 6809:1999</b>                   | New Zealand Standard NZS 6809:1999 <i>“Acoustics – Port Noise Management and Land Use Planning”</i>                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>dB</b>                              | Decibel. The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$                                                                                                                                                                                                                                                                                                                                            |
| <b>dBA</b>                             | The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.                                                                                                                                                                                                                                                                                                                                                             |
| <b><math>L_{Aeq}(t)</math></b>         | The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.                                                                                                                                                    |
| <b><math>L_{A10}</math></b>            | The A-weighted sound level exceeded for 10% of the measurement period, measured in dB. Commonly referred to as the average maximum noise level.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b><math>L_{A90}(t)</math></b>         | The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b><math>L_{Amax}</math></b>           | The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b><math>L_{day}</math></b>            | The equivalent continuous (time-averaged) A-weighted sound level ( $L_{Aeq}$ ) over the daytime period (0700-2200 hours).                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b><math>L_{dn}</math></b>             | The day night noise level which is calculated from the 24 hour $L_{Aeq}$ with a 10 dB penalty applied to the $L_{night}$ component.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b><math>L_{night}</math></b>          | The equivalent continuous (time-averaged) A-weighted sound level ( $L_{Aeq}$ ) over the night-time period (2200-0700 hours).                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b><math>L_p</math> or SPL</b>         | Sound Pressure Level. A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing ( $20 \mu\text{Pa}$ RMS) and expressed in decibels.                                                                                                                                                                                                                                                                                                                                                         |
| <b><math>L_w</math> or SWL</b>         | Sound Power Level. A logarithmic ratio of the acoustic power output of a source relative to $10^{-12}$ watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.                                                                                                                                                                                                                                                |
| <b>Frequency</b>                       | The number of pressure fluctuation cycles per second of a sound wave. Measured in units of Hertz (Hz).                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hertz (Hz)</b>                      | Hertz is the unit of frequency. One hertz is one cycle per second. One thousand hertz is a kilohertz (kHz).                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Noise</b>                           | A sound that is unwanted by, or distracting to, the receiver.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Ambient</b>                         | The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.                                                                                                                                                                                                                                                                                       |
| <b>Special Audible Characteristics</b> | Distinctive characteristics of a sound which are likely to subjectively cause adverse community response at lower levels than a sound without such characteristics. Examples are tonality (e.g. a hum or a whine) and impulsiveness (e.g. bangs or thumps). In some cases, noise limits are set for a specific activity for its character (e.g. Port Zone noise limits). Therefore, port noise character would be reasonably expected and not ‘special’ (e.g. would not apply to well managed log or container handling activities). |

## APPENDIX B NOISE RULES

### B1 RPN Zoning



### B2 RPN Rules

The relevant sections are reproduced in part below.

#### C.1.8 Coastal works general conditions

##### Noise

- 22) Noise from any activity within the coastal marine area (except for construction noise and noise from helicopters) must comply with *Table 4: Noise limits* at the notional boundary of any **noise sensitive activity**:

**Table 4: Noise limits**

| Time (Monday to Sunday) | L <sub>Aeq</sub> (15 min) | L <sub>Afmax</sub> |
|-------------------------|---------------------------|--------------------|
| 0700 to 2200 hours      | 55 db                     | Not applicable     |
| 2200 to 0700 hours      | 45 db                     | 75db               |

- noise must be measured in accordance with *New Zealand Standard. Acoustics – Measurement of Environmental Sound (NZS 6801:2008)* and assessed in accordance with *New Zealand Standard. Acoustics – Environmental Noise (NZS 6802:2008)*, and
- construction activities shall be managed in accordance with, and meet the noise limits set out in *Tables 5 and 6* below, and

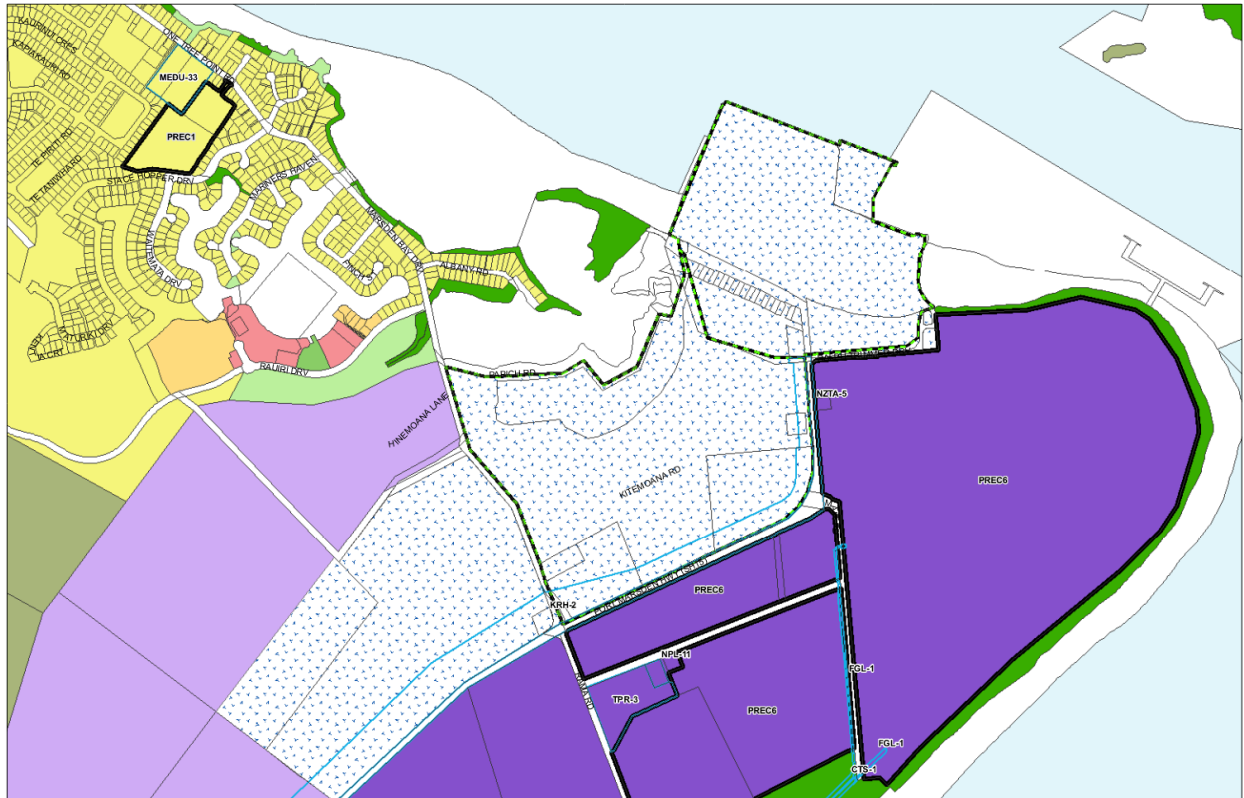
**Table 5: Upper limits for construction noise received in residential zones and dwellings in rural areas – from New Zealand Standard. Acoustics – Construction Noise (NZS 6803:1999)**

| Time of week                | Time period  | Duration of work       |             |                           |             |                          |             |
|-----------------------------|--------------|------------------------|-------------|---------------------------|-------------|--------------------------|-------------|
|                             |              | Typical duration (dBA) |             | Short-term duration (dBA) |             | Long-term duration (dBA) |             |
|                             |              | <i>Leq</i>             | <i>Lmax</i> | <i>Leq</i>                | <i>Lmax</i> | <i>Leq</i>               | <i>Lmax</i> |
| Weekdays                    | 0630 to 0730 | 60                     | 75          | 65                        | 75          | 55                       | 75          |
|                             | 0730 to 1800 | 75                     | 90          | 80                        | 95          | 70                       | 85          |
|                             | 1800 to 2000 | 70                     | 85          | 75                        | 90          | 65                       | 80          |
|                             | 2000 to 0630 | 45                     | 75          | 45                        | 75          | 45                       | 75          |
| Saturdays                   | 0630 to 0730 | 45                     | 75          | 45                        | 75          | 45                       | 75          |
|                             | 0730 to 1800 | 75                     | 90          | 80                        | 95          | 70                       | 85          |
|                             | 1800 to 2000 | 45                     | 75          | 45                        | 75          | 45                       | 75          |
|                             | 2000 to 0630 | 45                     | 75          | 45                        | 75          | 45                       | 75          |
| Sundays and public holidays | 0630 to 0730 | 45                     | 75          | 45                        | 75          | 45                       | 75          |
|                             | 0730 to 0800 | 55                     | 85          | 55                        | 85          | 55                       | 85          |
|                             | 1800 to 2000 | 45                     | 75          | 45                        | 75          | 45                       | 75          |
|                             | 2000 to 0630 | 45                     | 75          | 45                        | 75          | 45                       | 75          |

**Table 6: Upper limits for construction noise received in industrial or commercial areas for all of the year – from New Zealand Standard. Acoustics – Construction Noise (NZS 6803:1999)**

| Time period  | Duration of work                     |                                         |                                        |
|--------------|--------------------------------------|-----------------------------------------|----------------------------------------|
|              | Typical duration<br><i>Leq</i> (dBA) | Short-term duration<br><i>Leq</i> (dBA) | Long-term duration<br><i>Leq</i> (dBA) |
| 0730 to 1800 | 75                                   | 80                                      | 70                                     |
| 1800 to 0730 | 80                                   | 85                                      | 75                                     |

**B3 WDP Zoning**



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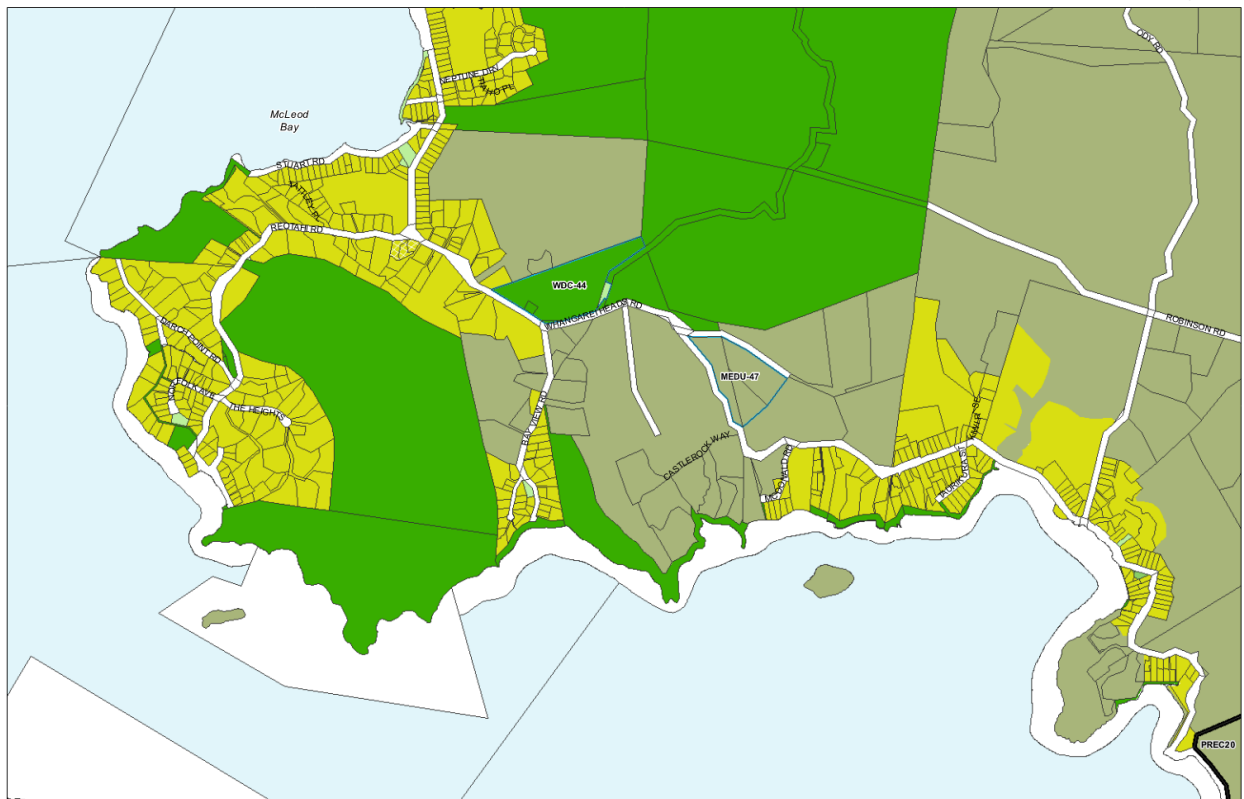
**WHANGAREI DISTRICT COUNCIL OPERATIVE PLANNING MAP**  
**Area Specific Matters - Map 43**  
**Marsden Bay**

0 0.125 0.25 0.5 Km  
A3 Scale: 1:10,000



Date Updated: 24 June 2024

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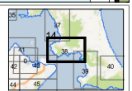


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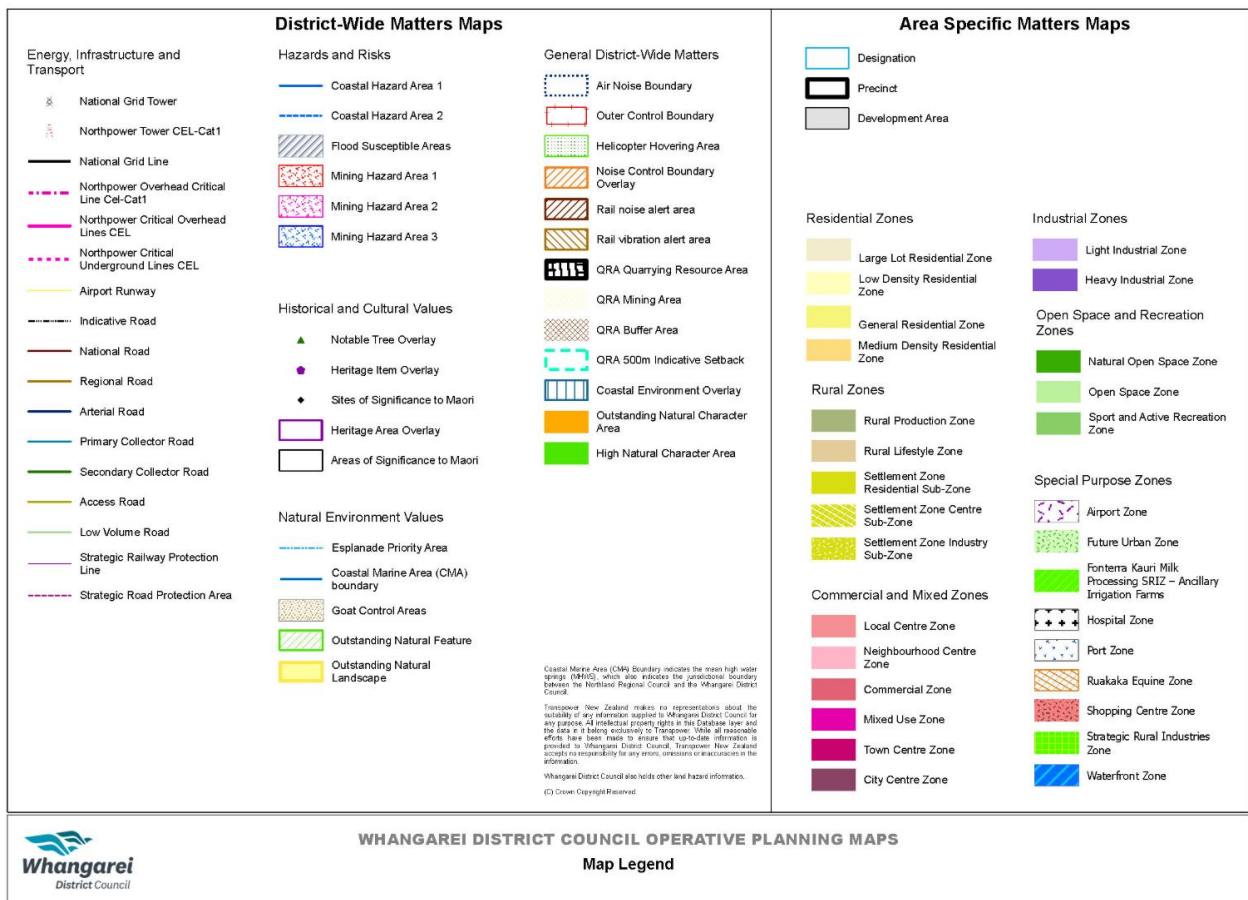
**WHANGAREI DISTRICT COUNCIL OPERATIVE PLANNING MAP**  
**Area Specific Matters - Map 38**  
**Reotahi**

0 0.125 0.25 0.5 Km  
A3 Scale: 1:10,000



Date Updated: 24 June 2024

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Date: 4 March 2025

## B4 WDP Port Zone Appendix 1 (Port Operations Area)



## B5 WDP Rules

The relevant sections are reproduced in part below.

### NAV-R2 Noise Arising from Activities within Zones

1. The noise limits that shall apply within and between Zones are set out in Tables NAV 1A and NAV 1B below.

*Note:*

1. *Except that where noise is generated from the Fonterra Kauri Milk Processing Site, the noise rules shall apply at the Fonterra Kauri Milk Processing Site – Noise Control Boundary as shown on the Planning Maps.*
2. The noise rules set out in Tables NAV 1A and NAV 1B shall apply within the relevant boundary assessment location as set out in Table NAV 2.

Table NAV 1A. Noise Limits within and between zones

| Noise emitted from any site in the following Zone                                                                                                        | Noise measured within the applicable boundary of any of the following Zones (refer to Table NAV 2 for applicable assessment location)                                                                                                                                                                                                | Daytime<br>07:00 to<br>22:00 hours | Night-time<br>22:00 to<br>07:00<br>hours                | Notes<br>(8,9) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------|----------------|
| <ul style="list-style-type: none"> <li>• Port Zone</li> <li>• Settlement Zone</li> <li>• Industrial Sub-Zone</li> <li>• Heavy Industrial Zone</li> </ul> | <ul style="list-style-type: none"> <li>• Residential Zones</li> <li>• Neighbourhood Centre Zone</li> <li>• Natural Open Space Zone</li> <li>• Open Space Zone</li> <li>• Rural Production Zone</li> <li>• Rural Lifestyle Zone</li> <li>• Settlement Zone</li> <li>• Future Urban Zone</li> <li>• PNDA – Areas A, B and C</li> </ul> | 55dB L <sub>Aeq</sub>              | 45dB L <sub>Aeq</sub><br><br>75dB<br>L <sub>AFmax</sub> | -              |

Table NAV 2. Boundary Assessment Locations

| Site Boundary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Notional Boundary                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Open Space Zone</li> <li>• Airport Zone</li> <li>• Port Zone</li> <li>• Town Centre Zone</li> <li>• City Centre Zone</li> <li>• Mixed Use Zone</li> <li>• Commercial Zone</li> <li>• Local Centre Zone</li> <li>• Shopping Centre Zone</li> <li>• Light Industrial Zone</li> <li>• Heavy Industrial Zone</li> <li>• Sport and Active Recreation Zone</li> <li>• Waterfront Zone</li> <li>• Medium Density Residential Zone</li> <li>• General Residential Zone</li> <li>• Neighbourhood Centre Zone</li> <li>• Hospital Zone</li> <li>• Settlement Zone</li> <li>• PNDA Areas A, B, C and D</li> </ul> | <ul style="list-style-type: none"> <li>• Any noise sensitive activity not owned or controlled by the quarry owner or operator in a Quarrying Resource Area</li> <li>• Rural Production Zone</li> <li>• Rural Lifestyle Zone</li> <li>• Future Urban Zone</li> <li>• Low Density Residential Zone</li> <li>• Large Lot Residential Zone</li> <li>• Natural Open Space Zone</li> </ul> |

**NAV-R3 Construction Noise**

1. Noise from demolition and construction, including that undertaken as part of temporary military training activities, shall comply with the guidelines and recommendations of NZS 6803: 1999 "*Acoustics - Construction Noise*". Noise levels shall be measured and assessed in accordance with New Zealand Standard NZS 6803: 1999 "*Acoustics - Construction Noise*". NAV-R3 shall not apply to permitted Maintenance or utility works undertaken within the *road* carriageway of a *road* where:
  - a. It has been demonstrated to Council that these works cannot reasonably comply with the referenced noise guidelines at the time when they must be carried out; and
  - b. A construction noise and vibration management plan, as prepared by a *Recognised Acoustician*, has been provided to Council.

## APPENDIX C NOISE SURVEY 2026

We undertook attended noise measurements in Marsden Bay and Reotahi on evening of the 29 and morning of 30 April 2026. The primary purpose was to experience the existing environment, quantify port noise levels, and enable a comparison with the findings in previous surveys (primarily the 2018 and 2023 monitoring campaigns detailed in Section 2.2.1).

The measurement period was targeted because of favourable weather conditions (i.e. fine weather with light northerly wind) and scheduled representative busy period at Northport (including log handling and the berthing of the Sierra Guardian wood chip carrier). Noise measurements in this survey, and in past surveys, intentionally focused on the evening, night and early morning periods to isolate Northport noise contributions as far as practicable. During the day, community and coastal interface noise contributions are higher, so the Northport noise contribution is harder to isolate and estimate.

Measurements were undertaken at the three measurement positions identified in Figure 3:

- MP1 - 26 Albany Road, Marsden Bay
- MP2 - Norfolk Avenue Playground, Reotahi
- MP3 - 21 Beach Road, Reotahi

**Figure 3: Noise Monitoring Measurement Positions**



In summary total noise levels were below 45 dB  $L_{Aeq}(15min)$  at all attended measurement locations. The measured levels included contributions from the port, community, and the natural coastal environment. The results are consistent with prior measurement campaigns and the noise environment at the most exposed receivers has not materially changed. Details of measurements are summarised in the Tables overleaf.

Table 6: Noise measurement summary

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Date and time</b>             | 29 April 1534 hrs to 2257 hrs and 30 April 0943 hrs to 0958 hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Consultant</b>                | Laura McNeill, Member of the Acoustical Society of New Zealand (MASNZ)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Location</b>                  | <p>Albany Road and Reotahi. Refer above Figure for measurement locations.</p> <p><b>MP1 NZTM 1733313E, 6033212N:</b> Northern fence line of 26 Albany Road. Direct line of sight to port.</p> <p><b>MP2 NZTM 1735095E, 6034480N:</b> Southwest corner of Norfolk Avenue Playground. Direct line of sight to port.</p> <p><b>MP3 NZTM 1735273E, 6034230N:</b> On street in front on 21 Beach Road. Direct line of sight to port.</p>                                                                                                                                                                                                                                                          |
| <b>Meteorological Conditions</b> | On 29 April, afternoon measurements were overcast (8 Okta) with a light northerly (<1m/s). Clouds clearing in later evening to 0-1 Okta with winds falling to near calm at night and the morning of 30 April. Likely Meteorological Class 4 conditions in the daytime and potential Category 5 at night-time as defined by NZS6801:2008.                                                                                                                                                                                                                                                                                                                                                     |
| <b>Methodology</b>               | Attended measurements of approximately 15 minutes duration were undertaken at each location, with continuous observation of noise sources throughout. The results are summarised below.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Northport Operations</b>      | <p>29 April:</p> <ul style="list-style-type: none"> <li>• Afternoon 1530 hrs to 1615 hrs – Log crane operations with truck movements throughout the port.</li> <li>• Evening 1730 hrs to 1815 hrs – No visible/audible port activity from the Reotahi vantage point.</li> <li>• Late evening/Night 2100 hrs onward - Sierra Guardian berthed at approximately 21:00. Activity from the log handling facility to the east was the dominant noise source.</li> </ul> <p>30 April:</p> <ul style="list-style-type: none"> <li>• Morning 0943 hrs to 0958 hrs Sierra Guardian still at berth. Activity from the log handling facility to the east remained the dominant noise source.</li> </ul> |

Table 7: Attended Measurement Summary

| Position | Date, time                                            | Measured levels (dB) |                  |                    | Dominant source, other sources                                                                                                                                                                      |
|----------|-------------------------------------------------------|----------------------|------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |                                                       | L <sub>Aeq</sub>     | L <sub>A90</sub> | L <sub>AFmax</sub> |                                                                                                                                                                                                     |
| MP1      | 26 Albany Road                                        | 40                   | 36               | 57                 | <u>Log unloading with log cranes and trucks</u> , bird calls, distant voices, insects, recreational boats in harbour                                                                                |
|          | <b>Log unloading</b>                                  |                      |                  |                    |                                                                                                                                                                                                     |
|          | 29/4/2026                                             |                      |                  |                    |                                                                                                                                                                                                     |
|          | 1533 hrs to 1554 hrs                                  |                      |                  |                    | Occasional beeping from Port can be heard and occasional bangs/crashes from port activity.                                                                                                          |
|          | Duration: 15:20 mm:ss                                 |                      |                  |                    | Activity appeared to increase towards end of measurement period with noise levels increasing.<br>(L <sub>AFmax</sub> is due to port noise)                                                          |
|          | 26 Albany Road                                        | 42                   | 38               | 62                 | As above, but with noise continuing to increase from Port. Wind in trees can also be heard intermittently.<br>(L <sub>AFmax</sub> is due to port noise)                                             |
|          | <b>Log unloading</b>                                  |                      |                  |                    |                                                                                                                                                                                                     |
|          | 29/4/2026                                             |                      |                  |                    |                                                                                                                                                                                                     |
|          | 1555 hrs to 1612 hrs                                  |                      |                  |                    |                                                                                                                                                                                                     |
|          | Duration: 15:02 mm:ss                                 |                      |                  |                    |                                                                                                                                                                                                     |
|          | 26 Albany Road                                        | 44                   | 41               | 57                 | <u>Crunching and grinding noise from log loading yard to east not associated with Port</u> , hum from Sierra Guardian Ship at berth, insects.                                                       |
|          | <b>Log loading yard</b><br>(not associated with port) |                      |                  |                    |                                                                                                                                                                                                     |
|          | 29/4/2026                                             |                      |                  |                    |                                                                                                                                                                                                     |
|          | 2226 hrs to 2241 hrs                                  |                      |                  |                    | Occasional noise from reversing beepers.                                                                                                                                                            |
|          | Duration: 15:06 mm:ss                                 |                      |                  |                    | (L <sub>AFmax</sub> is due to log yard)                                                                                                                                                             |
|          | 26 Albany Road                                        | 43                   | 40               | 56                 | As above                                                                                                                                                                                            |
|          | <b>Log loading yard</b><br>(not associated with port) |                      |                  |                    |                                                                                                                                                                                                     |
|          | 29/4/2026                                             |                      |                  |                    |                                                                                                                                                                                                     |
|          | 2241 hrs to 2257 hrs                                  |                      |                  |                    |                                                                                                                                                                                                     |
|          | Duration: 15:02 mm:ss                                 |                      |                  |                    |                                                                                                                                                                                                     |
|          | 26 Albany Road                                        | 39                   | 37               | 54                 | <u>Crunching and grinding noise from log loading yard to east not associated with Port</u> , trucks moving in Port, hum from Sierra Guardian ship, bangs and crashes from unloading of ship, birds. |
|          | <b>Log loading yard</b><br>(not associated with port) |                      |                  |                    |                                                                                                                                                                                                     |
|          | 30/4/2026                                             |                      |                  |                    |                                                                                                                                                                                                     |
|          | 1555 hrs to 1612 hrs                                  |                      |                  |                    | (L <sub>AFmax</sub> is due to log yard)                                                                                                                                                             |
|          | Duration: 15:02 mm:ss                                 |                      |                  |                    |                                                                                                                                                                                                     |
| MP2      | Norfolk Avenue Playground                             | 33                   | 30               | 57                 | <u>Low level humming noise from the east adjacent to the port</u> . Birds, wind in trees, insects, distant string trimmer, distant cars.                                                            |
|          | <b>Port inactive</b>                                  |                      |                  |                    |                                                                                                                                                                                                     |
|          | 30/4/2026                                             |                      |                  |                    |                                                                                                                                                                                                     |
|          | 1729 hrs to 1758 hrs                                  |                      |                  |                    | No activity can be seen or heard from port itself. Generally quiet.                                                                                                                                 |
|          | Duration: 15:04 mm:ss                                 |                      |                  |                    | (L <sub>AFmax</sub> is due to bird noise)                                                                                                                                                           |

|     |                                                                                               |    |    |    |                                                                                                                                                                                                                                                                                                            |
|-----|-----------------------------------------------------------------------------------------------|----|----|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Norfolk Avenue Playground                                                                     | 34 | 30 | 50 | As above                                                                                                                                                                                                                                                                                                   |
|     | <b>Port inactive</b><br>30/4/2026<br>1748 hrs to 1807 hrs<br>Duration: 15:02 mm:ss            |    |    |    |                                                                                                                                                                                                                                                                                                            |
| MP3 | 21 Beach Road                                                                                 | 35 | 33 | 48 | <u>Low level humming noise from the east adjacent to the port.</u> Insects, domestic noises, wavelets.<br>No activity can be seen or heard from port itself. Generally quiet.<br>(L <sub>AFmax</sub> is due to bird noise)                                                                                 |
|     | <b>Port inactive</b><br>29/4/2026<br>1816 hrs to 1835 hrs<br>Duration: 15:01 mm:ss            |    |    |    |                                                                                                                                                                                                                                                                                                            |
|     | 21 Beach Road                                                                                 | 34 | 32 | 45 | As above with running water onto beach now audible also.<br>Generally quiet.                                                                                                                                                                                                                               |
|     | <b>Port inactive</b><br>29/4/2026<br>2043 hrs to 2058 hrs<br>Duration: 15:01 mm:ss            |    |    |    |                                                                                                                                                                                                                                                                                                            |
|     | 21 Beach Road                                                                                 | 42 | 36 | 64 | <u>Sierra Guardian berthing (humming noise) which increased in level as the vessel approached the jetty, consistent with elevated thruster load during the final stages of the berthing manoeuvre,</u> insects, running water onto beach, dog barking, birds.<br>(L <sub>AFmax</sub> is due to bird noise) |
|     | <b>Sierra Guardian berthing</b><br>29/4/2026<br>2104 hrs to 2122 hrs<br>Duration: 15:01 mm:ss |    |    |    |                                                                                                                                                                                                                                                                                                            |

Figure 4: Photos of MP1 – 26 Albany Road, Marsden Bay



Figure 5: Photos of MP2 – Norfolk Avenue Playground



Figure 6: Photos of MP3 - 21 Beach Road, Reotahi

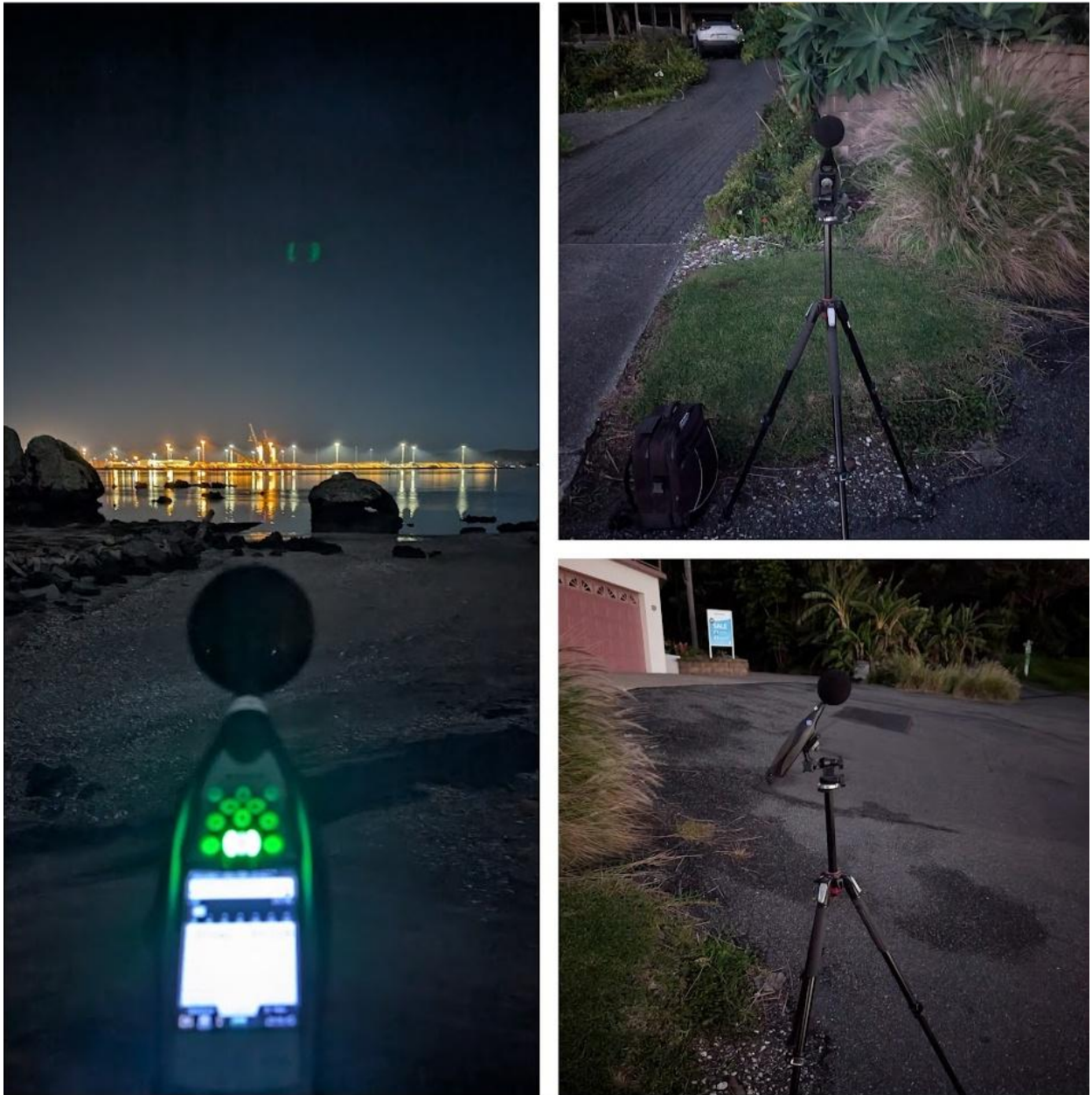
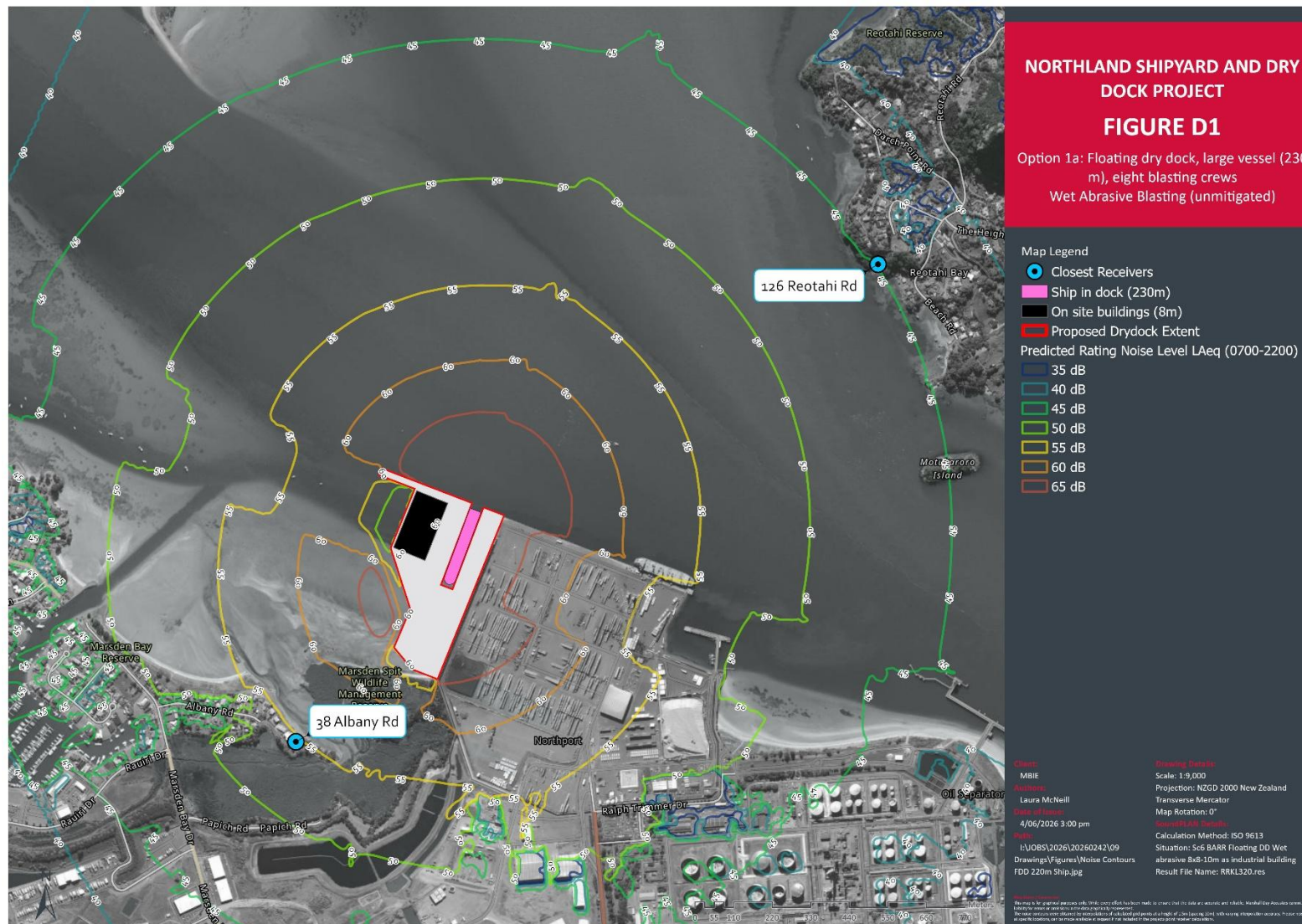


Figure 7: Sierra Guardian Ship Berthing (taken from Beach Road)

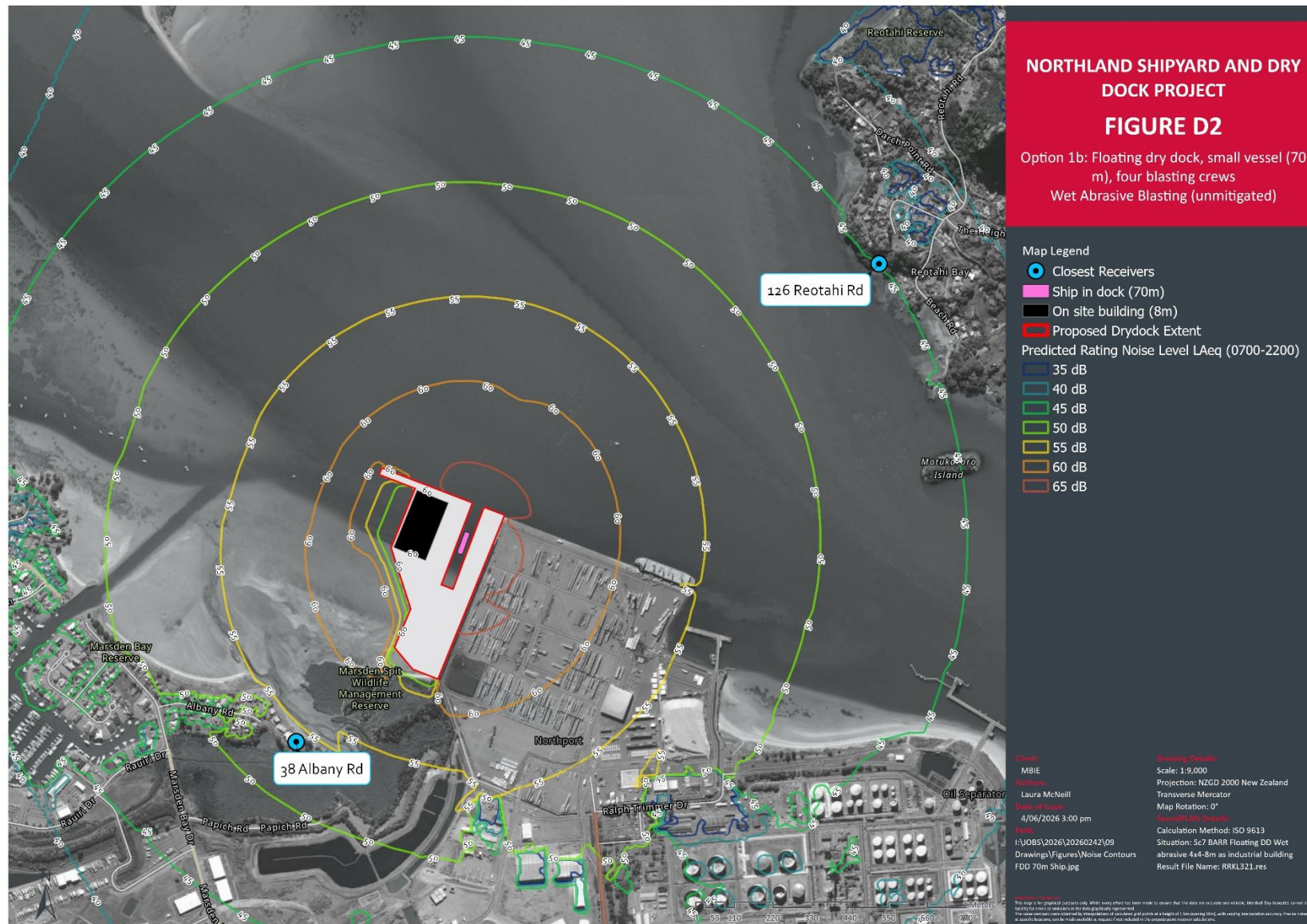


## APPENDIX D NOISE CONTOUR MAPS – WET ABRASIVE BLASTING

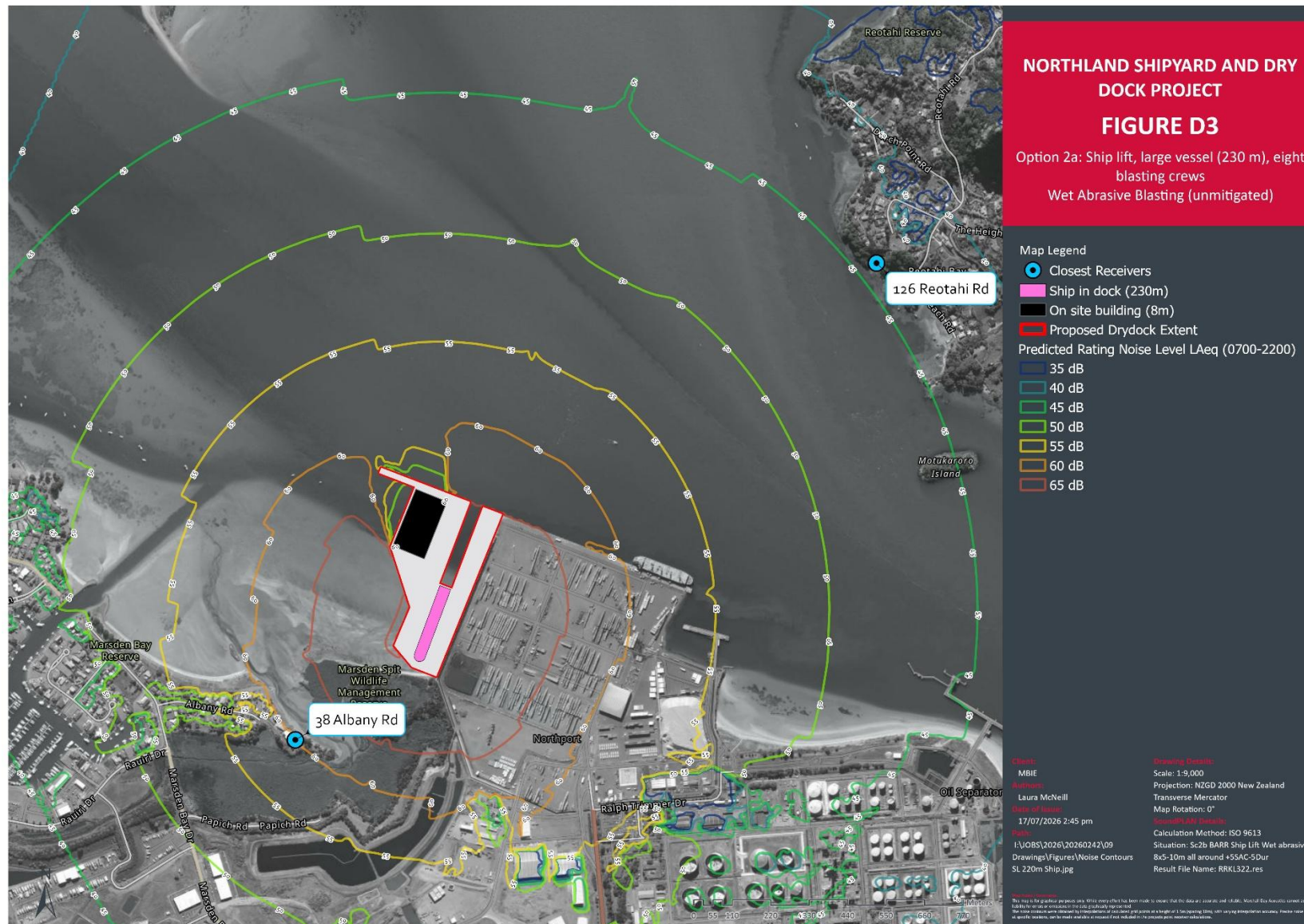
### D1 Option 1a: Floating drydock, large vessel (230 m), 8 blasting crews



D2 Option 1b: Floating drydock, small vessel (70 m), 4 blasting crews



D3 Option 2a: Ship lift, large vessel (230 m), 8 blasting crews



D4 Option 2b: Ship lift, small vessel (70 m), 4 blasting crews

