

B Noise Management Strategy

Orora Limited

B7 Reel Store – demolition and noise mitigation

3 April 2018

Doc no. 16002-NV-RP-7-0



Orora Limited
B7 reel store demolition and noise mitigation

Document no.	Doc No. 16002-NV-RP-7-0
Revision	Rev 0
Date	3 April 2018
Author	John Hutchison
Reviewer	Scott Hughes
File path	I:\PROJECTS\16002 - Orora\03 Deliverables\031 Reports\Project reports\16002-NV-RP-7-0 B7 Reel Store demolition and noise mitigation.docx

Hutchison Weller Pty Ltd
ABN 34 603 174 518
Suite 13, 357 Military Road
Mosman NSW 2008

www.hutchisonweller.com

Table of Contents

Glossary iv

1. Introduction..... 1

2. Operational noise limits and existing environment 3

 2.1 Operational noise limits 3

 2.2 Existing noise environment 3

3. Assessment of proposed changes to the mill..... 4

 3.1 Modelling 4

 3.2 Demolition staging 4

 3.3 Predicted noise levels 4

Appendix A. Staging of B7 Reel Store demolition

Appendix B. Historical noise monitoring data

Appendix C. Contours demonstrating increase in noise following demolition of B7 Reel Store building

Glossary

Acoustic and vibration related terms:

- **Acoustic Spectrum:** A representation of a sound sample (usually short term) of the amount of energy or sound level per frequency.
- **Ambient Noise:** Ambient noise encompasses all sound present in a given environment, being usually a composite of sounds from many sources near and far.
- **dB(A):** A unit of sound measurement which has frequency characteristics weighted so that it approximates the response of the human ear to sound waves
- **Heavy Vehicle:** A truck, transport or other vehicle with a gross vehicle weight above a specified level (for example: over 8 tonnes)
- **L_{A90}:** Is the noise level that is exceeded 90 per cent of the measurement time. This parameter is commonly referred to as the background noise level
- **L_{Aeq}:** Noise level that represents the energy average noise from the source during a specified time period, and is the equivalent continuous sound pressure level for a given period
- **L_{Aeq(15hr)}:** The Leq noise level for the period from 7 am to 10 pm.
- **L_{Aeq(9hr)}:** The Leq noise level for the period from 10 pm to 7 am.
- **NCA:** Noise Catchment Area. Grouping dwellings or receivers together in terms of similar noise environment.
- **Noise barrier:** Generally a wall or an earth mound that obstructs or restricts the passage of sounds waves from a noise source
- **Noise Logger:** A data logging (data and audio in some cases) which records noise. Usually used for unattended noise monitoring of background or ambient noise.
- **NML:** Noise Management Level as detailed in the NSW Interim Construction Noise Guideline. The NML is the noise goal for construction activities.
- **Octave Bands:** Sounds that contain energy over a wide range of frequencies are divided into sections called bands. A common standard division is in 10 octave bands identified by their center frequencies 31.5, 63, 250, 500, 1000, 2000, and 4000 Hz
- **RBL:** Rating Background Level is the overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used for determining the appropriate construction noise criteria.
- **RNP:** Road Noise Policy (OEH, 2011)
- **Sound Level Meter:** An instrument consisting of a microphone, amplifier and data analysis package for quantifying and measuring noise.
- **Sound Power Level (L_w):** Sound power level or acoustic power level is a logarithmic measure of the sound power in comparison to a specified reference level.
- **Sound Pressure Level (SPL or L_p):** The level of noise, usually expressed in dB(A), as measured by a standard sound level meter.

1. Introduction

Orora Limited (Orora) operates a Paper Mill at its site in Matraville in Sydney, producing recycled containerboard. Established circa 1902, the site has seen a number of developments including the commissioning of its ninth paper mill building, the B9, in 2013.

An illustration of the site and general process areas is provided in Figure 1.

A fire in the old B7 Mill building resulted in its demolition in 2018 and the installation of a 146-metre-long, 12-metre-tall noise barrier along the site boundary to mitigate noise impacts from the loss of the mill building, which shielded adjacent residences from Orora's operational noise emissions.

Continuing from the B7 Mill building demolition, Orora proposes to remove the adjoining B7 Reel Store building. In a similar approach to prevent adverse impacts on its neighbours from its operational noise, Orora proposes to continue the 12-metre-tall barrier, installing an additional 98 metres for a total of 244 metres.

Space constraints around the B7 Reel Store necessitate the demolition being performed in two stages:

1. East end
2. West end

The proposed noise barrier can only be constructed once each stage of demolition is complete. Extension 1, around 49 metres long, would be installed following Stage 1. Extension 2, consisting of a further 49 metres, would be installed following Stage 2. Proposed staging is illustrated in Appendix A.

For a short period of time after stages 1 and 2, there would be no noise barrier in place and operational noise levels at adjacent residences are likely to be greater than existing levels.

Orora has requested Hutchison Weller investigate the potential impacts of the proposed demolition and mitigation measures. This report details the operational noise limits with which Orora complies, the modelling method and predicted changes in noise levels due to the reel store demolition and noise barrier installation.

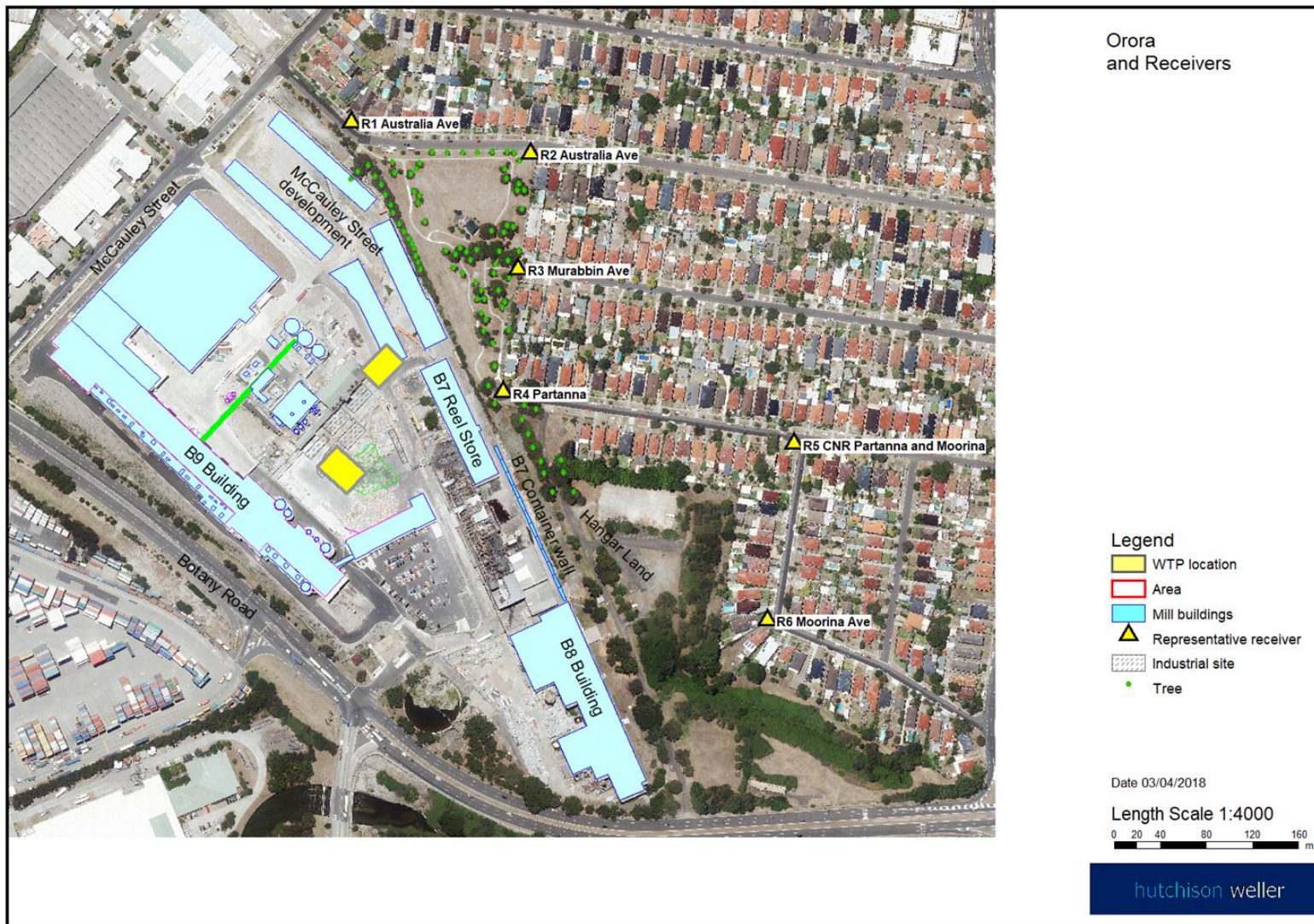


Figure 1 Overview of Orora's site and nearest sensitive receivers

2. Operational noise limits and existing environment

2.1 Operational noise limits

Operation of the mill is subject to noise conditions set out in the Ministers Conditions of Approval (MCoA) (including subsequent modifications) and Environment Protection Licence (EPL) No. 1594.

Under condition L4.1 of the EPL, operational noise is required to meet limits at six compliance locations around the site. These are replicated in Table 1.

Table 1 Operational noise limits

ID	Location	Day $L_{Aeq,15min}$, dB(A)	Evening $L_{Aeq,15min}$, dB(A)	Night $L_{Aeq,15min}$, dB(A)	Night L_{Amax} , dB(A)
R1	Corner of McCauley Street and Australia Avenue	46	45	43	55
R2	Australia Avenue	45	45	43	55
R3	Murrabin Avenue	46	45	43	55
R4	Partanna Avenue	42	41	41	55
R5	Corner of Partanna Avenue and Moorina Avenue	42	42	39	55
R6	Moorina Avenue	43	43	39	55

2.2 Existing noise environment

The existing noise environment in the Port Botany area is generally dominated by emissions from road traffic on Botany Road and McCauley Street, port operations and industrial premises, with intermittent domestic aircraft movements from Sydney Airport.

Background noise levels adjacent to the mill are regularly monitored at a number of locations, illustrated in Figure 1, as part of operational compliance requirements of the Orora site. Monitoring indicates that the noise levels in the area are not dominated by a specific site or activity but are a combination of surrounding noise influences.

Monitoring surveys indicate exceedances of the operational noise limits can occur whether the plant is operational or shut down for maintenance. The existing noise environment is influenced by several sources which are separately affected by the wind direction during the survey period for each of the receiver locations.

Appendix B presents an historical overview of the background noise levels measured at the EPL compliance locations for periods when the site was under a shut down as well as operational. The noise levels are presented with the site specific L_{Aeq} 15 minute criteria for each location.

3. Assessment of proposed changes to the mill

3.1 Modelling

A SoundPLAN noise model has been developed for the Orora site and includes the latest developments both within the site and externally. The model includes the removal of B5 and B7 Buildings, the recently completed water treatment plant (WTP) and the light industrial development at McCauley Street to the north of the site.

The McCauley Street precinct development is primarily constructed of 10 metre high prefabricated concrete panels and provides an effective new noise barrier between the B9 paper mill and residential areas to the north on Australia Avenue.

The noise model was used to predict the overall cumulative noise impact for the combined operations of the B9 paper mill in accordance with the ISO9613 prediction method, at the compliance locations identified in EPL 1594. The following components were incorporated in the model:

- Topography – Based on LPI topographical data for the area.
- Individual sensitive receivers – Nine receiver locations have been selected to represent the areas that may be impacted by the works. These receiver locations are illustrated in Figure 1.
- Meteorology –worst-case meteorological conditions (gentle breeze from source to receiver and stable conditions).
- Residential building structures are included in the model, meaning screening provided by neighboring houses is considered. In addition, buildings located on the Orora site and a new development on McCauley Street have been included in the model.

The modelled scenarios include the combined operations of the activities within the Orora site but does not consider external noise influences from other noise generating sources.

3.2 Demolition staging

Modelling has been completed for 4 stages of demolition and noise barrier installation, as illustrated in Appendix A:

1. Demolition of the east end of the Reel Store
2. Installation of extension 1 noise barrier to close the gap to the remaining part of the Reel Store
3. Demolition of the last portion (west end) of the Reel Store
4. Installation of extension 2 noise barrier to close the gap to the boundary fence

3.3 Predicted noise levels

Predicted noise levels for each stage of demolition and mitigation are presented in Table 2 for the compliance locations. Results indicate an increase in noise at compliance locations R3, R4 and R5 upon completion of each demolition stage, with the largest increase expected at R4.

A maximum increase of around 9 dB is expected for both stage 1 and stage 2 demolition, although at different receiver locations for each stage. The EPL noise limit is likely to be exceeded in either case where the noise barriers have not yet been completed.

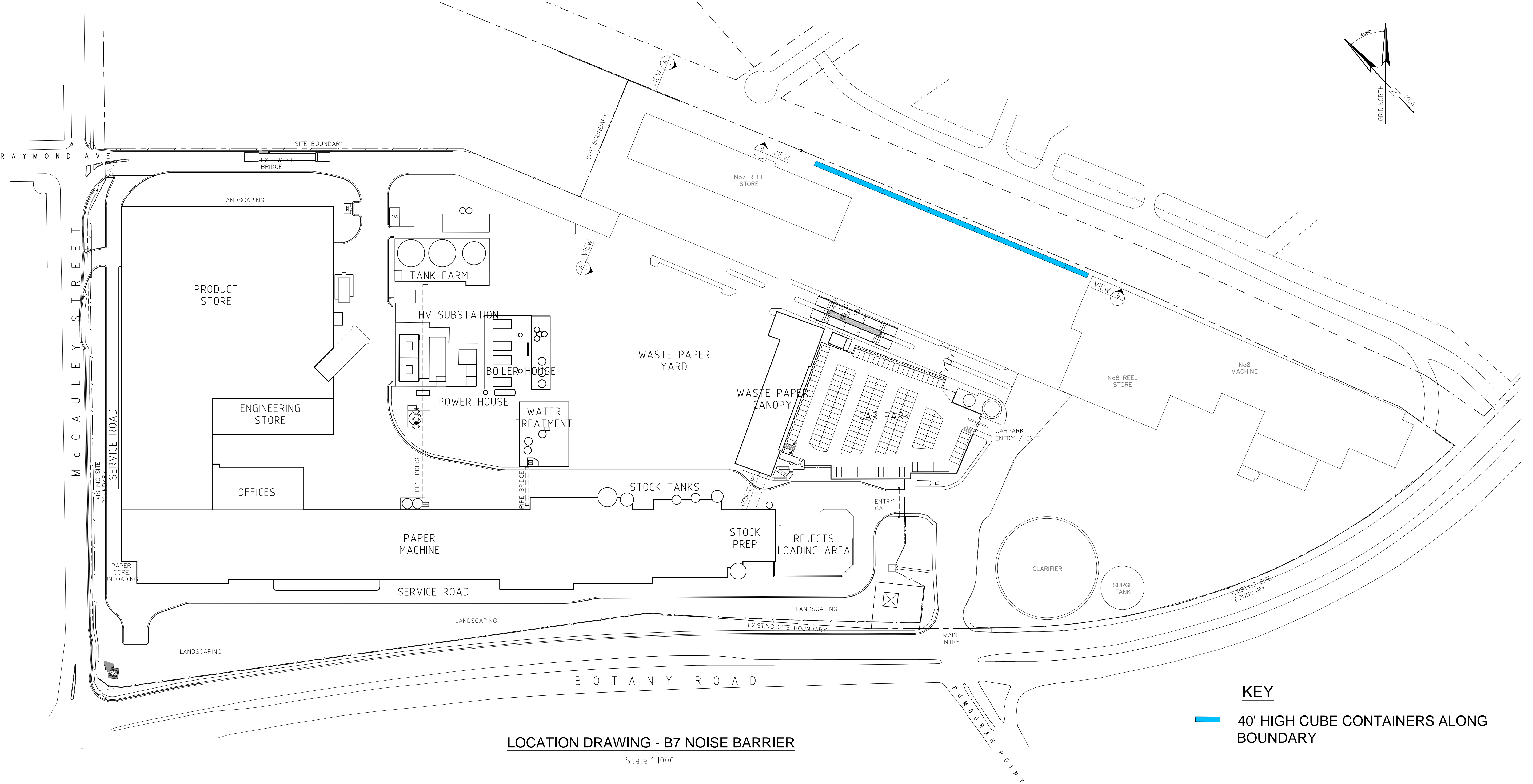
Completion of the noise barrier extension would provide around 9 dB in noise reduction following Extension 1 and a similar benefit after installation of Extension 2, bringing the predicted noise level at all receiver locations back to within the EPL limits.

An estimated number of residents impacted by each demolition stage is also indicated in Table 2 based on the predicted noise contours. Contours illustrating the change in noise levels for each stage are provided in Appendix C. The range of impacted residents would generally be limited to those at the end of Partanna Avenue and during Stage 2 demolition a few receivers at the end of Murrabin Avenue.

Table 2 Predicted noise levels against noise limits for each compliance location

Receiver	Night criterion dB(A)	Predicted LAeq, 15 minute noise level			
		Demolition Stage 1	Noise barrier extension 1	Demolition Stage 2	Noise barrier extension 2
R1 Australia Avenue	43	39.7	39.7	39.7	39.7
R2 Australia Avenue	43	41.4	41.3	41.8	41.6
R3 Murabbin Avenue	43	43.7	43.4	44.9	43.4
R4 Partanna Avenue	41	50.2	40.7	44.4	40.6
R5 CNR Partanna Avenue and Moorina Avenue	39	39.0	38.8	39.3	38.9
R6 Moorina Avenue	39	35.4	35.4	35.4	35.4
Number of potentially impacted residents		14	0	5	0

Appendix A. Staging of B7 Reel Store demolition

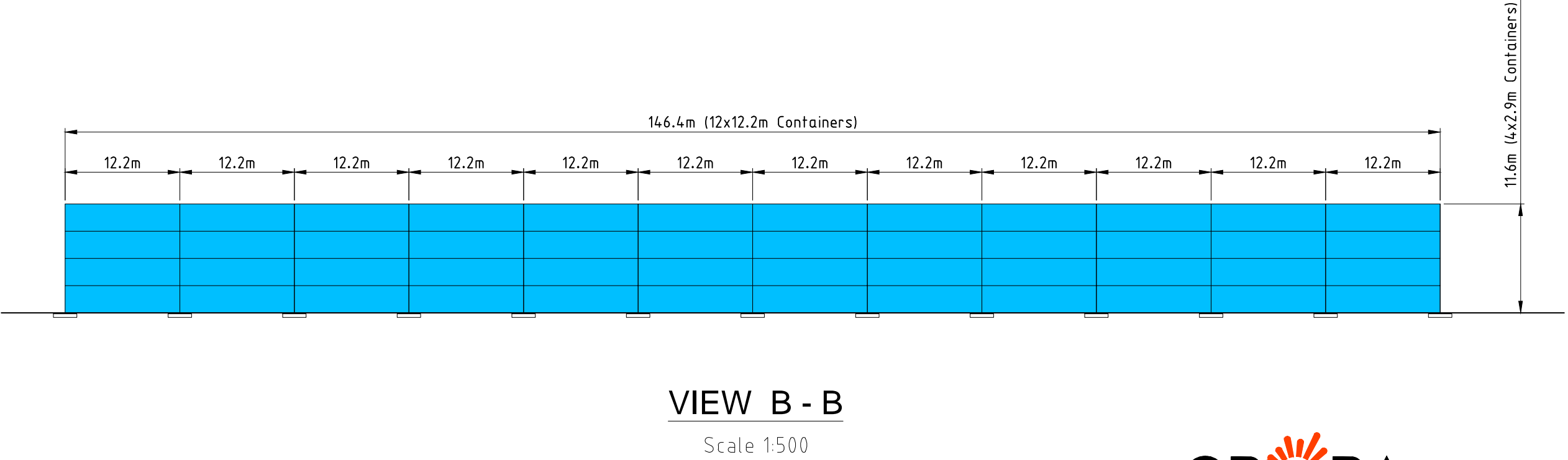
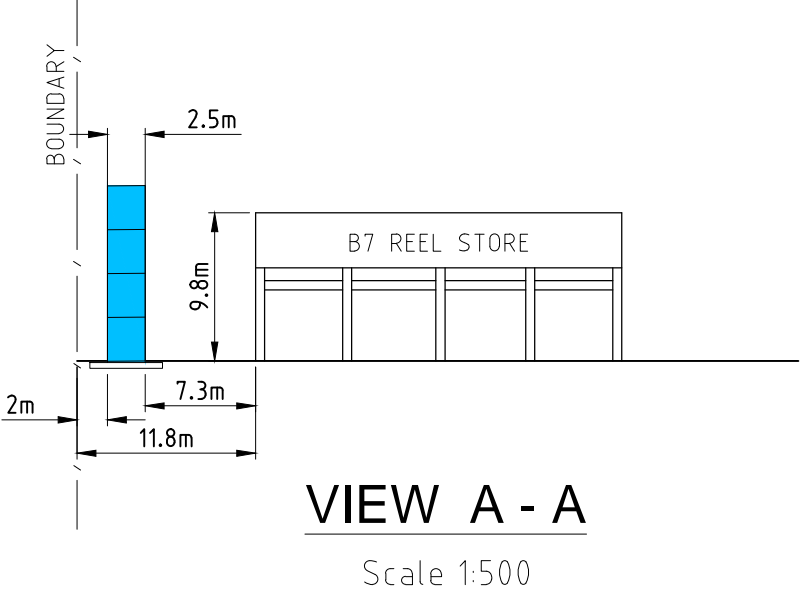


LOCATION DRAWING - B7 NOISE BARRIER

Scale 1:1000

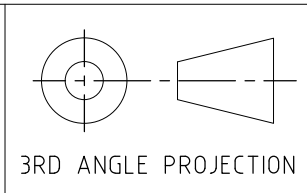
KEY

40' HIGH CUBE CONTAINERS ALONG BOUNDARY



REV.	REVISION	SIGNED	DATE	REV.	REVISION	SIGNED	DATE

DIMENSION TOLERANCES EXCEPT AS NOTED	
MACHINED SURFACES	FABRICATION
FRACTIONAL : ANGULAR :	± 0.5mm/M ± 0.5°
	± 1.5mm/M ± 1°

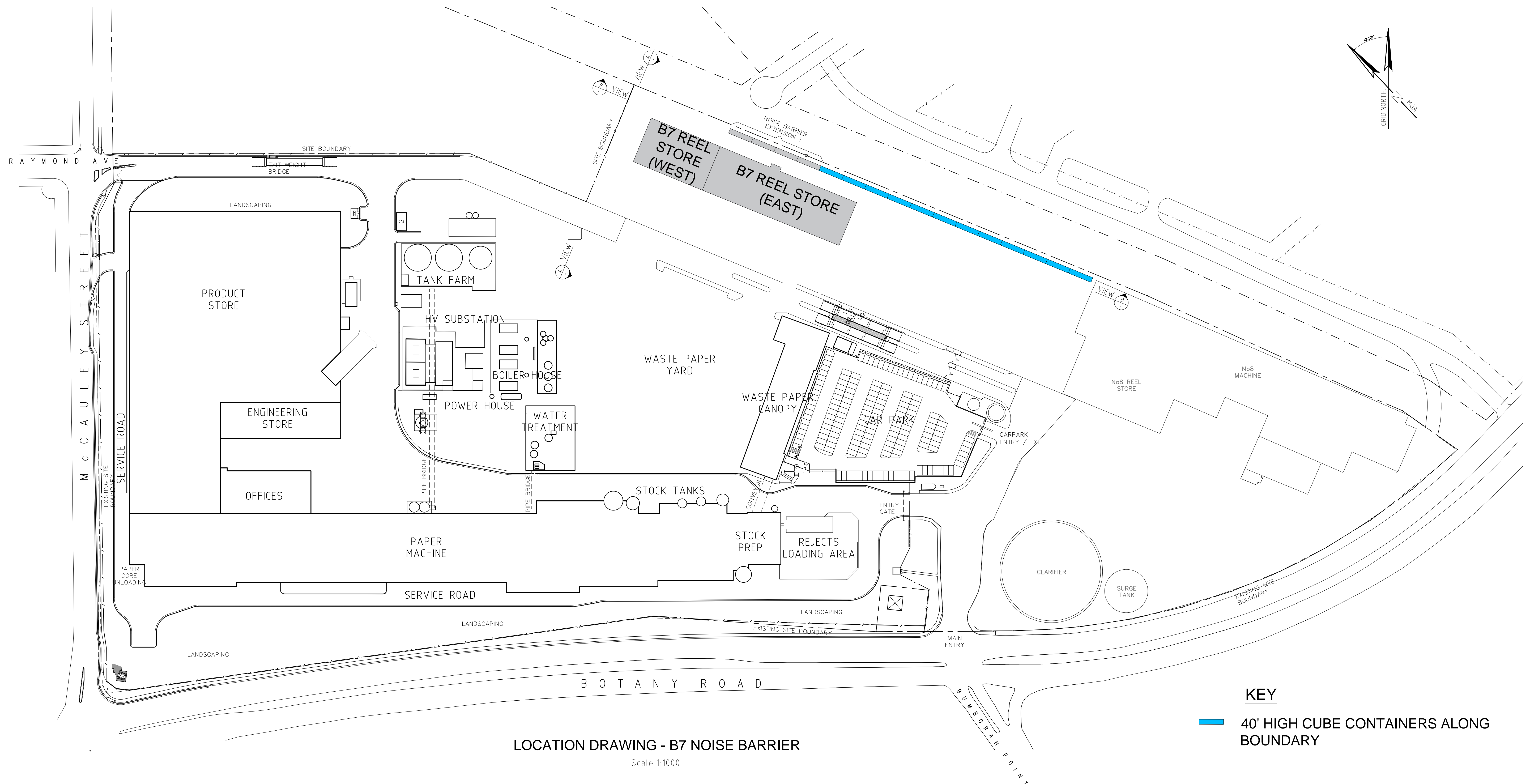


BOTANY MILL

MILL WIDE
B7 BOUNDARY
NOISE BARRIER

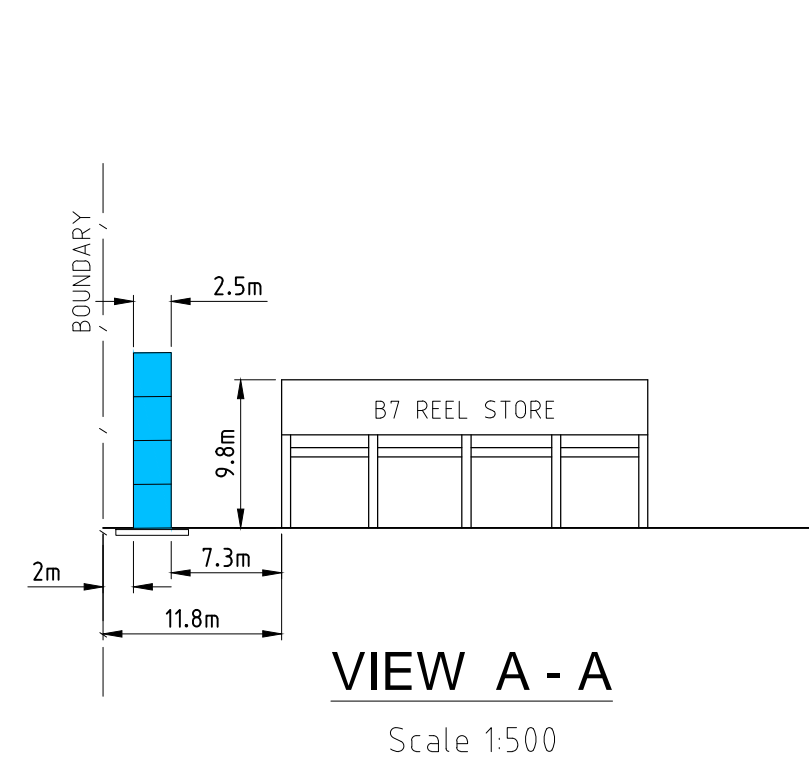
DEMO PROGRAM - B7 BUILDING HIDDEN

SCALE 1:1000 & 1:500 @ A1	COMPUTER FILE No. H:\ORORA\A1\Drawings\523958
DRAWN SG	AREA MILL WIDE
CHECKED	DRAWING No. 523958
APPROVED	REV No. 0
DATE 13/03/18	FILE INDEX JOB No.



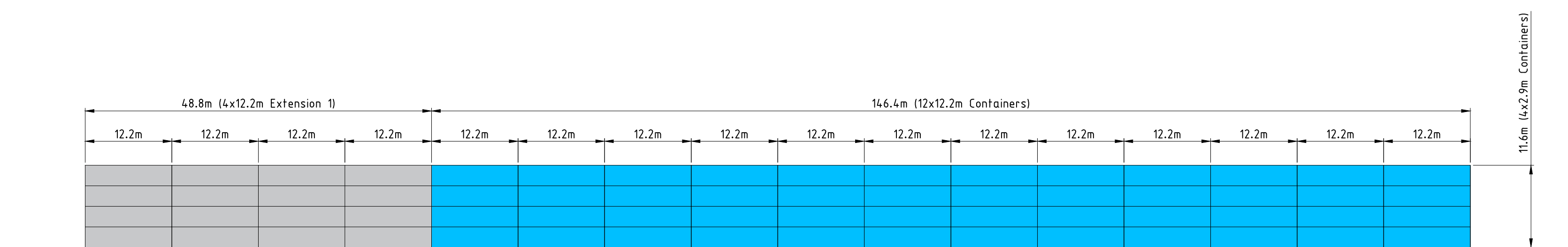
LOCATION DRAWING - B7 NOISE BARRIER

Scale 1:1000



VIEW A - A

Scale 1:500


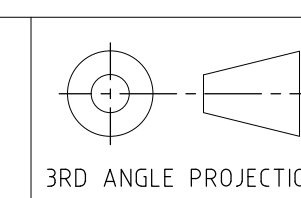


VIEW B - B

Scale 1:500

[illegible]

DIMENSION TOLERANCES EXCEPT AS NOTED		
	MACHINED SURFACES	FAI
FUNCTIONAL :	± 0.5mm/M	±
VAR :	± 0.5*	±



THIS DRAWING AND ALL TECHNICAL DATA CONTAINED HEREIN IS THE PROPERTY OF ORORA GROUP BOTANY MILL AND MUST NOT BE DISCLOSED TO THIRD PARTIES OR COPIED OR REPRODUCED WHOLLY OR IN PART OR IN ANY FORM WITHOUT THE WRITTEN CONSENT OF THE OWNER

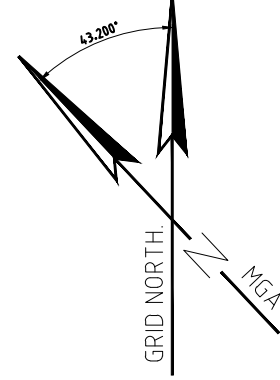
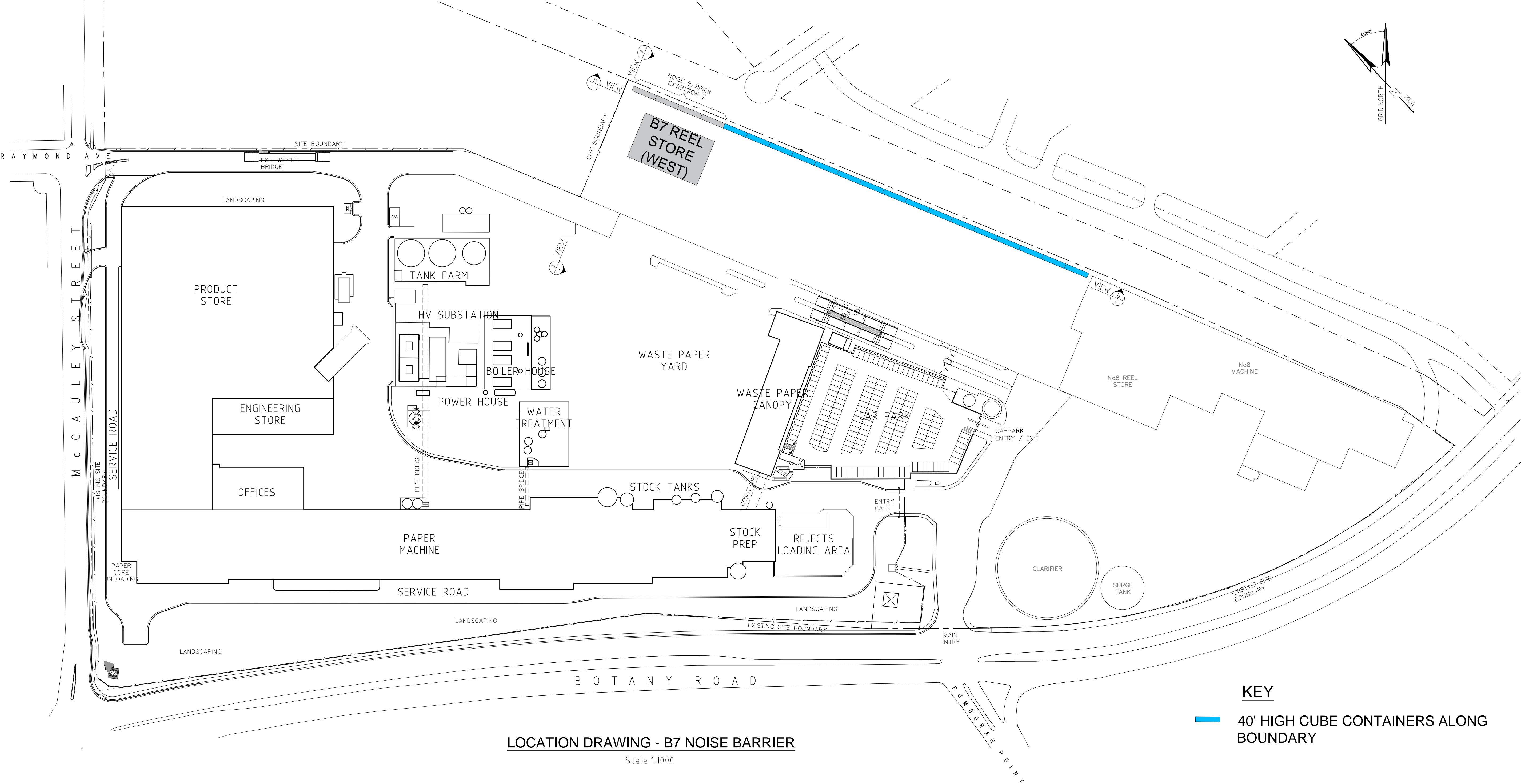


BOTANY MILL

MILL WIDE
B7 BOUNDARY

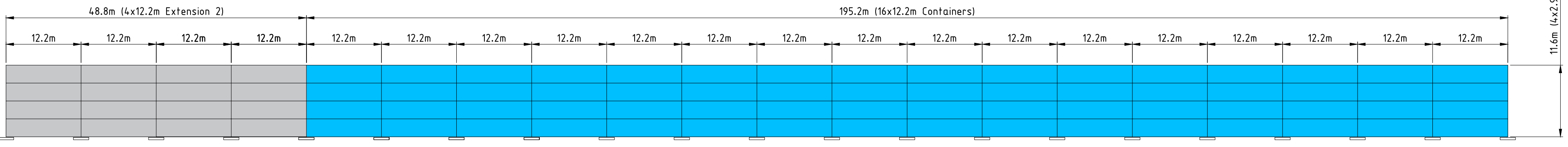
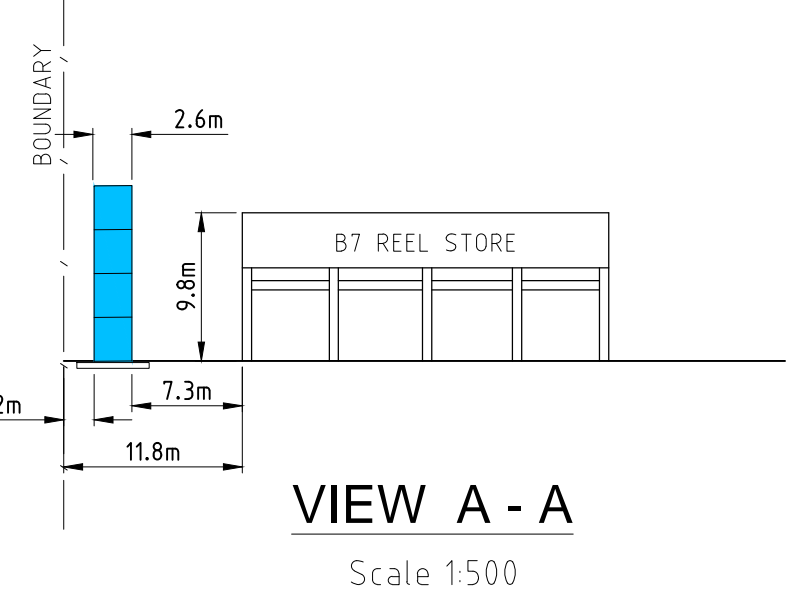
NOISE BARRIER
DEMOLITION PROGRAM - EXTENSION 1

SCALE	1:1000&1:500 @ A1		COMPUTER FILE No. H:\ORORA\AP\Drawings\S23959	
DRAWN	SG		AREA MILL WIDE	
CHECKED			DRAWING No.	REV No.
APPROVED			S23959	0
DATE	15/03/18		FILE	INDEX
				JOB No.



LOCATION DRAWING - B7 NOISE BARRIER
Scale 1:1000

KEY
 40' HIGH CUBE CONTAINERS ALONG BOUNDARY




REV.	REVISION	SIGNED	DATE	REV.	REVISION	SIGNED	DATE

DIMENSION TOLERANCES EXCEPT AS NOTED

MACHINED SURFACES: $\pm 0.5\text{mm}/\text{M}$ FRACTIONAL: $\pm 0.5^\circ$ ANGULAR: $\pm 1^\circ$

FABRICATION: $\pm 1.5\text{mm}/\text{M}$

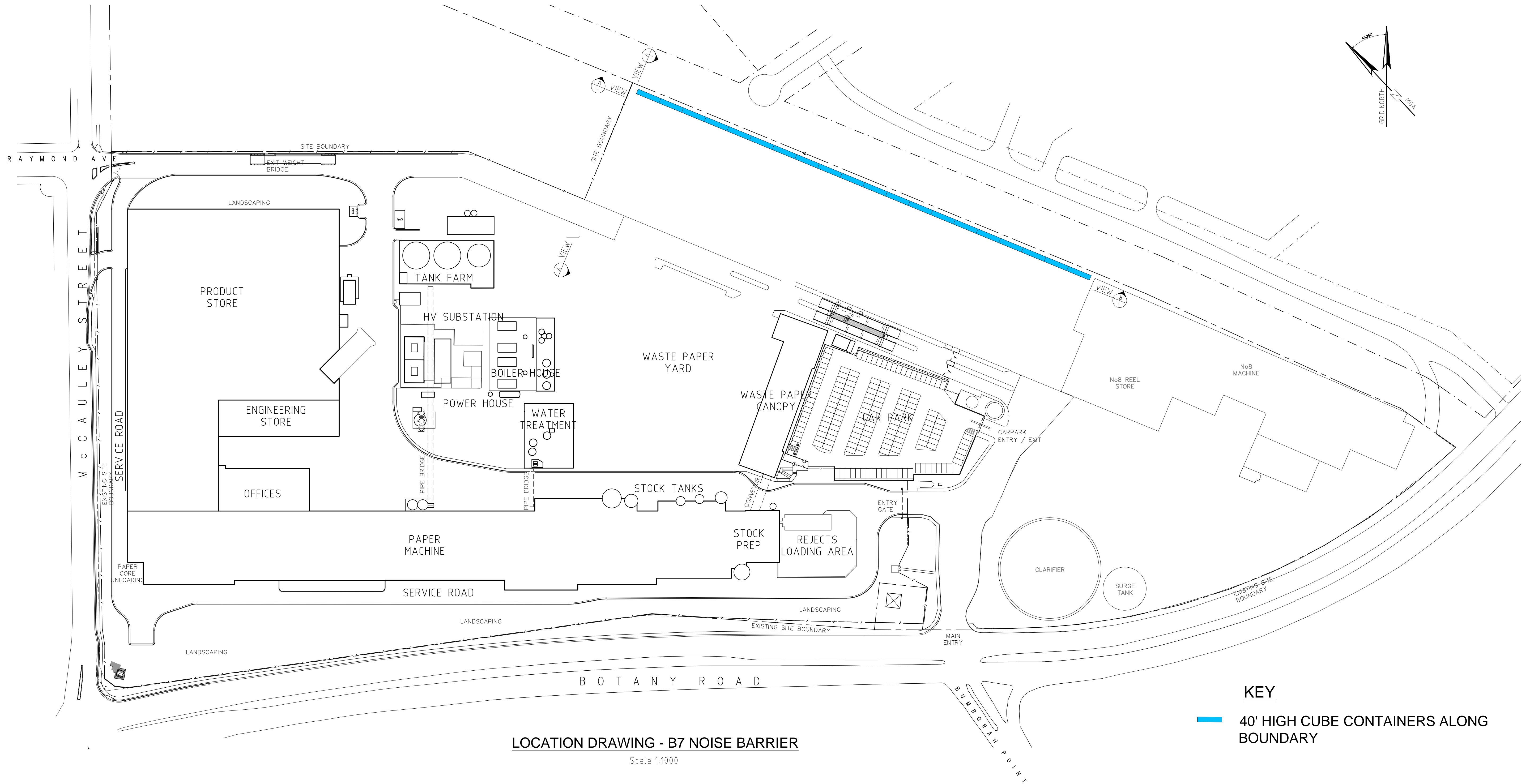
3RD ANGLE PROJECTION



BOTANY MILL

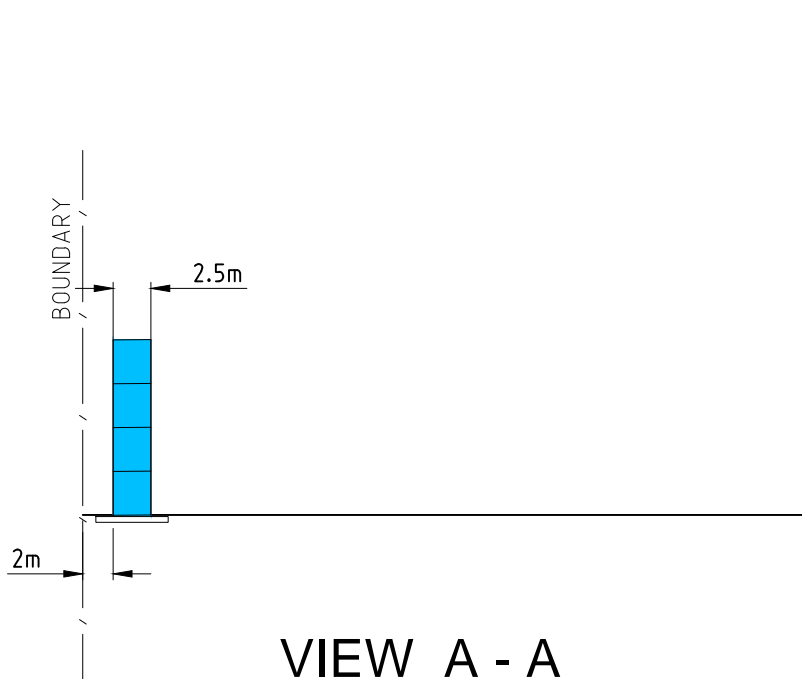
MILL WIDE
B7 BOUNDARY
NOISE BARRIER
DEMOLITION PROGRAM - EXTENSION 2

SCALE: 1:1000 & 1:500 @ A1	COMPUTER FILE No.: H:\ORORA\A1\Drawings\523960
DRAWN: SG	AREA: MILL WIDE
CHECKED:	DRAWING No.: 523960
APPROVED:	REV No.: 0
DATE: 15/03/18	FILE: INDEX: JOB No.:



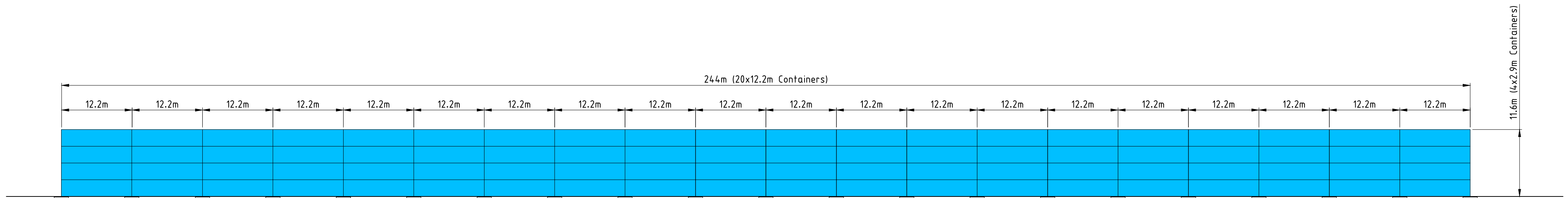
LOCATION DRAWING - B7 NOISE BARRIER

Scale 1:1000



VIEW A - A

Scale 1:500

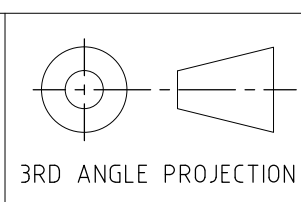


VIEW B - B

Scale 1:500

REV.	REVISION	SIGNED	DATE	REV.	REVISION	SIGNED	DATE		

DIMENSION TOLERANCES EXCEPT AS NOTED		
	MACHINED SURFACES	FAB
NAL :	± 0.5mm/M	±
R :	± 0.5°	±



THIS DRAWING AND ALL TECHNICAL DATA CONTAINED HEREIN IS THE PROPERTY OF OROGA GROUP BOTANY MILL AND MUST NOT BE DISCLOSED TO THIRD PARTIES OR COPIED OR REPRODUCED WHOLLY OR IN PART OR IN ANY FORM WITHOUT THE WRITTEN CONSENT OF THE OWNERS



BOTANY MILL

MILL WIDE
B7 BOUNDARY
NOISE BARRIER DEMO PROGRAM
B7 BUILDING & REEL STORE HIDDEN

SCALE	1:1000&1:500 @ A1		COMPUTER FILE No.	
DRAWN	SG		H:\ORDR\AP\Drawings\523961	
CHECKED	MILL WIDE		AREA	
APPROVED	DRAWING No.		REV No.	
DATE	15/03/18		523961 0	
	FILE	INDEX	JOB No.	

Appendix B. Historical noise monitoring data

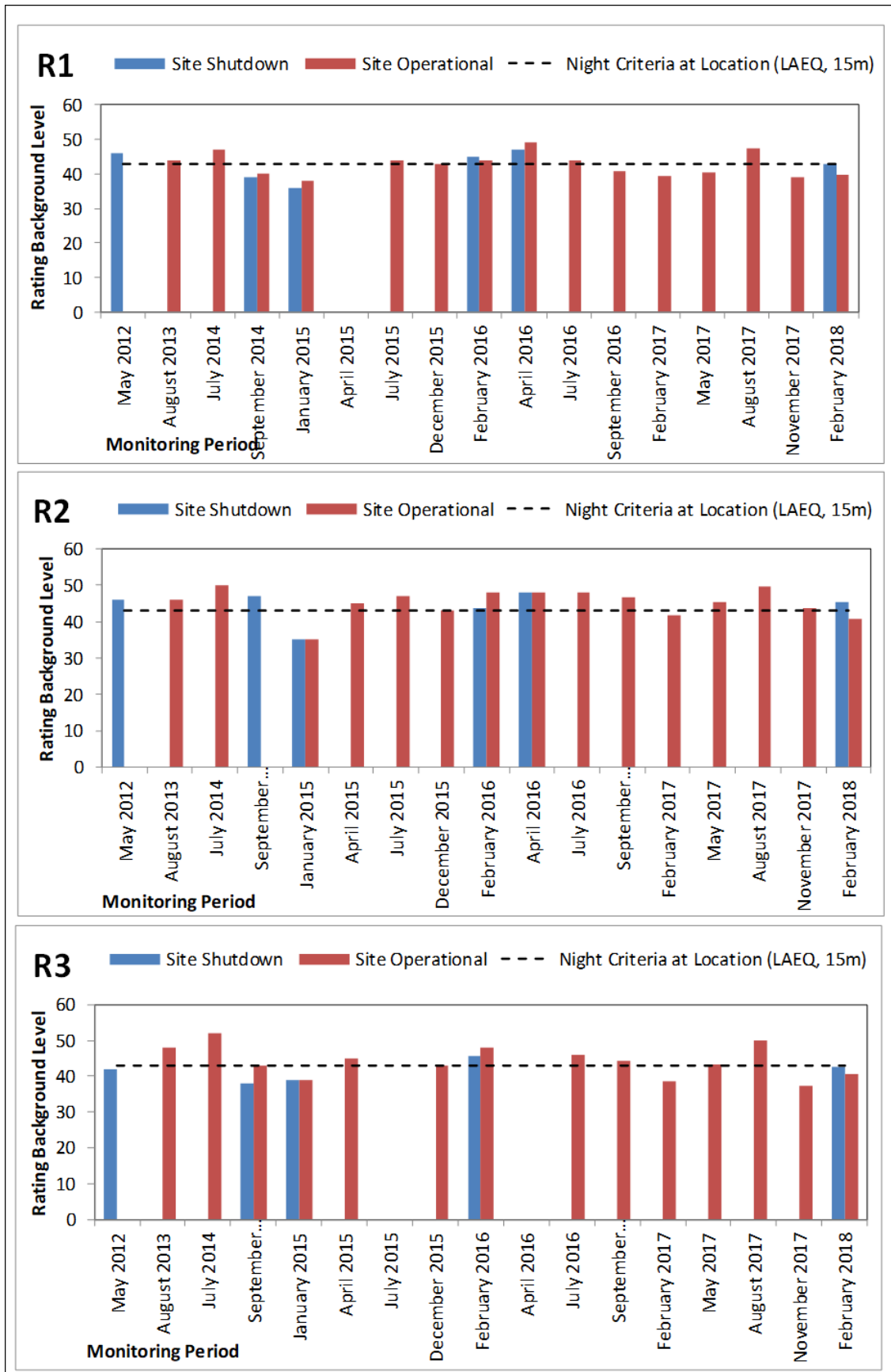


Figure 2 Background noise levels at EPL location 1 to 3

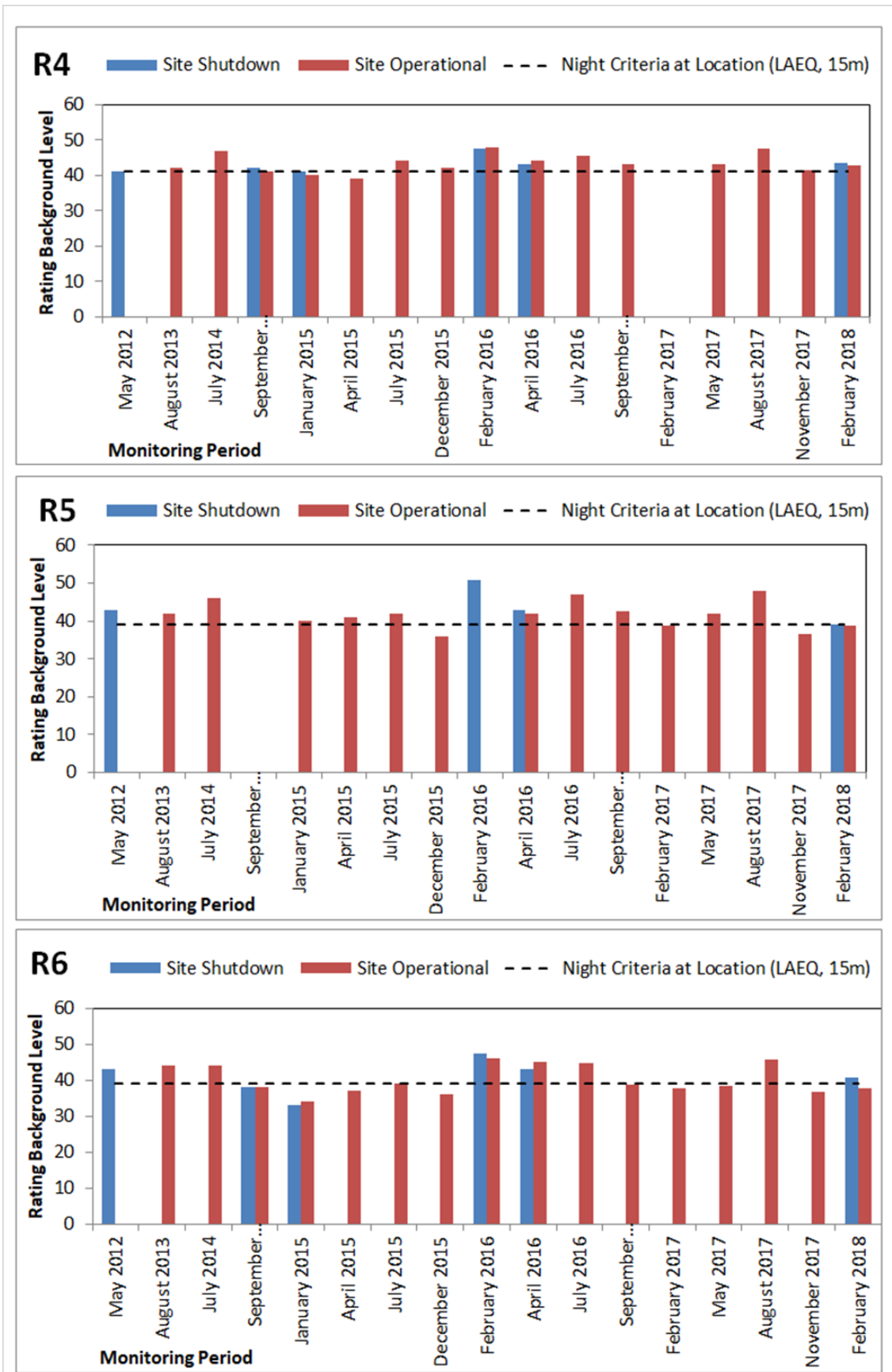
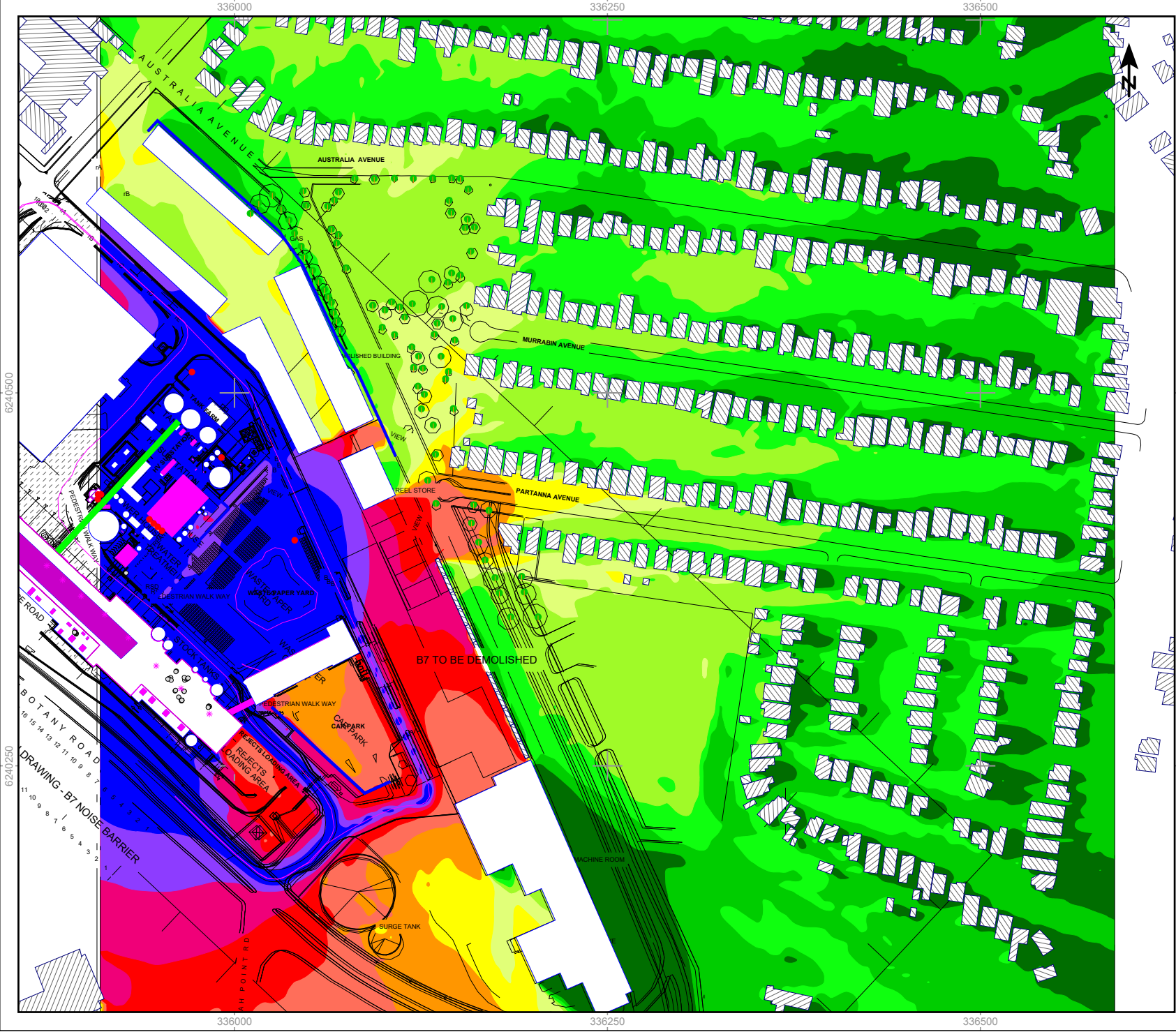


Figure 3 Background noise levels at EPL location 4 to 6

Appendix C. Contours demonstrating increase in noise following demolition of B7 Reel Store building



Customer:
Orora Pty Ltd

Project:
Project 1
Project-No.16002

B7 reel store
Demolition Stage 1

Map
1

Project engineer:
Created: 03/04/2018
Processed with SoundPLAN 7.4, Update 20/10/2017

Legend

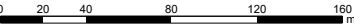
- Main building
- Noise Wall
- Line source
- Deciduous tree
- Industrial building
- Facade as source
- Point source
- Point receiver
- Area

Change in noise levels in dB(A)	
< 35.0	
35.0 - 37.5	
37.5 - 40.0	
40.0 - 42.5	
42.5 - 45.0	
45.0 - 47.5	
47.5 - 50.0	
50.0 - 52.5	
52.5 - 55.0	
55.0 - 57.5	
57.5 - 60.0	
>= 60.0	

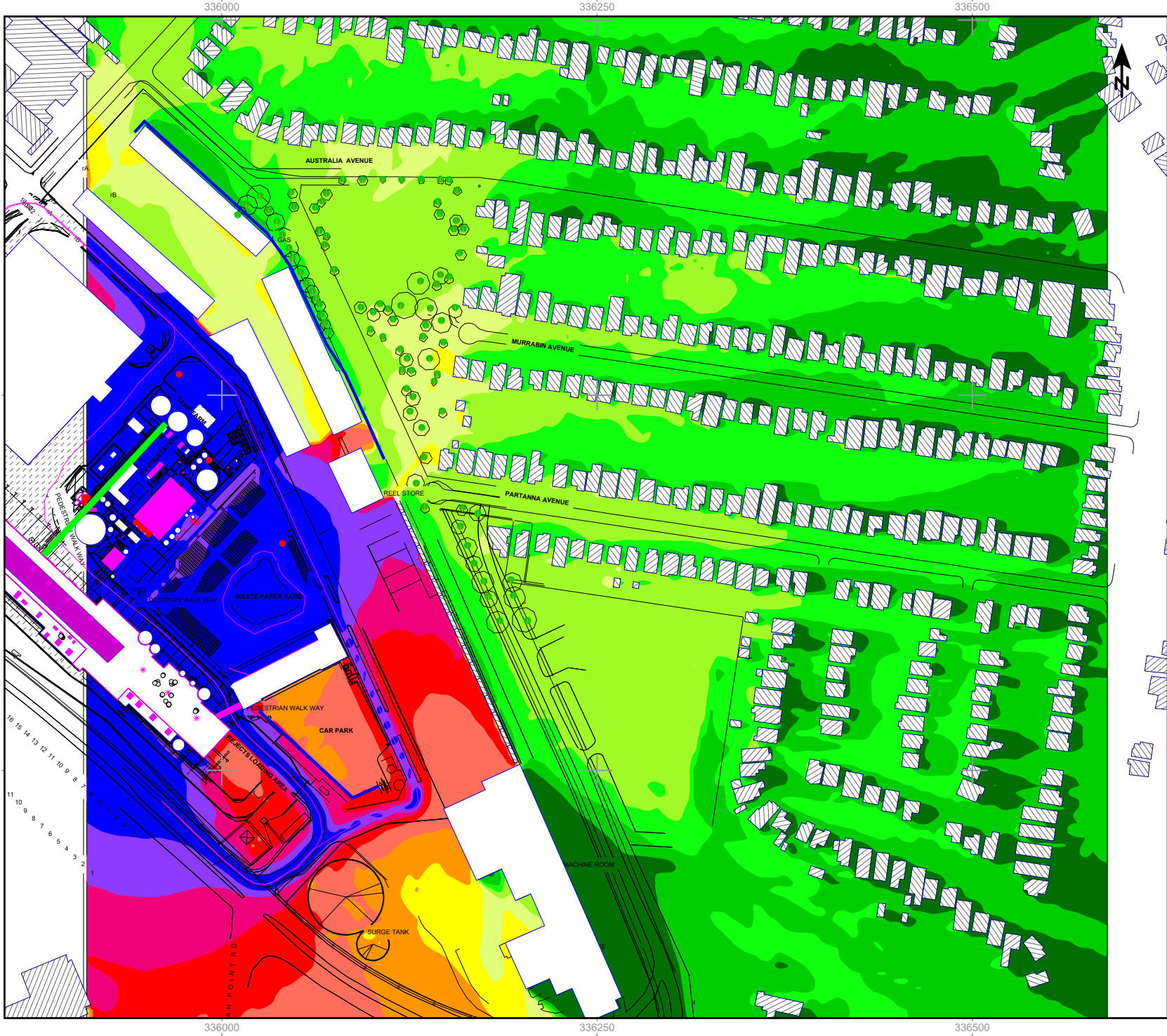
Map details:
Map showing noise contours for Orora during
B7 Reel Store demolition
B7 paper machine demolition complete
Container barrier installed (12 sections)

6 bays of Reel Store removed

Length scale 1:2500



hutchison weller



Customer:
Orora Pty Ltd

Project:
Project 1
Project-No.16002

B7 reel store
Noise barrier extension 1

Map
2

Project engineer:
Created: 03/04/2018
Processed with SoundPLAN 7.4, Update 20/10/2017

Legend

Main building

Noise Wall

Line source

Deciduous tree

Industrial building

Facade as source

Point source

Point receiver

Change in noise levels in dB(A)

< 35.0

35.0 - 37.5

37.5 - 40.0

40.0 - 42.5

42.5 - 45.0

45.0 - 47.5

47.5 - 50.0

50.0 - 52.5

52.5 - 55.0

55.0 - 57.5

57.5 - 60.0

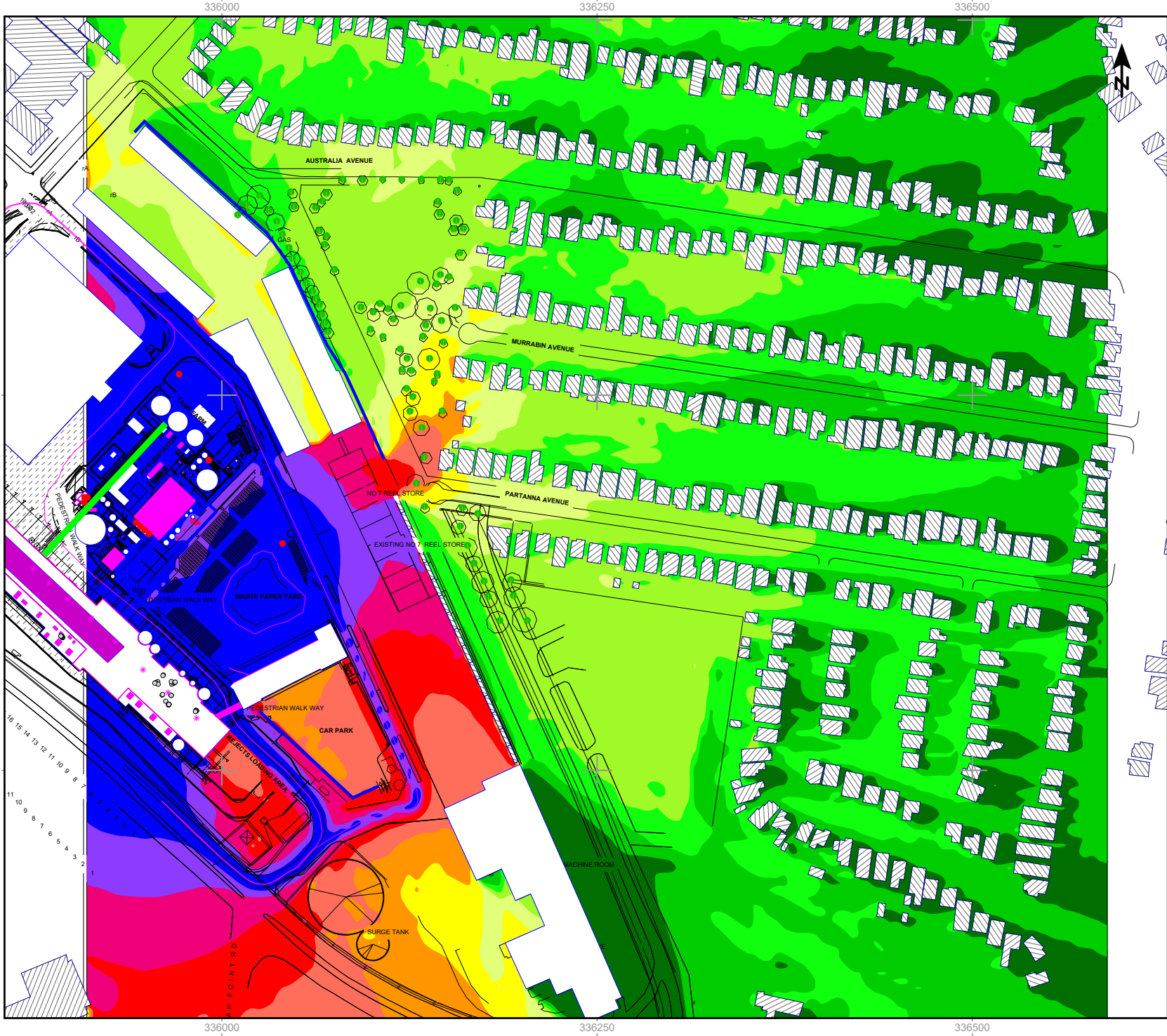
>= 60.0

Map details:
Map showing noise contours for Orora during
B7 Reel Store demolition
B7 paper machine demolition complete
Container barrier installed (12 sections)

6 bays of Reel Store removed
Extension wall 1 installed

Length scale 1:2500

hutchison weller



Customer:
Orora Pty Ltd

Project:
Project 1
Project-No.16002

B7 reel store
Demolition Stage 3

Map

3

Project engineer:
Created: 03/04/2018
Processed with SoundPLAN 7.4, Update 20/10/2017

Legend

- Main building
- Noise Wall
- Line source
- Deciduous tree
- Industrial building
- Facade as source
- Point source
- Point receiver

Change in noise levels in dB(A)	
< 35.0	
35.0 - 37.5	
37.5 - 40.0	
40.0 - 42.5	
42.5 - 45.0	
45.0 - 47.5	
47.5 - 50.0	
50.0 - 52.5	
52.5 - 55.0	
55.0 - 57.5	
57.5 - 60.0	
>= 60.0	

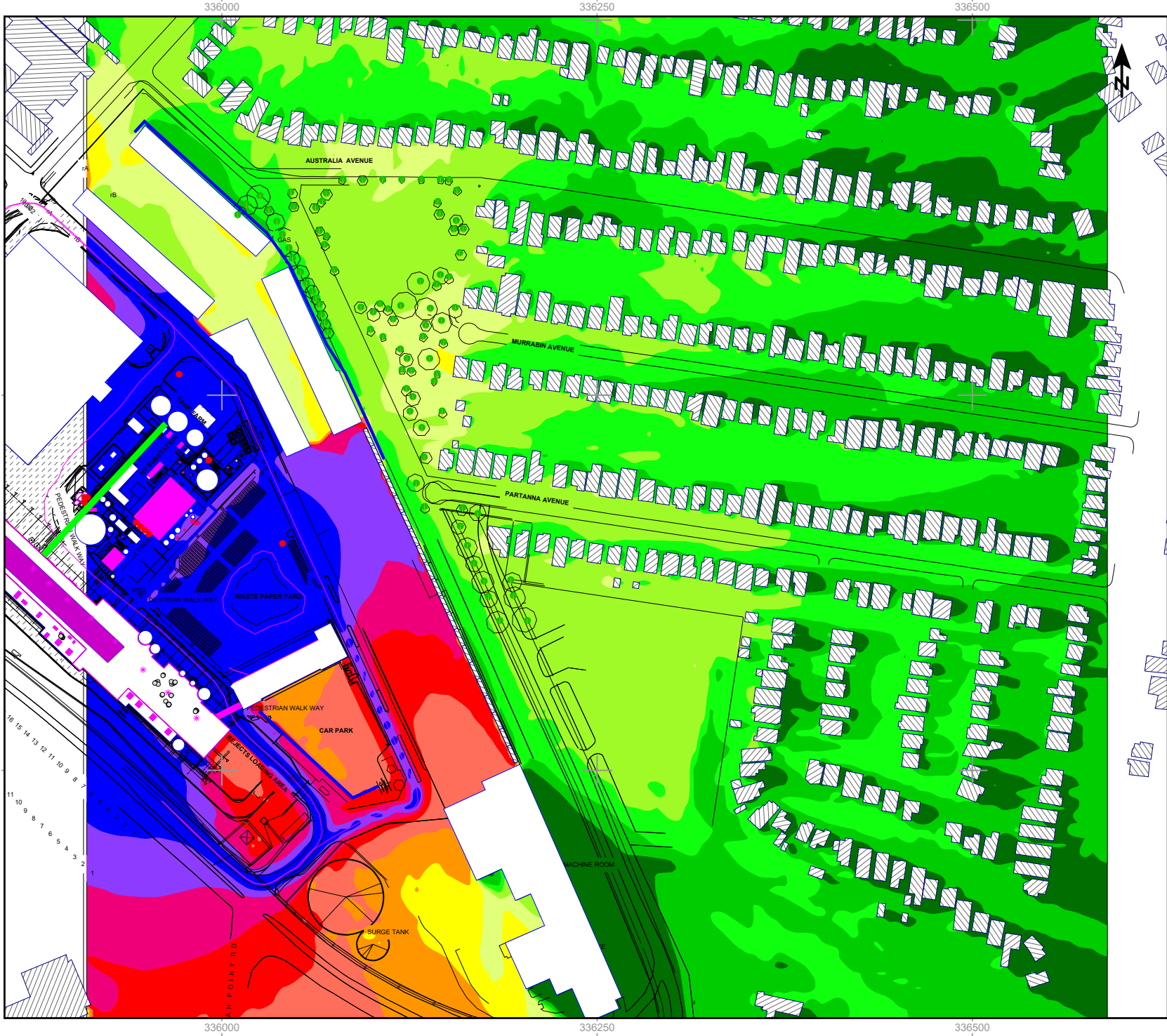
Map details:
Map showing noise contours for Orora during
B7 Reel Store demolition
B7 paper machine demolition complete
Container barrier installed (12 sections)

9 bays of Reel Store removed
Extension wall 1 installed

Length scale 1:2500



hutchison weller



Customer:
Orora Pty Ltd

Project:
Project 1
Project-No.16002

B7 reel store
Noise barrier extension 1

Map
4

Project engineer:
Created: 03/04/2018
Processed with SoundPLAN 7.4, Update 20/10/2017

Legend

- Main building
- Noise Wall
- Line source
- Deciduous tree
- Industrial building
- Facade as source
- Point source
- Point receiver

Change in noise levels in dB(A)

Change in noise levels in dB(A)	dB(A) Range
<	< 35.0
35.0 - 37.5	35.0 - 37.5
37.5 - 40.0	37.5 - 40.0
40.0 - 42.5	40.0 - 42.5
42.5 - 45.0	42.5 - 45.0
45.0 - 47.5	45.0 - 47.5
47.5 - 50.0	47.5 - 50.0
50.0 - 52.5	50.0 - 52.5
52.5 - 55.0	52.5 - 55.0
55.0 - 57.5	55.0 - 57.5
57.5 - 60.0	57.5 - 60.0
>=	>= 60.0

Map details:
Map showing noise contours for Orora during
B7 Reel Store demolition
B7 paper machine demolition complete
Container barrier installed (12 sections)

9 bays of Reel Store removed
Extension wall 2 installed

Length scale 1:2500
0 20 40 80 120 160 m

hutchison weller