MARSHALL DAY Acoustics

PORT OF NAPIER

WHARF 6 FUTURE PORT NOISE MAPS (2026)

Rp 004 r02 2015784A | 20 September 2016

MARSHALL DAY Acoustics

84 Symonds Street
PO Box 5811 Wellesley Street
Auckland 1141 New Zealand
T: +64 9 379 7822 F: +64 9 309 3540
www.marshallday.com

Project: **FUTURE PORT NOISE MAPS (2026)**

Prepared for: **Port of Napier**
PO Box 947
Napier 4140

Attention: **Bruce Lochhead and Michel de Vos**

Report No.: **Rp 004 r02 2015784A**

Disclaimer

Reports produced by Marshall Day Acoustics Limited are based on a specific scope, conditions and limitations, as agreed between Marshall Day Acoustics and the Client. Information and/or report(s) prepared by Marshall Day Acoustics may not be suitable for uses other than the specific project. No parties other than the Client should use any information and/or report(s) without first conferring with Marshall Day Acoustics.

The advice given herein is for acoustic purposes only. Relevant authorities and experts should be consulted with regard to compliance with regulations or requirements governing areas other than acoustics.

Copyright

The concepts and information contained in this document are the property of Marshall Day Acoustics Limited.
Use or copying of this document in whole or in part without the written permission of Marshall Day Acoustics constitutes an infringement of copyright. Information shall not be assigned to a third party without prior consent.

Document control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Issued	-	-	10 Aug 2016	Craig Fitzgerald	Keith Ballagh
Issued	r01	-	14 Sep 2016	Craig Fitzgerald	-
Issued	r02	Final Draft	20 Sep 2016	Craig Fitzgerald	-

Cover Photo: Creative Agency 514-806-1644

TABLE OF CONTENTS

This document may not be reproduced in full or in part without the written consent of Marshall Day Acoustics Limited

1.0 INTRODUCTION

Marshall Day Acoustics Limited (MDA) first prepared a noise model for Port of Napier in 1994. The noise model has regularly been reviewed to establish the operative City of Napier District Plan Port Noise Control Boundaries, evaluate future development options and reflect changes in current operations.

Port of Napier Ltd is seeking consent to build a new wharf ('Wharf 6') on the north side of the existing container terminal (refer Figure 1 below). Wharf 6 is proposed to be 350m long and 34m wide.

Port of Napier has engaged Marshall Day Acoustics Limited (MDA) to review forecast future operations to assess ongoing compliance with the District Plan noise rules. This report presents future noise contours for the peak period in 10 years (2026) incorporating the revised port layout (i.e. with Wharf 6) and forecast growth in operations.

Figure 1: Aerial Map showing proposed location of Wharf 6

Note:

- This report relates to port operations noise only. A separate acoustic report has been prepared to address temporary noise associated with the construction of Wharf 6 (refer MDA report Rp 001 2016446A).
- A glossary of technical terms is included in Appendix A.

2.0 PORT NOISE STANDARD (NZS 6809: 1999)

2.1 Overview

Noise from Port Napier is experienced primarily on the landward side of the mean high water springs, and is managed in terms of the Napier City District Plan. The District Plan's provisions have been developed in terms of New Zealand's Port Noise Standard.

The objective of NZS 6809 is to ensure the long-term compatibility of ports and their neighbours by the application of appropriate land use planning techniques. The Standard recognises the need for ports to operate in an effective manner and provides guidelines to ensure that the adjacent residential communities can co-exist with ports and their associated activities.

The Standard uses the concept of *Inner* and *Outer Control Boundaries* which it recommends be incorporated onto planning maps in the District Plan. Each boundary has an associated range of permitted and conditional activities. Furthermore, port companies and port users should implement management plans to manage and monitor noise from their operations, with the aim of progressively reducing noise levels wherever practicable.

The *Inner* and *Outer Control Boundaries* are based around an acoustic parameter called the *Day/Night Level* or L_{dn} and measured in dBA. This parameter is essentially the energy average sound level calculated over a 24-hour period. Night-time noise is adjusted by adding 10 dBA in order to reflect the greater sensitivity to noise at night. For NZS6809, the *Inner* and *Outer Control Boundaries* equate to a predicted noise level over a 5 day period of 65 dBA L_{dn} and 55 dBA L_{dn} respectively.

2.2 Port Noise Boundaries

The control boundaries are derived from the noise contours for the predicted peak operations period in the lifetime of the District Plan, which is typically 10 years in the future. The control boundaries are inclusive, following cadastral boundaries.

For existing ports, NZS 6809: 1999 recommends the noise limits in Table 1 below.

Table 1: Noise Limits for existing ports

Location	Day-night (Long term)	Night-time (Short term)
At any point on land at, or beyond, the inner control boundary (i.e. beyond Area A)	65 dB $L_{dn\ (5\ days)}$ 68 dB $L_{dn\ (1\ day)}$	60 dB $L_{Aeq\ (9\ hrs)}$ 65 dB $L_{Aeq\ (15\ min)}$ 85 dB L_{AFmax}

Note: Daytime is defined as 0700 – 2200 on any day
Night time is defined as 2200 – 0700 the following day

These limits have been applied to Port Napier's projected activities over the past two decades, and the inner and outer control boundaries have been incorporated in the District Plan, along with relevant rules. Port noise level must stay within these boundaries in order to comply with the District Plan.

The operative Port Noise Boundaries extend into the Harginge Road Residential and Northern Residential areas at the east end of Ahuriri, and Napier Character Hill Residential on the north side of Napier Hill (refer planning maps F7 and F8). The rules that apply to port noise are set out in Appendix B.

Port of Napier has also implemented a Noise Management Plan (NMP) in accordance with the requirements of NZS 6803: 1999 and District Plan rule 28.15.1 (b). Information on port noise, including the current version of the NMP is available on the Port of Napier website: http://www.napierport.co.nz/community/sustainability/.

2.3 Hawke's Bay Regional Coastal Environment Plan (RCEP)

With reference to Figure 2 and Figure 3 (overleaf), Wharf 6 is located in the Port Management Area of the Coastal Marine Area (CMA). The Hawke's Bay Regional Coastal Environment Plan including Policies in Chapter 25 and Rule 177, align with equivalent controls in the Napier District Plan provisions discussed in Section Section 2.2 above. This is a normal way to manage such cross-boundary effects.

Figure 2: City of Napier District Plan (Proposed Wharf 6 in Red)

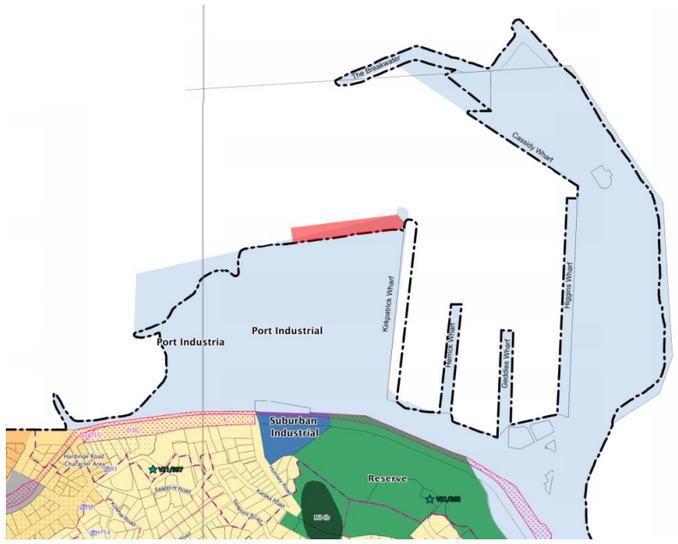


Figure 3: Hawke's Bay Regional Coastal Plan (Proposed Wharf 6 in Orange)

This document may not be reproduced in full or in part without the written consent of Marshall Day Acoustics Limited

2.4 Current Port Noise Maps (2016)

MDA has undertaken attended noise monitoring to verify the shape of the modelled noise contours, and annually reviews noise monitoring data from the Bluff Hill Noise Monitoring Terminal (NMT) to calibrate the port noise model. The Bluff Hill NMT is located within the Port Inner Noise Boundary (i.e. closer to the Port). Therefore conservatively, compliance is achieved if the noise limits are not exceeded at the Bluff Hill NMT.

The current operational scenario was recently updated in July 2016 (refer MDA report Rp 002 r01 2015784A). In summary, the noise contours remain compliant with District Plan rule 28.15.1 part (a).

2.5 Future Port Noise Maps (2026)

The objective of this report is to prepare a comparable future noise model for forecast peak period operations in 10 years (2026). The results enable evaluation of the predicted change in port noise emissions and its ability to continue to comply with District Plan rule 28.15.1 part (a).

3.0 MODELLING METHODOLOGY

3.1 Overview

A computer-based noise model is used to predict the 'average' noise emissions from the Port over a peak five-day operating period. The model consists of the following parts that must be accurate in order for the noise contours to be reliable:

- **Noise sources**
  The equipment reference noise levels are representative. Measurements have been made of representative Port machinery to determine the sound power levels in the model.
- **Operational scenario**
  The operational assumptions are representative, including the location of sources and their operational duration. This has been developed and reviewed with the Port on a regular basis.
- **Modelling methodology**
  The software takes into account attenuation due to distance, shielding, ground absorption, topography, air absorption and assigns the night weighting of the L_{dn} index. It enables both individual and cumulative assessment of noise emissions.
- **Calibration**
  The model relies on short-term and long-term monitoring to verify shape of the overall level of the contours and calibrate the model.

3.2 Noise Sources

The noise source data for the model was prepared from measurements carried out on Port of Napier machinery. In some cases, equipment information was supplemented with representative data measured at other Ports (e.g. ships) in order to make it more complete.

In every case, the octave band spectrum of the noise source was measured at a known distance while the equipment undertook several cycles of operation. From this data, the sound power level of the equipment was calculated. The calculated sound powers were cross checked against data for similar equipment. Table 2 summarises the sources used in the 2016 and 2026 noise models.

Table 2: Noise sources used in the operational noise models

Noise Sources used in Model*	Sound Power Level (dB L_{wA})
Cranes	110 – 115
Ships	105 – 115
Reach stackers / large forklifts / excavators	105 – 110
Log Loaders / Large Trucks	100 – 110
Small fork-lifts	90 – 95
Reefer units	85 – 110

* Trains and vehicles on public roads are excluded from port noise contours

3.3 Operational Scenarios

City of Napier District Plan Rule 28.15.1 parts (b-f) relate to noise monitoring, mitigation, management and liaison with respect to the 'Current Port Noise Maps'. The Current Port Noise Maps are produced from the 'busy 5-day' operational scenario model, which is updated annually. The Port operational input assumptions are essential to ensure the model reflects the peak 5-day period of maximum cargo throughput or activity.

The modelling assumptions include a description, the number of, and an equivalent 'on-time' description for each noise source. The 'on-time' operational profile is explained by way of the following four examples from Figure 2 of the Current Port Noise Maps (2016) included in Appendix C:

- Item A1: 'Logging trucks (east gate – log yard)'
  This represents truck movements between the east gate and log yard on Wharf 1, where two movements are required for one return trip. The average '5-day movements' for the noise source is split into day (0700-2200) and night (2200-0700) periods to enable application of the night weighting in the L_{dn} index. The sound power level of one truck is modelled travelling along the line shown in Figure 4 at an average speed of 15km/hr. The number of movements is input as 364 trucks movements per day and 28 movements per night over the 5-day period (i.e. 1820 day and 140 night movements over the modelled 5 day period).
- Item A2: 'Log Loaders (truck unloading)'
  This represents log loaders operating on Wharf 1. The sound power level of each unit is included at various representative locations identified in Figure 4. The daytime 'on-time' summary description '75% 13h 5d' indicates that the equipment is typically utilised 75% of an activity period spanning 13 hours on all 5 days. There are three of these sources included in the model, as denoted in the 'No.' column.
- Item E1: 'Reefers (24 chiller units stack 6wx4h)'
  This represents a stack of 24 reefer units, arranged 6 units wide by 4 units high. The cumulative sound power level for 24 units is evenly distributed over one end of the stack, facing the tower that provides electricity to the units. The location of the stacks is shown in Figure 4. The 'on-time' takes into account typical duty cycle times.
- Item E5: 'R&D / Depot Reach Stacker (10 units)'
  This represents ten reach stackers operating in the container terminal. The cumulative sound power level is for ten units evenly distributed over its region of operation shown in Figure 4.

This document may not be reproduced in full or in part without the written consent of Marshall Day Acoustics Limited

3.4 Modelling Methodology

The 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 SoundPLAN model uses the calculation algorithms of ISO 9613-2: 1996 'Acoustics – Attenuation of noise during propagation outdoors – Part 2: General method of calculation'. Its accuracy has been established by a number of field trials, including comparisons in New Zealand between predictions and measurements.

The model relies on the following geo referenced base data sourced from Napier City Council (May 2015):

- Topographical contours at 1m intervals
- Cadastral boundaries
- Building footprints and heights

The noise contours are obtained by computer interpolation between calculated grid points at 10m intervals.

3.5 Calibration

The 2016 annual monitoring review (to 30 June 2016) is summarised in Marshall Day Acoustics report Rp 002 r01 2015784A (6 July 2016).

The annual review is based on the measured ambient noise levels at the Bluff Hill Noise Monitoring Terminal (NMT), located near 3 Karaka Road. The Bluff Hill NMT is considered to provide a good point of reference for port noise levels received in the community. The NMT captures audio recordings of loud noise events to enable identification of the source and ensure validity of the measured data. It also enables identification of high noise sources for management purposes.

In summary, the review found that the port continues to comply with the 65 dB $L_{dn\,(5\,day)}$ and 68 dB $L_{dn\,(1day)}$ noise limits in rule 28.15.1 (a). It determined that the highest port noise controlled period measured 63.4 dB $L_{dn\,(5\,day)}$ at the NMT for the period 15 to 20 March 2016. Note noise levels are normally reported to the nearest whole number, however to aid transparency, the calibration level is presented to one decimal place.

Environmental noise sources unrelated to the Port (such as wind, rain, cicadas, crickets and bird song) are often seasonal, easily identified and excluded through the annual review process. However, sporadic noise sources (such as public road, rail and air movements) are often difficult to identify, separate and exclude. It is estimated that on a normal day, noise sources unrelated to the Port contribute approximately 56 dB L_{dn}, elevating the measured noise level at the NMT by approximately 1 decibel during the peak operations period.

Therefore, the Current Port Noise Maps (2016) are calibrated to 62.4 dB $L_{dn\,(5\,day)}$ at the NMT (i.e. 63.4 dB $L_{dn\,(5\,day)}$ minus 1 decibel).

The results of an attended noise survey in 2012 have been used to verify the shape of the modelled noise contours at multiple locations. The agreement between predicted and measured contours is excellent (± 1 dBA) at receiver positions with line of sight to the operations. Note that ± 2 dBA accuracy would normally be expected and is considered acceptable for environmental noise predictions.

The future noise model (2026) leverages from the current noise model (2016) with the same noise sources, operational assumptions (adjusted for forecast growth), modelling parameters and calibration adjustment. In summary, the future (2026) noise contours are predicted to be generally the same shape as the current (2016) noise contours, but 2 decibels louder (1.7 decibels at the NMT).

4.0 PORT NOISE MAPS

The Current Port Noise Maps (2016) are included in Appendix C and the Future Port Noise Maps (2026) are included in Appendix D.

For each set of noise maps, the Figures are summarised as follows:

- Figures 1 and 1A: The noise contours at 1.5m above ground level enable comparison with noise survey measurements undertaken in accordance with New Zealand Standard NZS 6801:2008 "*Acoustics – Measurement of environmental sound*", which is the revision of the 1999 version referred to in rule 28.15.1 (f).
- Figure 2: Presents the modelling inputs and assumptions.

It is considered that the calibrated current noise model (2016) provides an accurate representation of the existing peak operations period. Likewise, the calibrated future noise model (2026) provides an accurate representation of the potential peak operations period.

In summary, the future peak period operations in 2026 are predicted to remain compliant with District Plan rule 28.15.1 part (a).

5.0 CONCLUSIONS

MDA has updated the Port of Napier noise model to represent both current (2016) and future (2026) operations with Wharf 6 and forecast growth. It is considered that the noise model provides an accurate representation of current and future port noise emissions during peak operating periods.

In summary:

- The future (2026) noise contours are predicted to be generally the same shape as the current (2016) noise contours, but 2 decibels louder
- Port of Napier future operations are predicted to remain compliant with Napier District Plan noise rule 28.15.1 part (a)

This document may not be reproduced in full or in part without the written consent of Marshall Day Acoustics Limited

APPENDIX A GLOSSARY OF TERMINOLOGY

NZS 6809:1999	New Zealand Standard NZS 6809:1999 "Acoustics – Port Noise Management and Land Use Planning"
dB	Decibel. The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
dBA	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.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
$L_{Aeq\,(t)}$	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.
$L_{A90\,(t)}$	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
L_{dn}	The day night noise level which is calculated from the 24 hour L_{Aeq} with a 10 dB penalty applied to the night-time (2200-0700 hours) L_{Aeq}.
Frequency	The number of pressure fluctuation cycles per second of a sound wave. Measured in units of Hertz (Hz).
Hertz (Hz)	Hertz is the unit of frequency. One hertz is one cycle per second. One thousand hertz is a kilohertz (kHz).
Noise	A sound that is unwanted by, or distracting to, the receiver.
Ambient	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.

APPENDIX B NAPIER DISTRICT PLAN, PORT INDUSTRIAL ZONE, RULE 28.15

28.15 **Noise**

1. The following noise conditions shall apply to all land uses, other than those exempted in Rule 57.5 and container repair, and maintenance activities (See Rule 28.15.2 below):

   a) All land uses within the zone must be conducted so as to ensure the following noise limits are not exceeded at any point beyond the Port Inner Noise Boundary shown on the planning maps:

Over any 5 consecutive day period	L_{dn}	65 dBA
On any day	L_{dn}	68 dBA
2200 hours to 0700 hours the following day	$L_{eq\,(9hour)}$	60 dBA
	$L_{eq\,(15min)}$	65 dBA
2200 hours to 0700 hours the following day	L_{max}	85dBA

   NOTE: To demonstrate non-compliance it shall only be necessary to show non-compliance with any one noise limit.

   b) The Port Operator shall include in a Port Noise Management Plan minimum monitoring and reporting requirements for noise management as set out in Appendix 33A.

   c) Where any noise sensitive activity is partly or wholly contained within the area seaward of a noise contour line that is 65 dBA L_{dn} (5 day average) as shown on the current Port Noise Contour Map attached to the Port Noise Management Plan; or

   Where sound level monitoring indicates that port noise equals or exceeds 65 dBA L_{eq} (15 minutes 10pm-7am) on more than three occasions (more than 24 hours apart) during any rolling 12 month period within the boundary of a noise sensitive activity:

   The Port Operator shall comply with the matters set out in Appendix 33B(1).

   d) Where any noise sensitive activity is partly or wholly contained within the area seaward of a noise contour line that is 68 dBA L_{dn} (5 day average) as shown on the current Port Noise Contour Map attached to the Port Noise Management Plan; or

   Where sound level monitoring indicates that port noise equals or exceeds 68 dBA L_{eq} (15 minutes 10pm-7am) on more than three occasions (more than 24 hours apart) during any rolling 12 month period within the boundary of a noise sensitive activity:

   The Port Operator shall comply with the matters set out in Appendix 33B(2).

   e) The Port Operator shall establish, maintain and participate in a Port Noise Liaison Committee which shall operate in accordance with the requirements set out in Appendix 33C.

   f) Noise must be measured in accordance with the provisions of New Zealand Standard NZS6801:1999 "Acoustics: Measurement of Environmental Sound" and New Zealand Standard NZS6809:1999 "Acoustics: Port Noise Management and Land Use Planning".

This document may not be reproduced in full or in part without the written consent of Marshall Day Acoustics Limited

APPENDIX C CURRENT PORT NOISE MAPS (2016)

- Figure 1 Noise Contours 1.5m above ground (5 decibel intervals)
- Figure 2 Model 5-day Operational Scenario

APPENDIX D FUTURE PORT NOISE MAPS (2026)

- Figure 1 Noise Contours 1.5m above ground (5 decibel intervals)
- Figure 2 Model 5-day Operational Scenario

This document may not be reproduced in full or in part without the written consent of Marshall Day Acoustics Limited

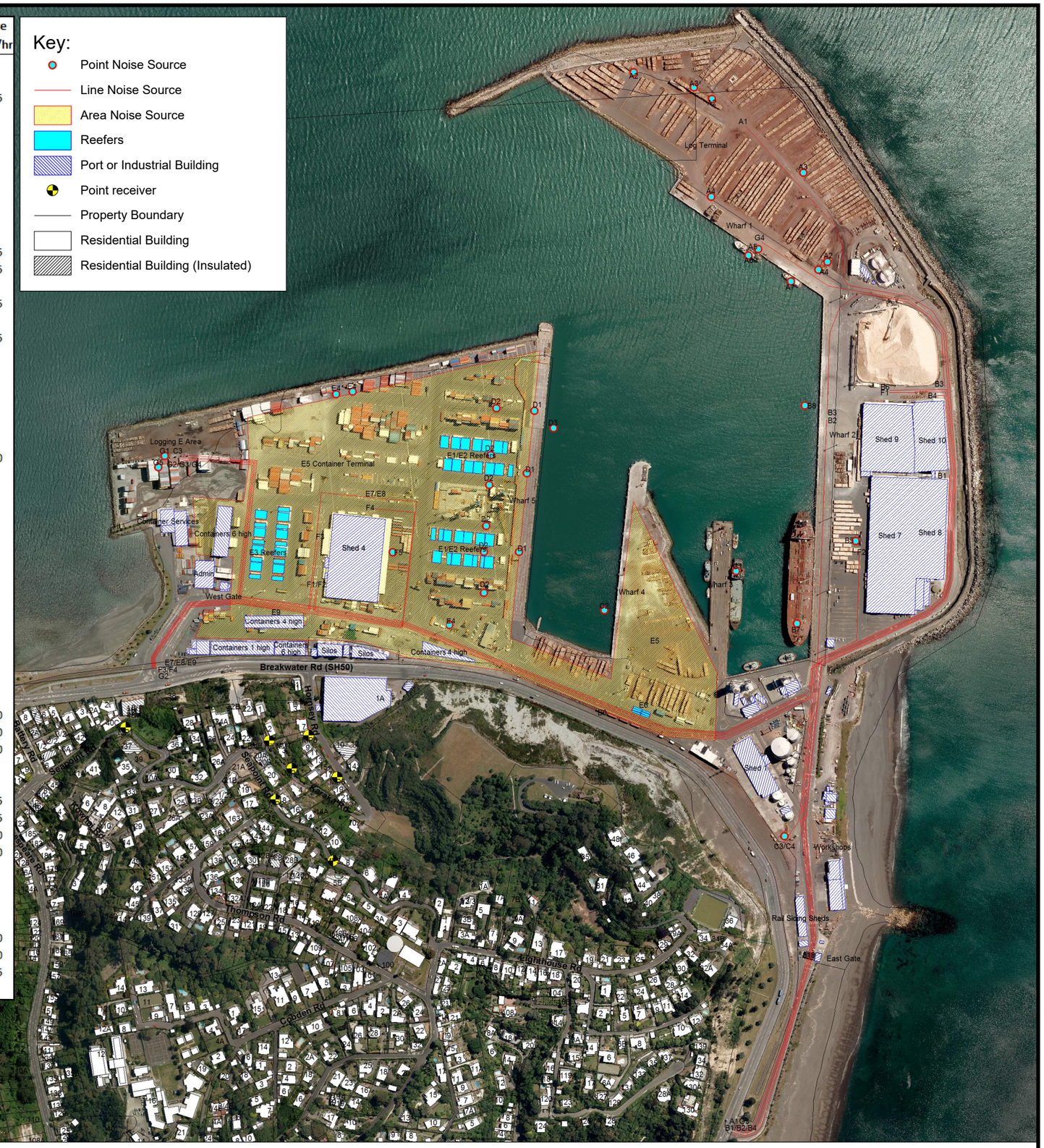
MARSHALL DAY Acoustics

Port of Napier Current Port Noise Maps (2016)
Figure 1: Noise contours 1.5m above ground

Client: Port of Napier Ltd
Path: J:\JOBS\2015\2015784A\07 SoundPLAN\Sp001 Port Napier 2016
Filename: Figure 1 Current 2016 Noise Contours at 1.5m.SGS, Result file: RRLK0453.res, Prepared: cmf, Date: 20 September 2016
The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of +/- 1.5dB. For precise noise levels at specific location, refer to point receiver calculations.

Scale @ A3 1:4000
0 25 50 100 150 m
N

Item	Model Source Description	No.	Location dgm + Z (m)	X, Y	Site activities 'on-time' Day (07-22)	Night (22-07)	Vehicle movements to/from site Day (07-22)	Night (22-07)	km/hr
A	***"Sources A - Wharf 1.geo"***								
A1	Log Trucks (East gate - log yard)	1	2		-	-	364/d	28/n	15
A2	Log Loaders (truck unloading)	3	3		75% 13h 5d	75% 1h 5n	-	-	-
A3	Log High Stacker (log yard)	2	2		75% 13h 5d	75% 1h 5n	-	-	-
A4	Log Loaders (ship loading)	2	3		75% 15h 5d	75% 9h 5n	-	-	-
A5	Log Butting Tractor (log ship loading)	1	2		75% 15h 5d	75% 9h 5n	-	-	-
A6	Log Excavators (4 units log ship stacking)	1	8		100% 15h 5d	100% 9h 5n	-	-	-
A7	Log Ship (~179m, bow out)	1	15		60% 15h 5d	60% 9h 5n	-	-	-
B	***"Sources B - Wharf 2.geo"***								
B1	Feritiliser Trucks (East gate - Shed 8)	1	2		-	-	50/d	-	15
B2	Fertiliser Trucks (East gate - Wharf 2)	1	2		-	-	68/d	4/n	15
B3	Fertiliser Trucks (Ship to Shed 10)	1	2		20% 15h 5d	20% 9h 5n	-	-	-
B4	Feritiliser Trucks (East gate - Shed 10)	1	2		-	-	66/d	22/n	15
B5	Diesel Forklift (Shed 7)	1	1.5		40% 15h 5d	40% 1h 5n	-	-	-
B6	WPI Truck (Rail siding - Shed 9)	1	2		-	-	9/d	43/n	15
B7	Ship (~185m, bow out)	1	15		51% 15h 5d	51% 9h 5n	-	-	-
B8	Log Ship (~179m, bow out)	1	15		20% 15 5d	20% 9h 5n	-	-	-
C	***"Sources C - Wharf 3 and 4.geo"***								
C1	Ship (~80m, bow in)	1	10		35% 15h 5d	35% 9h 5n	-	-	-
C2	Ship (~170m, bow in)	1	15		46% 15h 5d	46% 9h 5n	-	-	-
C3	Log Trucks (Rail siding - E Area)	1	2		-	-	10/d	-	10
C4	Log High Stacker (Rail siding)	1	2		25% 13h 5d	25% 1h 5n	-	-	-
D	***"Sources D - Wharf 5.geo"***								
D1	Container Cranes	3	10		60% 15h 5d	60% 9h 5n	-	-	-
D2	Reach Stackers	6	2		60% 15h 5d	60% 9h 5n	-	-	-
D3	Container Ship (~269m, bow in)	1	20		65% 15h 5d	65% 9h 5n	-	-	-
E	***"Sources E - Container Terminal.geo"***								
E1	Reefers (24 chiller units stack 6wx4h)	14	0 - 10		50% 15h 5d	50% 9h 5n	-	-	-
E2	Reefers (24 freezer units stack 6w x 4h)	14	0 - 10		33% 15h 5d	33% 9h 5n	-	-	-
E3	Reefers Testing (6 unit rows 6w x 1h)	17	1.5		25% 15h 5d	25% 9h 5n	-	-	-
E4	Generator (for overflow reefers)	3	2		100% 15h 5d	100% 9h 5n	-	-	-
E5	R&D / Depot Reach Stacker (10 units)	1	2		100% 15h 5d	20% 2h 5d	-	-	-
E6	Halls Reefers	6	2		33% 15h 5d	33% 9h 5n	-	-	-
E7	Container Trucks In (West gate to Wharf 5)	1	2		-	-	436/d	-	10
E8	Container Trucks Out (Wharf 5 to West gate)	1	2		-	-	436/d	-	10
E9	Thames St Trucks	1	2		-	-	139/d	16/n	10
F	***"Sources F - Shed 4.geo"***								
F1	Pulp Truck (Shed 9 to Shed 4)	1	2		-	-	34/d	2/n	15
F2	Pulp Truck (Shed 7 to Shed 4)	1	2		-	-	27/d	2/n	15
F3	Pan Pac Trucks In (West gate to Shed 4)	1	2		-	-	30/d	3/n	10
F4	Pan Pac Trucks Out (Shed 4 to West gate)	1	2		-	-	30/d	3/n	10
F5	Diesel Forklift (Shed 4)	1	1.5		75% 15h 5d	75% 1.5 5n	-	-	-
G	***"Sources G - Logging E Area.geo"***								
G1	Log Loaders (truck loading/unloading)	1	3		75% 13h 5d	75% 1h 5n	-	-	-
G2	Log Trucks (West gate - E Area)	1	2		-	-	74/d	-	10
G3	Log Trucks (East gate - E Area)	1	2		-	-	-	6/n	10
G4	Log Trucks (E Area - Logging Ship)	1	2		-	-	50/d	30/n	15
G5	Log High Stacker (E Area)	1	2		60% 13h 5d	60% 1h 5n	-	-	-

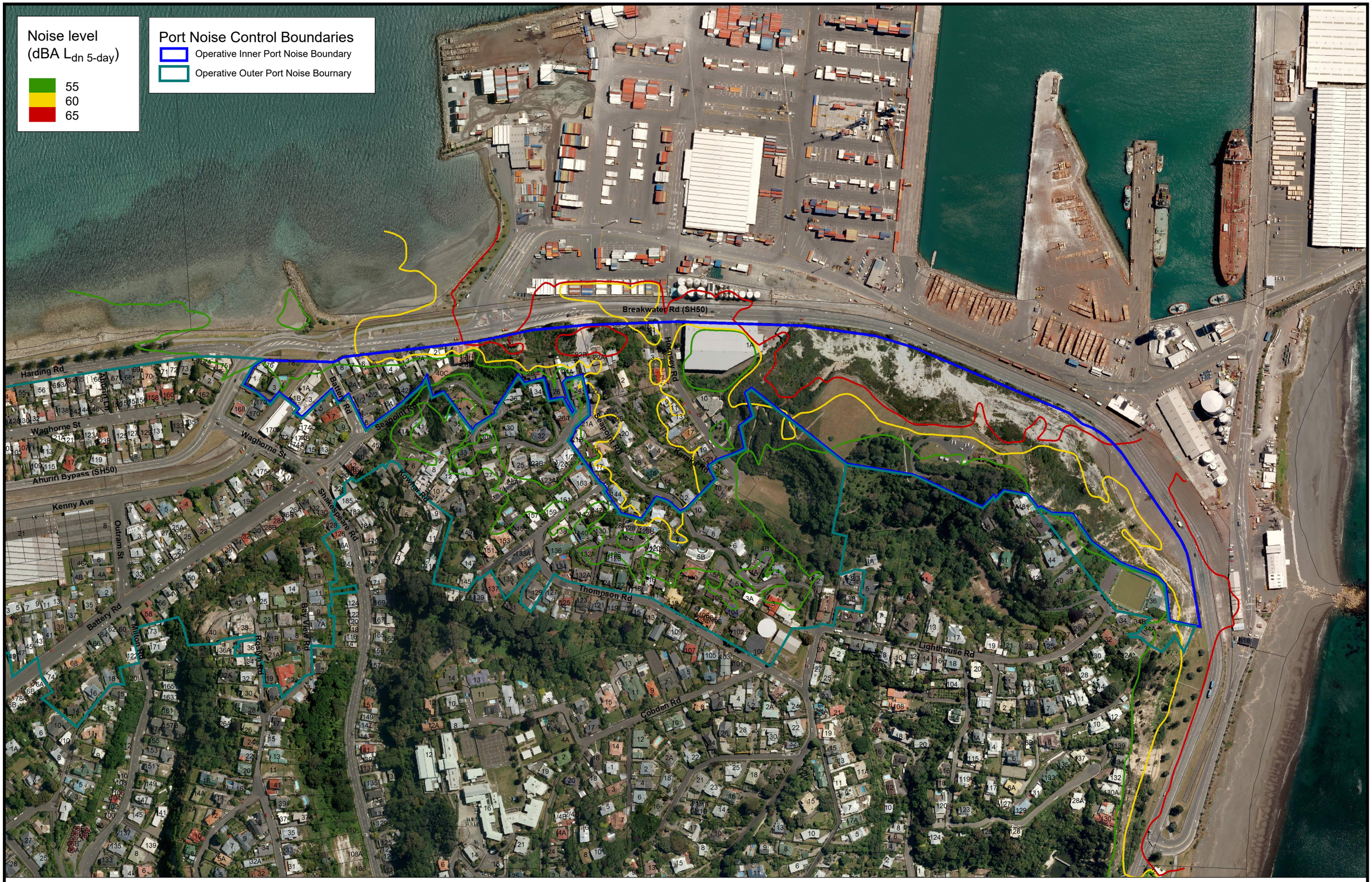


MARSHALL DAY Acoustics

Port of Napier Current Port Noise Maps (2016)
Figure 2: Model 5-Day Operational Scenario

Client: Port of Napier Ltd
Path: J:\JOBS\2015\2015784A\07 SoundPLAN\Sp001 Port Napier 2016
Filename: Current 2016 Figure 2 Port Noise Model.SGS, Prepared: cmf, Date: 10 August 2016
Napier City Council inputs (2015): Geo referenced topography (1m intervals), cadastal boundaries, building footprints, buildings heights, street numbers and aerial imagery.
Port of Napier inputs (2016): Operational assumptions reviewed and approved 13 June 2016

Scale @ A3 1:6000
0 50 100 200 300 m
N



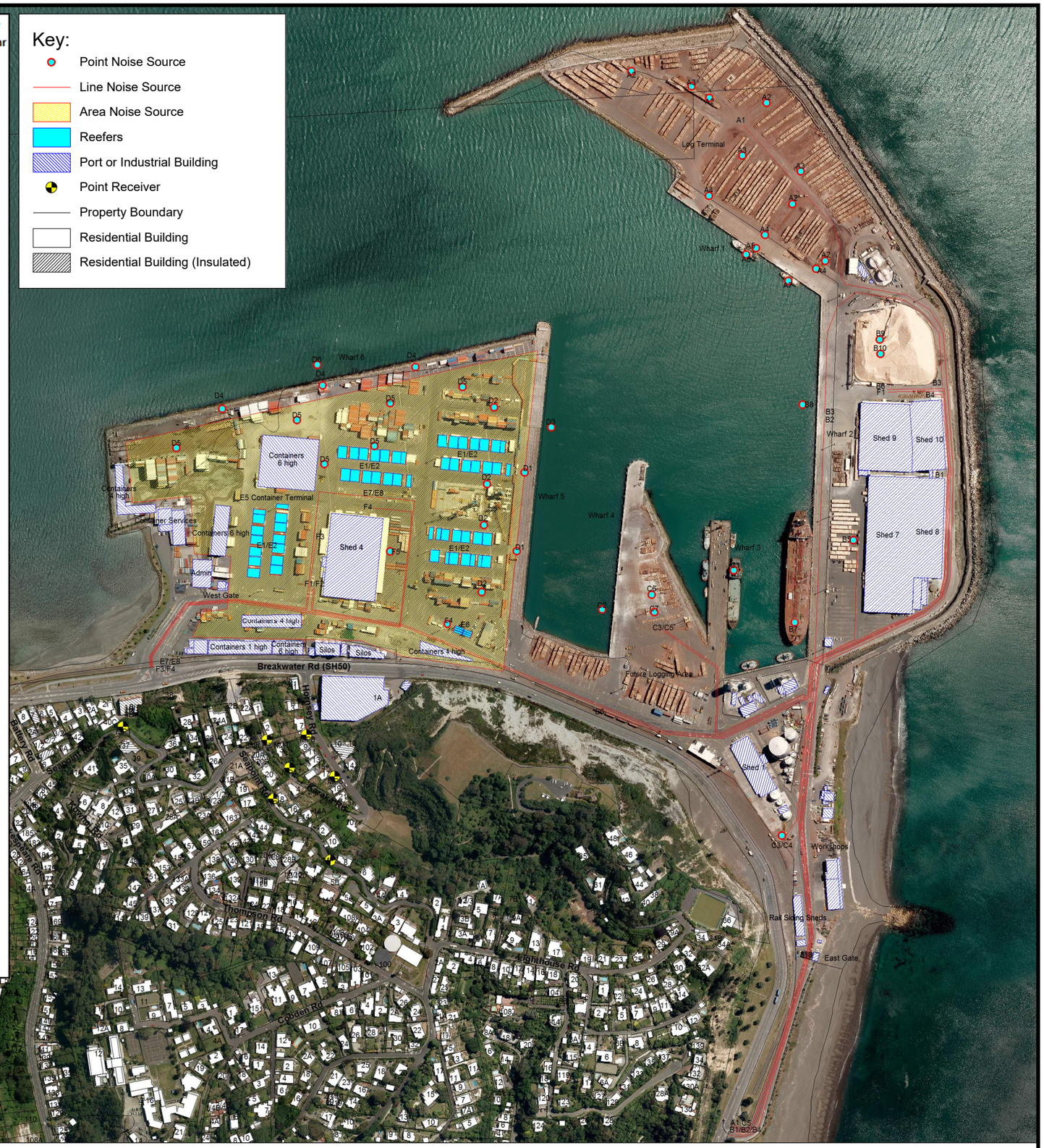
MARSHALL DAY Acoustics

Port of Napier Future Port Noise Maps (2026)
Figure 1: Noise contours 1.5m above ground

Client: Port of Napier Ltd
Path: J:\JOBS\2015\2015784A\07 SoundPLAN\Sp001 Port Napier 2016
Filename: Future 2026 Figure 1 Noise Contours at 1.5m.SGS, Result file: RRLK0903.res, Prepared: cmf, Date: 20 September 2016
The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of +/- 1.5dB. For precise noise levels at specific location, refer to point receiver calculations.

Scale @ A3 1:4000
0 25 50 100 150 m
N

Item	Model Source Description	No.	Location dgm + Z (m)	X, Y	Site activities 'on-time' Day (07-22)	Night (22-07)	Vehicle movements to/from site Day (07-22)	Night (22-07)	km/hr
A	***"Sources A - Wharf 1.geo"***								
A1	Log Trucks (East gate - log yard)	1	2		-	-	950/d	62/n	15
A2	Log Loaders (truck unloading)	5	3		75% 13h 5d	75% 1h 5n	-	-	-
A3	Log High Stacker (log yard)	3	2		75% 15h 5d	75% 9h 5n	-	-	-
A4	Log Loaders (ship loading)	3	3		75% 15h 5d	75% 9h 5n	-	-	-
A5	Log Butting Tractor (log ship loading)	1	2		75% 15h 5d	75% 9h 5n	-	-	-
A6	Log Excavators (4 units log ship stacking)	1	8		100% 15h 5d	100% 9h 5d	-	-	-
A7	Log Ship (~179m, bow out)	1	15		100% 15h 5d	100% 9h 5n	-	-	-
B	***"Sources B - Wharf 2.geo"***								
B1	Feritiliser Trucks (East gate - Shed 8)	1	2		-	-	50/d	-	15
B2	Fertiliser Trucks (East gate - Wharf 2)	1	2		-	-	68/d	4/n	15
B3	Fertiliser Trucks (Ship to Shed 10)	1	2		25% 15h 5d	25% 9h 5n	-	-	-
B4	Fertiliser Trucks (East gate - Shed 10)	1	2		-	-	66/d	22/n	15
B5	Diesel Forklift (Shed 7)	1	1.5		70% 15h 5d	70% 1h 5n	-	-	-
B6	WPI Truck (Rail siding - Shed 9)	1	2		-	-	9/d	43/n	15
B7	Ship (~185m, bow out)	1	15		51% 15h 5d	51% 9h 5n	-	-	-
B8	Log Ship (~179m, bow out)	1	15		20% 15 5d	20% 9h 5n	-	-	-
B9	Log Loaders (truck unloading)	1	3		75% 13h 5d	75% 1h 5n	-	-	-
B10	Log High Stacker (log yard)	1	2		75% 15h 5d	75% 9h 5n	-	-	-
C	***"Sources C - Wharf 3 and 4.geo"***								
C1	Wharf 3 Ship (~80m, bow in)	1	10		35% 15h 5d	35% 9h 5n	-	-	-
C2	Wharf 4 Ship (~170m, bow in)	1	15		46% 15h 5d	46% 9h 5n	-	-	-
C3	Log Trucks (Rail siding - E Area)	1	2		-	-	22/d	-	15
C4	Log High Stacker (Rail siding)	1	2		56% 13h 5d	56% 1h 5n	-	-	-
C5	Log Trucks (East gate - log yard)	1	2		-	-	20/d	-	15
C6	Log Loaders (truck unloading)	1	3		15% 15h 5d	-	-	-	-
C7	Log High Stacker (log yard)	1	2		15% 15h 5d	-	-	-	-
D	***"Sources D - Wharf 5 and 6.geo"***								
D1	Wharf 5 Container Cranes (mobile)	2	10		15% 15h 5d	15% 9h 5n	-	-	-
D2	Wharf 5 Reach Stackers	4	2		15% 15h 5d	15% 9h 5n	-	-	-
D3	Wharf 5 Container Ship (~269m, bow in)	1	20		20% 15h 5d	20% 9h 5n	-	-	-
D4	Wharf 6 Container Cranes (mobile)	3	10		60% 15h 5d	60% 9h 5n	-	-	-
D5	Wharf 6 Reach Stackers	6	2		60% 15h 5d	60% 9h 5n	-	-	-
D6	Wharf 6 Container Ship (~290m centred)	1	20		65% 15h 5d	65% 9h 5n	-	-	-
E	***"Sources E - Container Terminal.geo"***								
E1	Reefers (24 chiller units stack 6wx4h)	28	0 - 10		50% 15h 5d	50% 9h 5n	-	-	-
E2	Reefers (24 freezer units stack 6w x 4h)	28	0 - 10		33% 15h 5d	33% 9h 5n	-	-	-
E4	Generator (for overflow reefers)	1	2		100% 15h 5d	100% 9h 5n	-	-	-
E5	R&D / Depot Reach Stacker (15 units)	1	2		100% 15h 5d	27% 9h 5n	-	-	-
E6	Halls Reefers	6	2		33% 15h 5d	33% 9h 5n	-	-	-
E7	Container Trucks In (West gate to Wharf 5)	1	2		-	-	1159/d	-	10
E8	Container Trucks Out (Wharf 5 to West gate)	1	2		-	-	1159/d	-	10
F	***"Sources F - Shed 4.geo"***								
F1	Pulp Truck (Shed 9 to Shed 4)	1	2		-	-	60/d	4/n	15
F2	Pulp Truck (Shed 7 to Shed 4)	1	2		-	-	47/d	3/n	15
F3	Pan Pac Trucks In (West gate to Shed 4)	1	2		-	-	30/d	3/n	10
F4	Pan Pac Trucks Out (Shed 4 to West gate)	1	2		-	-	30/d	3/n	10
F5	Diesel Forklift (Shed 4)	1	1.5		100% 15h 5d	100% 1.5h 5n	-	-	-



MARSHALL DAY Acoustics

Port of Napier Future Port Noise Maps (2026)
Figure 2: Model 5-Day Operational Scenario

Client: Port of Napier Ltd
Path: J:\JOBS\2015\2015784A\07 SoundPLAN\Sp001 Port Napier 2016
Filename: Future 2026 Figure 2 Port Noise Model.SGS, Prepared: cmf, Date: 10 August 2016
Napier City Council inputs (2015): Geo referenced topography (1m intervals), cadastal boundaries, building footprints, buildings heights, street numbers and aerial imagery.
Port of Napier inputs (2026): Operational assumptions reviewed and approved 11 July 2016

Scale @ A3 1:6000
0 50 100 200 300 m

N