

# MOOREBANK LOGISTICS PARK

## Moorebank Precinct East: Six-Monthly Operations Compliance Report

Report: #1

Period: May – November 2020

31 MARCH 2021

# SYDNEY INTERMODAL TERMINAL ALLIANCE

<b>Author</b>	Author Name	Richard Mason
<b>Checker</b>	Steve Ryan	Steve Ryan
<b>Approver</b>	Approver Name	Richard Mason
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## Author Details

Author Details	Qualifications and Experience
Richard Mason	BSc Environmental Science

## REVISIONS

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## KEY TERMS AND ACRONYMS

Acronym/Term	Meaning
CNBMP	Container Noise Barrier Management Plan
CoC	Conditions of Consent
DPIE	Department of Planning, Industry and Environment (previously Department of Planning and Environment)
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
ERP	Emergency Response Plan which includes the Bushfire Emergency and Evacuation Plan (BEEP), Bushfire Management Plan (BMP) and Flood Emergency Management Plan (FEMP)
IMEX	Import Export
MLP	Moorebank Logistics Park
OAQMP	Operational Air Quality Management Plan
OCR	Six Monthly Operational Compliance Report
OCCS	Operational Community Communication Strategy
OEMP	Operational Environmental Management Plan
ONVMP	Operational Noise and Vibration Management Plan
OTAMP	Operational Traffic and Access Management Plan
OWRMP	Operational Waste and Resource Management Plan
POCR	Pre-operations Compliance Report
POPD	Program for Operational Phase Delivery
SIOMP	Operational Stormwater Infrastructure and Operation and Maintenance Plan
SSD	State Significant Development
UDLP	Urban Design and Landscape Plan
WTP	Workplace Travel Plan
SSD 6766	Stage 1 of the MPE Concept Approval (MP 10_0193) as approved under SSD 6766. It involves the construction and operation of an IMEX terminal and associated Rail Link.
SSD 7628	Stage 2 of the MPE Concept Approval (MP 10_0193) as approved under SSD 7628. It involves the construction and operation of warehousing and distribution facilities on the MPE site and upgrades to approximately 1.5 kilometres of Moorebank Avenue from approximately 35 metres south of the northern boundary of the MPE site to approximately 185 metres south of the southern MPE site boundary.



## TABLE OF CONTENTS

<b>REVISIONS .....</b>	<b>ii</b>
<b>KEY TERMS AND ACRONYMS .....</b>	<b>iii</b>
<b>1 EXECUTIVE SUMMARY .....</b>	<b>6</b>
<b>1 INTRODUCTION .....</b>	<b>7</b>
1.1 Project Overview .....	7
1.2 Project Approvals .....	7
1.3 Scope and Purpose .....	7
<b>2 PROJECT DESCRIPTION .....</b>	<b>8</b>
2.1 Site Location .....	8
2.2 Scope of Works .....	9
2.3 Operation activities undertaken .....	9
<b>3 PROJECT COMPLIANCE SUMMARY .....</b>	<b>11</b>
3.1 Environmental Monitoring .....	11
3.1.1 Air Quality Monitoring .....	11
3.1.2 Noise Monitoring .....	12
3.1.3 Storm Water Infrastructure and Water Quality Monitoring .....	13
3.1.4 Biodiversity Monitoring .....	13
3.1.5 Biannual Trip and Origin Destination Report .....	14
3.2 Previous Report Actions .....	14
3.3 Incidents .....	14
3.4 Complaints Management .....	14
<b>APPENDIX A - SSD 6766 CONDITIONS OF CONSENT .....</b>	<b>15</b>
<b>APPENDIX B - SSD 7628 CONDITIONS OF CONSENT .....</b>	<b>16</b>
<b>APPENDIX C – COMPLETED COMPLIANCE REPORTS .....</b>	<b>17</b>
<b>APPENDIX D - COMPLIANCE REPORT DECLARATION FORM .....</b>	<b>18</b>

## APPENDICES

- APPENDIX A - SSD 6766 CONDITIONS OF CONSENT**
- APPENDIX B - SSD 7628 CONDITIONS OF CONSENT**
- APPENDIX C – COMPLETED COMPLIANCE REPORTS**
- APPENDIX D - COMPLIANCE REPORT DECLARATION FORM**



## LIST OF FIGURES

Figure 1-1 MLP East Precinct Layout – sourced SIMTA MPE OEMP Rev 15.....	8
Figure 2 - EMS-BK Air quality monitoring locations.....	11

## 1 EXECUTIVE SUMMARY

In accordance with SSD 7628 Condition of Consent (CoC) C21(c)(iii), a Six-monthly operational compliance report (OCR) must be prepared.

The Department of Planning, Industry and Environment (DPIE) was notified on 24 February 2020, that SIMTA intends to commence the staged operation of the MLP East Precinct in Area 2 on 13 March 2020. Area 2 encompasses Warehouse 3, 4 and 5 (approved under SSD 7628 MPE Stage 2).

This OCR has been prepared in accordance with the requirements of the *Compliance Reporting Post Approval Requirements (NSW DP&E, June 2018)* and has been prepared to outline the progress of compliance for all operational requirements against the Project Approvals.

The Department approved the Program for Operational Phase Delivery (POPD) on 21 May 2019 which outlined the staged submission of operational documents under condition A14 of SSD 7628. The Department also considered the combining of strategies, plans or programs to be acceptable, provided that all relevant conditions across both SSD 6766, and SSD 7628 are met.

Regular reviews of compliance against the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC 2011/6229) Conditions of Approval are undertaken but are not the subject of this compliance report.

## 1 INTRODUCTION

### 1.1 Project Overview

Application Number	
<b>Project name:</b>	Moorebank Logistics Park – Operational Area 1
<b>Proponent</b>	Qube Holdings (Qube)
<b>Site Address</b>	MLP East Precinct site, Moorebank Avenue, Moorebank
<b>Project Phase</b>	Six Monthly Operation Compliance Report (OCR)
<b>Project Activity</b>	Operation of an import-export terminal, rail link and warehouse and distribution facilities and associated infrastructure.
<b>Report date</b>	Thursday, 01 April 2021

### 1.2 Project Approvals

Approval for the construction and operation of the MLP East Precinct was obtained progressively as follows:

- SIMTA Moorebank Intermodal Terminal Facility dated 6 March 2014 (EPBC 2011/6229)
- Moorebank Precinct East (MPE) Concept Approval – 10\_0193
- MPE Stage 1 – SSD 6766
- MPE Stage 2 – SSD 7628
- MPE Stage 2 – SSD 7628 – Subdivision partial development consent
- MPE Stage 2 – SSD 7628\_MOD 2 – Modification 2 boundary adjustment and basin 9 design adjustment

### 1.3 Scope and Purpose

In accordance with SSD 7628 Condition C21 (c) (iii), a Six-Monthly Operation Compliance Report (OCR) is required to outline progress of compliance for all operation requirements against the MPE Stage 1 and Stage 2 approval.

There is no specific requirement under SSD 6676 for the submission of an OCR, however this report has been prepared to address the operational requirements for both SSD 6766 and SSD 7628 and has been prepared in accordance with the requirements of the *Compliance Reporting Post Approval Requirements* (NSW DP&E, June 2018).

## 2 PROJECT DESCRIPTION

### 2.1 Site Location

The Moorebank Logistic Park (MLP) is an integral component of the Freight, Ports and Transport strategies of both the NSW and Commonwealth governments to help manage the challenges of an expected tripling of freight volumes at Port Botany by 2031.

The MLP aims to streamline the freight logistics supply chain from port to store, deliver savings to businesses and consumers, and help service the rapidly growing demand for imported goods in south-west Sydney. It is located approximately 27 kilometres (km) south-west of the Sydney Central Business District and approximately 26 km west of Port Botany within the Liverpool Local Government Area. The MLP is divided into an East Precinct and a West Precinct, located east and west of Moorebank Avenue respectively,

-1). The MLP East Precinct commenced operations in September 2019 and is the subject of this Pre-Operation Compliance Report (POCR), while the MLP West Precinct is still currently under construction.



Figure 1-1 MLP East Precinct Layout – sourced SIMTA MPE OEMP Rev 15

## 2.2 Scope of Works

The main features of the MLP East Precinct include:

- The Import Export (IMEX) Terminal. The IMEX Terminal comprises:
  - Truck processing, holding and loading areas with an entrance and exit from Moorebank Avenue
  - Rail loading and container storage areas serviced by container handling equipment
  - An Administration facility and associated car parking with light vehicle access from Moorebank Avenue.
- A Rail Link connecting the IMEX terminal and the Southern Sydney Freight Line (SSFL) traversing Moorebank Avenue, Anzac Creek and Georges River
- Associated ancillary infrastructure including signage, lighting, landscaping, water management
- Warehouse and distribution facilities including warehousing up to 21 m in height, typically ranging in size from 20,000 m<sup>2</sup> to 62,000 m<sup>2</sup>. Individual warehouses typically comprise the following:
  - Office and administration facilities
  - Amenities
  - Car parking
  - Truck loading/unloading docks
  - Internal parking for pick-up and delivery vehicles (PUD)
  - Specialised sortation and conveyor equipment
  - Hardstand areas that provide trailer parking spaces, external PUD parking spaces, vehicle manoeuvring areas and access to the main internal site road
  - Signage for business identification purposes, including backlit illuminated signage on each warehouse
  - Internal fit out, comprising racking and storage.
- A freight village including a mix of retail, commercial and light industrial spaces typically up to 15 m in height and varying in size and design
- An internal road network to enable efficient movement of vehicles, dispatch of freight from the warehouses and transport of containers between the IMEX Terminal and warehouse and distribution facilities.
- Security and Administration offices and demountables.

## 2.3 Operation activities undertaken

Documents can be submitted in stages as permitted by CoC A14 and CoC A15. The application of the operational documents will be staged to take progressive effect across the MLP East Precinct site as construction is completed and operations commences was detailed in the POPD approved by the DPIE on 21 May 2019.

This OCR has been prepared in accordance with the requirements of the Compliance Tracking Program (CTP) to outline progress of compliance for all operation requirements against both SSD 6766 and SSD 7628.

The following works have been undertaken:

- Movement and storage of containers in and out of the terminal via rail
- Truck processing, holding and loading areas
- Primary and secondary container loading/ unloading areas
- Transfer of containers between terminal and warehouses vis internal transfer vehicles
- Pickup and delivery of goods to warehouses via truck movements

- Warehouses 1,3a and 4b are occupied and operational
- Warehousing and Administrative Activities
- Security, maintenance and monitoring of all infrastructure and equipment related to the above activities.

### 3 PROJECT COMPLIANCE SUMMARY

This OCR outline progress of compliance for all operation requirements against Project Approvals. Compliance against the project CoC and the Final Compilation of Mitigation Measures (FCMM) are outlined in SSD 6766 Conditions of Consent and SSD 7628 Conditions of Consent, Appendix A and B respectively.

A declaration of compliance is available in Appendix D.

Furthermore, an independent environmental audit has been scheduled for SSD 6766 and SSD 7628 Development Consents for MPE Operations in April 2021. A copy of the audit report will be provided to DPIE.

#### 3.1 Environmental Monitoring

In accordance with the CoC and OEMP, environmental monitoring activities are required to be undertaken for the operation phase of the MPE Stage 1 and Stage 2 project. These activities include air quality monitoring, noise monitoring, storm water infrastructure and water quality monitoring, and Biannual trip and origin destination reports. A summary of the monitoring results is addressed in the following sections. The full reports on each of these monitoring requirements are available in Appendix C.

##### 3.1.1 Air Quality Monitoring

Dust monitoring results during this reporting period are as follows:

- Dust levels were generally compliant with the dust deposition criteria of  $4\text{g}/\text{m}^2/\text{month}^1$  (annual average) and, as such, no exceedances of the criteria directly related to operations works were recorded during this reporting period

##### Continuous Air Quality Monitoring

Four real-time air quality monitors (Shown in Blue IN FIGURE 2 below) are located at boundary locations on the MPE Stage 2 site to monitor air quality.



Figure 2 - EMS-BK Air quality monitoring locations

These DustTrak™ II Aerosol Monitor systems were sited in accordance with AS3580.1.1:2016 *Method for sampling and analysis of ambient air. Part 1.1: Guide to siting air monitoring equipment* and are connected to a solar array and battery storage system. Real time results are available via a Cloud Data Management System.

During operation of MPE, the real-time boundary air quality monitors will measure  $\text{PM}_{2.5}$ ,  $\text{PM}_{10}$ ,  $\text{NO}_2$  and CO emissions. Air quality monitors were attended to and calibrated during the period.

<sup>1</sup> Dust limit indicates the maximum limit of  $4\text{g}/\text{m}^2/\text{month}$  over a 12-month recording period and hence only applies to the annual average.

As identified in Table 4-2 of the Operation Air Quality Management Plan, the Action Response Level (ARL) for PM<sub>10</sub> is 50µg/m<sup>3</sup> (i.e. where the 1-hour average is 50µg/m<sup>3</sup> or greater a trigger alert occurs, and a proactive management response must be initiated).

Results during this reporting period:

- No exceedances of the annual average criteria have occurred for either PM<sub>2.5</sub>, PM<sub>10</sub>, CO or NO<sub>2</sub>
- No exceedances of the 1-hour average criteria or annual average criteria has occurred for CO or NO<sub>2</sub>
- Exceedances of the 24-hour average criteria occurred for PM<sub>2.5</sub> and PM<sub>10</sub>
  - There were seven exceedances (out of 172 days) of the PM<sub>2.5</sub> 24-hour average criteria during the reporting period (about 4%).
  - There were 20 exceedances (out of 172 days) of the PM<sub>10</sub> 24-hour average criteria during the reporting period (about 12%).
  - Most of the exceedances occurred in June and July 2020.
  - The exceedances correlate to higher readings in the night and early morning periods.
  - Investigations at MLP Precinct East upon receipt of the exceedances has not identified significant dust or emissions issues from MLP Precinct East. Alerts received were also communicated to MPW Stage 2 site teams (see next bullet point).
  - Most of these exceedances were recorded at AQM03 which is the monitor located on the western boundary of MPW Stage 2. MPW Stage 2 has approval to receive imported material outside of standard construction hours and has been undertaking this activity during the reporting period. Note exceedances were also reported on nights where there was no import of material. Monitoring of these minor exceedances is ongoing to pinpoint the actual source.
  - AQM01 is the monitor located closest to the MLP Precinct East rail siding. As shown in Figure 2. Exceedances recorded at AQM01 occurred when there were no trains operating, and as such it is unlikely that operations at MLP Precinct East are a contributing factor causing the identified exceedances at AQM01, and similarly at AQM03 and AQM04.
  - Exceedances at AQM02 predominantly occurred in June and July. Exceedance causes are unknown as Warehouse 3 and Warehouse 4 are sealed and limited night works have been undertaken. Monitoring of these minor exceedances is ongoing to pinpoint the actual source.

Air quality monitoring reports completed during this period are available in appendix C of this report.

### 3.1.2 Noise Monitoring

Results during this reporting period are as follows:

- Noise monitoring results demonstrated that works were inaudible above background noise and compliant with established noise management criteria established in the CNVMP for all of the four locations.
- No noise complaints related to operations were received during this reporting period.

#### Continuous Noise Monitoring

Exceedances during site operating hours are reviewed to determine their source and whether they are attributable to operational activities. Meteorological conditions (average and maximum wind speeds, temperature, precipitation and cloud cover etc.) are also noted during review of any exceedances. Noise monitors were attended to and calibrated during the period. In addition to continuous monitoring attended noise monitoring to meet relevant conditions of consent (Rail Noise, Warehouse plant and equipment and Noise barrier assessments) was undertaken in the period.

Results during this reporting period:

- No exceedances related to operation were reported in this period

### Rail Noise Monitoring

The following Rail Noise Monitoring was undertaken during the period.

- Monitor Break squeal monitoring system results <https://moorebanknoisemonitor-emsbk.trackiq.net/NoiseMonitor/>
- Monitor and maintain a rail noise monitoring system on the rail link.
- Monitor and maintain a wayside angle of attack monitoring system to continuously monitor the angle of attack to the rail of rolling stock wheels.
- Attended rail noise monitoring (Renzo Tonin and EMSBK/RailIQ).
- Calibration of Rail Noise Monitoring Equipment (Renzo Tonin and EMSBK/RailIQ).

Results during this reporting period are as follows:

- No exceedances relating to MPE Stages 1 and 2 operations were reported in this period.
- No noise complaints relating to MPE Stages 1 and 2 operations were reported in this period.

Noise monitoring reports completed during this period are available in appendix C of this report.

### 3.1.3 Storm Water Infrastructure and Water Quality Monitoring

Prior to discharge, the quality of discharge water is tested and characterised to demonstrate compliance. Criteria include total suspended solids (TSS) of 50 mg/L, turbidity of 25 nephelometric turbidity units (NTU), pH of 6.5-8.5 and oil and grease (visible sheen).

Results during this reporting period:

Nutrient values remain under the thresholds for ANZECC/ARMCANZ (2000) guidelines under the categorisation 'the protection of slightly disturbed lowland river ecosystems in southeast Australia'. There are no observed significant trend increases in nutrient values across the available datasets and analysis period. Recorded values for hydrocarbons within the stormwater network are interpreted as being static and remain under the accepted thresholds. Copper has increased by a small margin at Discharge Point (DP) 1, 5 and 7 across the data sample when analysed over the temporal scale but is considered appropriate for slightly- moderately disturbed systems. This will be monitored closely over coming water quality monitoring programs to determine if increased concentrations continue. Water Quality monitoring was undertaken by qualified consultants during the period.

Water quality monitoring report and infrastructure inspection reports are available in Appendix C of this report.

### 3.1.4 Biodiversity Monitoring

The following Biodiversity Monitoring are required to be undertaken.

- Monitoring of weed cover
- Monitoring of threatened species occurrence
- Monitoring of viability of native vegetation adjoining the rail easement
- Monitoring of feral fauna occurrence

Results during this reporting period:

No significant biodiversity observations or findings were made during the period. All Spring/ Autumn biodiversity monitoring has been undertaken with reports due prior to the annual anniversary of operations in May 2021.

### **3.1.5 Biannual Trip and Origin Destination Report**

The Biannual trip and origin destination report completed for this period has been attached in Appendix C for reference.

### **3.2 Previous Report Actions**

As this is the first Six-Monthly Operational Compliance Report there are no previous actions identified. Ongoing actions being tracked will be reported in the next Six-Monthly Operational Compliance Report.

### **3.3 Incidents**

MPE Operations incident register is attached in appendix C.

### **3.4 Complaints Management**

No complaints were received relating to MPE operations in this period

## **APPENDIX A - SSD 6766 CONDITIONS OF CONSENT**

COMPLIANCE REQUIREMENT	UNIQUE (ID)	COMPLIANCE REQUIREMENT	DEVELOPMENT PHASE	COMPLIANCE STATUS	EVIDENCE AND COMMENTS
SSD 6766	A1	The Applicant shall carry out the development generally in accordance with the: a. State Significant Development Application SSD 6766; b. SIMTA Intermodal Terminal Facility – Stage 1 – Environmental Impact Statement (Hyder Consulting Pty Ltd, May 2014); c. SIMTA Intermodal Terminal Facility – Stage 1 – Response to Submissions (Hyder Consulting Pty Ltd, September 2015); and d. The conditions of this consent.	All	Ongoing	To the extent it relates to MPE Stage 1. All sources referred to are included in the project obligations register and OEMP.
SSD 6766	A2	In the event of an inconsistency between: a. the conditions of this approval and any document listed from condition A1(a) to A1(c) inclusive, the conditions of this approval shall prevail to the extent of the inconsistency; and b. any document listed from condition A1(a) to A1(c) inclusive, and any other document listed from condition A1(a) to A1(c) inclusive, the most recent document shall prevail to the extent of the inconsistency.	All	Ongoing	
SSD 6766	A3	The Applicant shall comply with any reasonable requirement(s) of the Secretary arising from the Department's assessment of: a. any reports, plans or correspondence that are submitted in accordance with this consent; and b. the implementation of any actions or measures contained within these documents.	All	Ongoing	
SSD 6766	A4	This approval will lapse ten years from the date of this approval unless works the subject of this approval are physically commenced, on or before that lapse date.	All	Compliant	
SSD 6766	A7	The applicant shall ensure that all licences, permits, consents and approvals are obtained and maintained as required throughout the life of the development. No condition of this consent removes the obligation of the Applicant to obtain, renew or comply with such licences, permits or approvals. The Applicant shall ensure that a copy of this consent and all relevant environmental licences, permits, consents and approvals are available on the site that all times during the development and made available on the Project Website.	All	Ongoing	Required licences, permits, consents and approvals required prior to construction are being progressively obtained. E25 Report to be uploaded to Website once complete MP EPL to be uploaded to Website
SSD 6766	C19	The Applicant shall ensure that the construction and operation of the proposed development will not prevent the existing use of Moorebank Avenue as a public road to a standard commensurate to its current use prior to the development.  Note: temporary closures or part closures and changes to the operation of Moorebank Avenue may occur for limited periods during construction as detailed in the Construction Traffic Management Plan	All	Compliant	The OTAMP was approved 6/12/2019
SSD 6766	G3	Within 3 months of commencement of operation, the Applicant shall provide to the Certifying Authority evidence that all easements required by this approval, and other licences, approvals and consents, have been lodged for registration or registered at the NSW Land and Property Information.	operation	Compliant	
SSD 6766	G4	Signage shall be installed in accordance with Drawing A3001 Issue C (Terminal – Signage Details) dated 14/04/2015, unless otherwise agreed by the Secretary.	operation	Compliant	Signages with the Terminal are per approved detailed design drawings
SSD 6766	G5	The quantities of Dangerous Goods present at any time on the site or transported from and to the terminal site shall be kept below the screening threshold quantities listed in the Hazardous and Offensive Development Guidelines Applying SEPP 33, (DP&E 2011). The screening threshold quantities for each Dangerous Goods shall be defined in accordance with Table 1: Screening Methods of Applying SEPP 33.	operation	Ongoing	No Dangerous Goods have been transported during this reporting period

SSD 6766	G7	<p>The Applicant shall install and maintain a rail noise monitoring system on the rail link at the commencement of operation to continuously monitor the noise from rail operations on the rail link. The system shall capture the noise from each individual train pass by noise generation event, and include information to identify:</p> <ul style="list-style-type: none"> <li>a) Time and date of freight train passbys;</li> <li>b) Imagery or video to enable identification of the rolling stock during day and night;</li> <li>c) LAeq(15hour) and LAeq(9hour) from rail operations; and</li> <li>d) LAF(max) and SEL of individual train passbys, measured in accordance with ISO3095; or</li> <li>e) Other alternative information as agreed with the Secretary.</li> </ul> <p>The results from the noise monitoring system shall be publicly accessible from a website maintained by the Applicant. The noise results from each train shall be available on the website ideally within 24 hours of it passing the monitor. The LAeq(15hour) and LAeq(9hr) results from each day shall be available on the website within 24 hours of the period ending.</p> <p>Prior to the commencement of operation, the applicant shall submit for the approval of the Secretary, justification supporting the appropriateness of the location for rail noise monitoring including details of any alternative options considered and reasons for these being dismissed. The rail noise monitoring system shall not operate until the Secretary has approved the proposed monitoring location.</p> <p>The Applicant shall provide an annual report to the Secretary with the results of monitoring for a period of 5 years, or as otherwise agreed with the Secretary, from the commencement of operation of the IMEX terminal. The Secretary shall consider the need for further reporting following a review of the results for year 5.</p>	operation	Ongoing	Not applicable to this reporting period
SSD 6766	G7A	<p>The applicant shall install and maintain a wayside angle of attack monitoring system on the rail link at the commencement of operation to continuously monitor the angle of attack to the rail of rolling stock wheels. The system shall capture the angle of attack from a wheel on each axle of every train, and include information to identify:</p> <ul style="list-style-type: none"> <li>a) Time and date of each axle pass by; and</li> <li>b) The identification number of each item of rolling stock.</li> </ul> <p>The results from the angle of attack monitoring system shall be:</p> <ul style="list-style-type: none"> <li>• accessible by train operators from a website maintained by the Applicant. Angle of attack results from each train shall be available on the website within 24 hours of it passing the monitor, unless unforeseen circumstances have occurred.</li> <li>• included in a six-monthly report to the Secretary. The report should at least identify the number of wagons with wheels that exceed the ASA standard angle of attack and the action taken by operators to improve steering performance.</li> </ul> <p>Prior to the commencement of operation, the Applicant shall submit for the approval of the Secretary, justification supporting the appropriateness of the location for angle of attack monitoring, the format of the information to be accessible to operators and the format of the public report.</p> <p>The angle of attack monitoring system shall not operate until the Secretary has approved the proposed monitoring location and reporting arrangements.</p>	operation	Ongoing	Not applicable to this reporting period
SSD 6766	G7B	<p>The Applicant shall:</p> <ul style="list-style-type: none"> <li>(a) not less than three months and not more than twelve months from commencement of operation, engage an appropriately qualified and experienced acoustic engineer to undertake a night-time noise survey at Glenfield Farm (or an equivalent location if access is denied).</li> <li>(b) the noise survey shall be conducted in accordance with the EPA's Rail Infrastructure Noise Guideline 2013 to determine: <ul style="list-style-type: none"> <li>(i) the contribution of any new rail traffic travelling to and from the development; and,</li> <li>(ii) the increase in the total rail traffic noise level caused by any new rail traffic to and from the development.</li> </ul> </li> <li>(c) the noise survey shall be conducted for not less than 12 contiguous days in the winter months (July, August or September).</li> <li>(d) if as a result of the noise survey there is a sustained increase in the total rail traffic noise level due to the noise level from rail traffic travelling to and from the development of more than 2dB(A) for more than 30% of nights surveyed, the Applicant shall within twelve months, construct a noise barrier along the relevant sections of rail link in accordance with the specifications provided by an appropriately qualified and experienced acoustic engineer so as to limit the increase in the total rail traffic noise level at Glenfield Farm caused by any new rail traffic to and from the development to not exceed 2dB(A).</li> <li>(e) the report of the noise survey including the results and recommendations shall be provided to the Secretary.</li> </ul>	operation	Ongoing	<p>The Locomotive Best Practice Review was developed in consultation with EPA and TfNSW and a final document has been issued, with confirmation from both parties that consultation comments have been closed out in the final report.</p> <p>This was approved by DP&amp;E on 17/09/2017</p> <p>The Moorebank Intermodal Terminal Project Best Practice Wagon Report (Condition G6B) was published on 16 April 2019 by Renzo Tonin and is currently in consultation with TfNSW</p>

SSD 6766	G8	The following measures must be implemented during operation: a) The use of top of rail friction modifiers and automatic rail lubrication equipment in accordance with ASA Standard T HR TR 00111 ST Rail Lubrication, where required; and b) Measures to ensure the rail cross sectional profile is maintained in accordance with ETN-01-02 Rail Grinding Manual for Plain Track to ensure the correct wheel / rail contact position and hence to encourage proper rolling stock steering.	operation	Ongoing	Use of Automatic Rail Lubrication Equipment / Maintain Rail Cross Sectional Profile
SSD 6766	G10	Containers must be transferred between the site and Port Botany predominantly by rail, unless where unforeseen circumstances have occurred (e.g. an incident, breakdown, derailment or emergency maintenance on the rail line). The Secretary may at any time request the Applicant to demonstrate that the transport of containers between the site and Port Botany container terminals is by rail. This is to be demonstrated upon request by the Secretary for the prior 12 month period.	operation	Ongoing	Containers are to be transferred by rail unless there is track maintenance or unforeseen circumstances
SSD 6766	G11	The Applicant shall prepare a six-monthly report to the Secretary with the results of container and vehicle monitoring for a period of 3 years, or as otherwise agreed with the Secretary, from the commencement of operation of the IMEX terminal. The Secretary shall consider the need for further reporting following a review of the results for year 3. The report shall include: a) The number of twenty foot equivalent units dispatched and received during the period; b) A record of heavy vehicle entry by date and approximate time; and c) The number of light vehicles turning right into the terminal site from Moorebank Avenue and turning left from the terminal site onto Moorebank Avenue for a representative day.	operation	Compliant	BTODR survey completed within reporting period. Report submitted after reporting period
SSD 6766	G12	All containers handling equipment, purchased after 2019 must meet US EPA Tier 4 or EU Stage IV emission standard or achieve an equivalent emission control performance to those standards listed in this condition.	operation	Ongoing	
SSD 6766	G13	The Applicant must carry out any activity, or operate any plant, in or on the premises by such practicable means as may be necessary to prevent or minimise air pollution.	operation	Ongoing	Continuous air monitoring is ongoing
SSD 6766	G14	Heavy road freight vehicles are not permitted to use Moorebank Avenue south of the East Hills Railway corridor. A main gate monitoring system (e.g. CCTV) shall be installed to identify heavy vehicles turning left from the terminal site onto Moorebank Avenue, or turning right from Moorebank Avenue to the terminal site. The Secretary may at any time request the Applicant to provide a heavy vehicle monitoring report for the prior 12 month period.	operation	Compliant	No heavy road freight vehicle from the project has been identified using the East Hills Railway Corridor



## **APPENDIX B - SSD 7628 CONDITIONS OF CONSENT**

COMPLIANCE REQUIREMENT	UNIQUE (ID)	COMPLIANCE REQUIREMENT	DEVELOPMENT PHASE	COMPLIANCE STATUS	EVIDENCE AND COMMENTS
SSD 7628	A1	In addition to meeting the specific performance measures and criteria established under this consent all reasonable measures must be implemented to prevent, and if prevention is not reasonable, minimise, any harm to the environment that may result from the construction and operation of the development, and any rehabilitation required under this consent.	All	Ongoing	
SSD 7628	A2	The development may only be carried out: (a) in compliance with the conditions of this consent; (b) in accordance with all written directions of the Secretary in relation to this consent; (c) in accordance with the EIS, Submissions Report, Consolidated assessment clarification responses, and updated Biodiversity Assessment Report; (d) in accordance with the amended Development Layout Plans and Design Plans, amended WSUD plans and amended architectural plans to be submitted for the Secretary's approval as part of this consent; and (e) in accordance with the management and mitigation measures at APPENDIX B of this consent.	All	Ongoing	OEMP and Sub Plans have developed to comply with the CoCs
SSD 7628	A8	The container freight road volume must not exceed 250,000 TEUs p.a., subject to the exception identified in condition A9, which may only be considered under condition A9 after the facility has been in operation.	Operation	Ongoing	Limit not yet exceeded
SSD 7628	A9	The movement of container freight by road may exceed the 250,000 TEU limit p.a. by up to a further 250,000 TEU p.a., if the Secretary is satisfied that traffic monitoring and modelling of the operation of the facility demonstrate that traffic movements resulting from the proposed increase in TEU will achieve the objective of not exceeding the capacity of the transport network.	Operation	Ongoing	Limit not yet exceeded
SSD 7628	A10	In determining the TEU limit, the Secretary may take account any roadworks or mitigation measures proposed under a Voluntary Planning Agreement to minimise traffic impacts.	All	Ongoing	OTAMP has been developed to address this condition
SSD 7628	A11	The maximum GFAs for the following uses apply: (a) 300,000m2 for the warehousing and distribution facilities; and (b) 8,000m2 for the freight village.	Operation	Not triggered	Not breached
SSD 7628	A12	The warehousing and distribution facilities must only be used for activities associated with freight using the MPE Stage 1 rail intermodal terminal.	Operation	Not triggered	

SSD 7628	A13	Freight village tenants and occupations are restricted to those activities that provide: (a) ancillary support for the development, its tenants, worker population and visitors; (b) a nexus with activities undertaken in relation to the warehouse, logistics functions of the IMT development and/ or; (c) provide aligned services to the intermodal functions. Prior to occupancy of any freight village tenancy, and every subsequent occupation of these tenancies, details of the tenant and occupation activity is to be submitted to the Secretary demonstrating that the proposed activity complies with this condition.	Operation	Not triggered	
SSD 7628	A14	With the approval of the Secretary, the Applicant may submit any strategy, plan or program required by this consent on a staged basis.	All	Compliant	The CTP (Rev 5) dated 24 May 2018, was approved by DP&E on 8/06/2018 Document Delivery Strategy (DDS)
SSD 7628	A15	If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program.	All	Compliant	The CTP (Rev 5) dated 24 May 2018, was approved by DP&E on 8/06/2018 Document Delivery Strategy (DDS)
SSD 7628	A16	With the approval of the Secretary, any strategy, plan or program required by this consent may be combined	All	Ongoing	CERSEDMP and SWMP
SSD 7628	A17	In seeking the Secretary's approval, a clear relationship must be demonstrated between the strategies, plans or programs that are proposed to be combined.	All	Ongoing	All plans
SSD 7628	A19	Where conditions of this consent require a document to be prepared in consultation with an identified party, the Applicant must: (a) consult with the relevant party prior to submitting the subject document to the Secretary for approval; (b) provide evidence that at least two weeks was provided for the relevant party to comment on the document; and (c) include in the document: (i) details of the consultation undertaken; (ii) a description of how matters raised by those consulted have been resolved to the satisfaction of both the Applicant and the party consulted; and (iii) details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.	All	Compliant	Stakeholder consultation outcomes addressed within each management plan.
SSD 7628	A20	All licences, permits, approvals and consents as required by law must be obtained and maintained as required for the development. No condition of this consent removes the obligation for the Applicant to obtain, renew or comply with such licences, permits, approvals and consents.	All	Compliant	CEMP (Rev 4) dated 5 April 2018, approved by DP&E 8/06/2018 Specific licence/permit requirements are addressed in each subplan. Compliance Tracker.
SSD 7628	A30	Unless the Applicant and the applicable authority agree otherwise, the Applicant must: (a) repair, or pay the full costs associated with repairing any public infrastructure that is damaged by carrying out the development; and (b) relocate, or pay the full costs associated with relocating any infrastructure that needs to be relocated as a result of the development.	All	Not triggered	Records of damage or rectification required should activities cause damage to public infrastructure.

SSD 7628	A32	All plant and equipment used at the site or to monitor the performance of the development must be: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	All	Compliant	CEMP / Maintenance records
SSD 7628	B1	The Applicant must: (a) prepare each plan, program and other documents in consultation with the specified stakeholders; (b) not commence each phase of the project until the plans, programs and other documents required under this consent are approved by or, where not required to be approved, submitted to the Secretary specified within the timeframes; and (c) implement the most recent version of the required plans and programs approved by the Secretary for the duration of the development.	All	Compliant	Record of consultation included in all plans.
SSD 7628	B28	The Applicant is to prepare a <b>Biannual Trip Origin and Destination Report</b> each six months following commencement of any operation (in a format agreed with TfNSW and RMS) that advises: (a) the number of actual and standard twenty foot equivalent shipping containers despatched and received during the period; (b) the number of days in the period that the truck gate was open for despatching trucks 24 hours a day, 7 days a week and detail any exceptions to this and advise actual hours of operation; (c) records of vehicle numbers accessing the site; and (d) representative vehicle origins and destinations, based on a cordon in the surrounding network. A framework for recording and reporting on the data required for the report, prepared to the satisfaction of TfNSW and RMS, is to be submitted to the Secretary three months prior to the commencement of operation. The report is to be submitted within one month of its preparation throughout operation of the project, starting six months from the commencement of operation, unless otherwise agreed by the Secretary, TfNSW and RMS. The cordon count at (d) above will: • apply to all classes of vehicles; and • cover the intermodal terminal, the warehousing facility and any other uses such as the freight village.	Operation	Compliant	Traffic monitoring conducted within reporting period, submitted outside of reporting period.
SSD 7628	B30	The Applicant must ensure that the <b>Workplace Travel Plan</b> is implemented for the life of the development.	Operation	Ongoing	Approval of the WTP was received by DPIE on 6/12/2019
SSD 7628	B51	The annual independent audit must be undertaken by a suitably qualified WSUD professional. The audit is to verify the condition of the treatment system(s), verify and document that the system(s) is working as intended, verify the system(s) has been cleaned adequately, verify there is no excessive build-up of material in the system(s) and identify any issues with the treatment system(s) which require rectification for the system(s) to adequately perform its intended function.	Operation	Not triggered	Scheduled for April 2021
SSD 7628	B54	Best practice reactive and proactive management measures must be implemented to minimise dust generated during all works authorised by this consent.	All	Compliant	The EWEMP / EWAQMP was superseded by the CAQMP (Rev 4) - 11 May 2018, approved by DP&E 1/06/2018
SSD 7628	B55	Deposited dust must not exceed an increase of 2g/m2/month or maximum of 4g/m2/month at the closest off site sensitive receiver.	All	Compliant	The EWEMP / EWAQMP was superseded by the CAQMP (Rev 4) - 11 May 2018, approved by DP&E 1/06/2018
SSD 7628	B60	The Applicant must ensure the development does not cause or permit the emission of any offensive odour (as defined in the POEO Act).	All	Ongoing	CEMP/ OEMP
SSD 7628	B61	Equipment must be installed and operated in accordance with best practice to ensure that the development complies with all load limits, air quality criteria, air emission limits and air quality monitoring requirements as specified under this consent.	All	Ongoing	CEMP/ CAQMP
SSD 7628	B64	Continuous <b>noise monitoring</b> at sensitive receivers must be undertaken during early works, fill importation, construction and for at least 12 months following occupation of the entire site.	All	Complaint	Quarterly reports for noise monitoring completed during 2020

SSD 7628	B79	The permitted hours of warehouse and distribution operation are detailed in <b>Table 4</b> .	Operation	Compliant	OEMP
SSD 7628	B80	Noise generated by operation of the development inclusive of MPE Stage 1 operations must not exceed the noise limits in <b>Table 5</b> .	Operation	Ongoing	OEMP
SSD 7628	B85	The Applicant must carry out <b>noise monitoring of mechanical plant and other noisy equipment</b> for a minimum period of one week where valid data is collected following occupation of each warehouse. The monitoring program must be carried out by a suitably qualified and experienced person(s) and a Monitoring Report for Mechanical Plant must be submitted to the Secretary within two months of occupation or each tenancy to verify predicted mechanical plant and equipment noise levels.	Operation	Compliant	Submitted to DPIE
SSD 7628	B86	Within 12 months of occupation of the first warehouse, 50% occupation of the site and 100% occupation of the site, or as otherwise agreed by the Secretary, the Applicant must undertake <b>operational noise monitoring</b> to compare actual noise performance of the project against predicted noise performance, and prepare an <b>Operational Noise Report</b> to document this monitoring. The Report must include, but not necessarily be limited to: a) noise monitoring to assess compliance with the predicted operational noise levels and the noise limits specified in Table 5; b) a review of the operational noise levels in terms of criteria and noise goals established in the NSW RNP (EPA, 2011); c) sleep disturbance impacts compared to those determined in documents specified under condition A2; d) impacts associated with annoying characteristics such as prominent tonal components, impulsiveness, intermittency, irregularity and dominant low-frequency content; e) methodology, location and frequency of noise monitoring undertaken, including monitoring sites at which project noise levels are ascertained, with specific reference to locations indicative of impacts on sensitive receivers; f) details of any complaints and enquiries received in relation to operational noise generated by the project between the date of commencement of operation and the date the report was prepared; g) any required recalibrations of the noise model taking into consideration factors such as actual traffic numbers and heavy vehicle proportions; and h) an assessment of the performance and effectiveness of applied noise mitigation measures together with a review and if necessary, reassessment of all feasible and reasonable mitigation measures.	Operation	Not triggered	Required by May 2021
SSD 7628	B87	The Applicant must provide the Secretary and the EPA with a copy of the Operational Noise Report within 60 days of completing the operational noise monitoring referred to in (a) above or as otherwise agreed by the Secretary.	Operation	Not triggered	Required by May 2021
SSD 7628	B88	To ensure the operational noise impacts are appropriately managed, the following measures apply: a) use of best practice plant; and b) preparation of a <b>risk assessment</b> to determine if non-tonal reversing alarms can be fitted as a condition of site entry. Alternatively, site design may include traffic flow that does not require or precludes reversing of vehicles.	Operation	Not triggered	Required by May 2021
SSD 7628	B89	For the duration of operation heavy road freight vehicles are not permitted to use Moorebank Avenue south of the East Hills Railway corridor. A main gate monitoring system (e.g. CCTV) must be installed to identify heavy vehicles turning left from the terminal site onto Moorebank Avenue, or turning right from Moorebank Avenue to the terminal site. The Secretary may at any time request the Applicant to provide a <b>heavy vehicle monitoring report</b> for the prior 12 month period.	Operation	Compliant	No heavy road freight vehicle from the project have been identified using the East Hills Railway corridor

SSD 7628	B90	For the duration of operation, the Applicant must: a) continue to implement all reasonable and feasible best practice noise mitigation measures; b) continue to investigate ways to reduce the noise generated by the development, including maximum noise levels which may result in sleep disturbance; and c) report on these investigations and the implementation and effectiveness of these measures in the Annual Review to the satisfaction of the Secretary.	Operation	Compliant	Ongoing monitoring. To be reported in the Annual Review
SSD 7628	B115	Prior to occupation of each premises and in each instance of occupation by a new occupant, a report must be submitted to the Secretary confirming that the premises will be operated so as to comply with the requirements of conditions B111 and B113.	Operation	Compliant	CTP OEMP
SSD 7628	B121	Waste must be secured and maintained within designated waste storage areas at all times and must not leave the site or be deposited on or otherwise enter neighbouring public or private properties.	Operation	Compliant	No community waste complaints identified. Warehouse tenant have procured Waste Contractor to dipose any waste
SSD 7628	B122	All waste materials removed from the site must only be directed to a waste management facility or premises lawfully permitted to accept the materials.	All	Compliant	
SSD 7628	B123	The Applicant must assess and classify all liquid and non-liquid wastes to be taken off site in accordance with the latest version of EPA's <i>Waste Classification Guidelines Part 1: Classifying Waste</i> (EPA, 2014).	All	Compliant	
SSD 7628	B124	Waste generated outside the site must not be received at the site for storage, treatment, processing, reprocessing, or disposal unless it satisfies these conditions.	All	Compliant	
SSD 7628	B125	The Applicant must retain all sampling and waste classification data for the life of the development in accordance with the requirements of EPA.	All	Compliant	
SSD 7628	B126	The collection of waste generated during operation of the development must be undertaken between 7 am to 10 pm Monday to Friday	Operation	Compliant	
SSD 7628	B145	Public road access must comply with section 4.1.3(1) of <i>Planning for Bush Fire Protection 2006</i> except for the requirement for through-access.	All	Compliant	CTP/ BFMP
SSD 7628	B146	The provision of water, electricity and gas must comply with section 4.1.3 of <i>Planning for Bush Fire Protection 2006</i> .	All	Compliant	CTP/ BFMP
SSD 7628	B153	The Applicant must obtain a certificate from a suitable qualified tradesperson, certifying that kitchen, food storage and food preparation areas have been fitted in accordance with Australian Standard AS4674. The Applicant must provide evidence of receipt of the certificate to the satisfaction of the Certifying Authority prior to occupation.	Operation	Not triggered	Not applicable to warehouse 1

SSD 7628	B155	<p>No later than one month before early works and fill importation, a <b>Community Communication Strategy</b> must be prepared and submitted to the Secretary for approval. The Community Communication Strategy is to provide mechanisms to facilitate communication between the Applicant, the Council and the community (including adjoining affected landowners and businesses, and others directly impacted by the development), during the design and construction of the development. The Community Communication Strategy must:</p> <p>(a) assign a central contact person to keep the nearby sensitive receivers regularly informed throughout the development;</p> <p>(a) detail the mechanisms for regularly consulting with the local community throughout the development, such as holding regular meetings to inform the community of the progress of the development and report on environmental monitoring results;</p> <p>(b) detail a procedure for consulting with nearby sensitive receivers to schedule high noise generating works or manage traffic disruptions;</p> <p>(c) include contact details for key community groups, relevant regulatory authorities, Registered Aboriginal Parties and other interested stakeholders; and</p> <p>(d) include a complaints procedure for recording, responding to and managing complaints, including:</p> <p>(i) email, toll-free telephone number and postal address for receiving complaints;</p> <p>(ii) advertising the contact details for complaints prior to and during operation, via the local newspaper and through on-site signage;</p> <p>(iii) a complaints register to record the date, time and nature of the complaint, details of the complainant and any actions taken to address the complaint; and</p> <p>(iv) procedures for the resolution of any disputes that may arise during the course of the development.</p>	Operation	Compliant	CCS (Rev 4) dated 7 May 2018, approved by DP&E 01/06/2018
SSD 7628	C5	Overall responsibility of the development, including the freight village environmental management during operation, must be by the entity responsible for the Precinct environmental management.	Operation	Not triggered	OEMP
SSD 7628	C7	<p>The Applicant must ensure that the environmental management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <p>(a) detailed baseline data;</p> <p>(b) a description of:</p> <p>(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);</p> <p>(ii) any relevant limits or performance measures/criteria; and</p> <p>(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;</p> <p>(c) a description of the management measures to be implemented to comply with the relevant statutory requirements, limits or performance measures/criteria;</p> <p>(d) a program to monitor and report on the:</p> <p>(i) impacts and environmental performance of the development; and</p> <p>(ii) effectiveness of any management measures (see (c) above);</p> <p>(e) a contingency plan to manage any unpredicted impacts and their consequences;</p> <p>(f) a program to investigate and implement ways to improve the environmental performance of the development over time;</p> <p>(g) a protocol for managing and reporting any:</p> <p>(i) incidents and non-compliances;</p> <p>(ii) complaints;</p> <p>(iii) non-compliances with statutory requirements; and</p> <p>(h) a protocol for periodic review of the plan.</p> <p>Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for a particular management plan.</p>	All	Ongoing	All management plans

SSD 7628	C9	<p>Within three months of:</p> <p>(a) the submission of an annual review under condition C10;  (b) the submission of an incident or non-compliance notification under condition C13;  (c) the submission of an audit under condition C18;  (d) the approval of any modification of the conditions of this consent; or  (e) the issue of a direction of the Secretary under condition A2;  the strategies, plans and programs required under this consent must be reviewed, and if necessary to either improve the environmental performance of the development, cater for a modification or comply with a direction, must be revised, to the satisfaction of the Secretary. Where revisions are required, the revised document must be submitted to the Secretary for approval within six weeks of the review.</p> <p>Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve the environmental performance of the development.</p>	all	Ongoing	CEMP
SSD 7628	C10	<p>Each year, the Applicant must submit a <b>review the environmental performance</b> of the development (including all tenants and occupants) to the to the Department. The review must:</p> <p>(a) describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;  (b) include a comprehensive review of the monitoring results and complaints records from the previous year, including a comparison of these against the:  (i) the relevant statutory requirements, limits or performance measures/criteria;  (ii) requirements of any plan or program required under this consent;  (iii) the monitoring results of previous years; and  (iv) the relevant predictions in the EIS, Submissions Report, Consolidated assessment clarification responses; Modification Assessment, or conditions of this consent;  (c) identify any non-compliance over the previous year, and describe what actions were (or are being) taken to ensure compliance;  (d) identify any trends in the monitoring data over the life of the development;  (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and  (f) describe what measures will be implemented over the next year to improve the environmental performance of the development.</p> <p>The Applicant must ensure that copies of the Annual Review are submitted to Council and are available to the CCC and any interested person upon request.</p>	All	Not Triggered	Due in May 2021
SSD 7628	C11	<p>The Department must be notified in writing to <a href="mailto:compliance@planning.nsw.gov.au">compliance@planning.nsw.gov.au</a> immediately after the Applicant becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one), and set out the location and nature of the incident.</p>	All	Ongoing	CEMP/OEMP
SSD 7628	C12	<p>A written incident notification addressing all requirements for such notification set out in Appendix D of this consent, must also be emailed to the Department at the following address: <a href="mailto:compliance@planning.nsw.gov.au">compliance@planning.nsw.gov.au</a> within 7 days after the Applicant becomes aware of an incident. Notification is required to be given under this condition even if the Applicant fails to give the notification required under condition or, having given such notification, subsequently forms the view that an incident has not occurred.</p>	All	Ongoing	CEMP/OEMP
SSD 7628	C13	<p>Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Secretary the Applicant must provide the Secretary and any relevant public authorities (as determined by the Secretary) with a detailed report on the incident addressing all requirements for such reporting set out in Appendix D of this consent, and such further reports as may be requested.</p>	All	Ongoing	CEMP/OEMP
SSD 7628	C14	<p>Any written requirements of the Secretary or relevant public authority (as determined by the Secretary) which may be given at any point in time, to address the cause or impact of an incident must be complied with and within any timeframe specified by the Secretary or relevant public authority.</p>	All	Ongoing	CEMP/OEMP

SSD 7628	C15	If statutory notification is provided to EPA as required under the POEO Act in relation to the development, such notification must also be provided to the Secretary within 24 hours after the notification was provided to EPA.	All	Ongoing	CEMP/OEMP
SSD 7628	C16	The Department must be notified in writing to compliance@planning.nsw.gov.au within 7 days after the Applicant becomes aware of any non-compliance.	All	Ongoing	CEMP/OEMP
SSD 7628	C17	The notification must identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply, the reasons for the non-compliance (if known), and what actions have been, or will be, undertaken to address the non-compliance.	All	Ongoing	CEMP/OEMP
SSD 7628	C18	Within one year of the commencement of any development under this consent, and every three years thereafter, unless the Secretary directs otherwise, the Applicant must commission and pay the full cost of an <b>Independent Environmental Audit (Audit)</b> of the development. Audits must: (a) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary; (b) be carried out in consultation with the relevant agencies and the CCC; (c) assess the environmental performance of the development (and tenancies) and assess whether it is complying with the relevant requirements in this consent, and any strategy, plan or program required under this consent; and (d) review the adequacy of any approved strategy, plan or program required under this consent; and (e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under this consent.	All	Not Triggered	Due in May 2021
SSD 7628	C19	Within three months of commencing an Independent Environmental Audit, or unless otherwise agreed by the Secretary, a copy of the audit report must be submitted to the Secretary, and any other NSW agency that requests it, together with a response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Secretary.	All	Not Triggered	Due in May 2021
SSD 7628	C20	At least 48 hours before the commencement of construction until the completion of all works under this consent, including demolition and remediation, the Applicant must: (a) make copies of the following publicly available on its website: (i) the documents referred to in condition A2 of this consent; (ii) all current statutory approvals for the development; (iii) all approved strategies, plans and programs required under the conditions of this consent; (iv) regular reporting on the environmental performance of the development in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent; (v) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; (vi) a summary of the current stage and progress of the development; (vii) contact details to enquire about the development or make a complaint; (viii) a complaints register updated on a monthly basis; (ix) the Annual Reviews of the development; (x) audit reports prepared as part of any independent environmental audit of the development and the Applicant's response to the recommendations in any audit report; (xi) any other matter required by the Secretary; and (b) keep such information up to date, to the satisfaction of the Secretary.	All	Compliant	The website is being progressively updated as documents are approved for each stage of the construction activities.

SSD 7628	C21	<p>The Proponent must prepare and implement a <b>Compliance Tracking Program</b> to track compliance with the requirements of this approval. The <b>Compliance Tracking Program</b> must be submitted to the Secretary for approval prior to the commencement of construction.</p> <p>The Compliance Tracking Program must include, but not be limited to:</p> <ul style="list-style-type: none"> <li>(a) provision for the notification of the Secretary prior to the commencement of construction and prior to the commencement of operation of the development (including prior to each stage, where works are being staged);</li> <li>(b) provision for periodic review of the compliance status of the development against the requirements of this approval and the environmental management measures committed to in the documents referred to in condition A2;</li> <li>(c) provision for periodic reporting of compliance status to the Secretary, including but not limited to: <ul style="list-style-type: none"> <li>(i) a <b>Pre-Construction Compliance Report</b> prior to the commencement of construction,</li> <li>(ii) quarterly Construction Compliance Reports, for the duration of construction, and</li> <li>(iii) a <b>Pre-Operation Compliance Report</b> prior to the commencement of operation, and six monthly operational compliance reports;</li> </ul> </li> <li>(d) a program for independent environmental auditing;</li> <li>(e) mechanisms for recording environmental incidents during construction and actions taken in response to those incidents;</li> <li>(f) provision for reporting environmental incidents to the Secretary during construction;</li> <li>(g) procedures for rectifying any non-compliance identified during environmental auditing, review of compliance or incident management; and</li> <li>(h) provision for ensuring all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities.</li> </ul>	All	Compliant	This Report
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## **APPENDIX C – COMPLETED COMPLIANCE REPORTS**

# MOOREBANK LOGISTICS PARK – PRECINCT EAST

Operational Air Quality Six Monthly Compliance Report #1  
May – October 2020

19 NOVEMBER 2020



## CONTACT



**STEPHAN MITCHELL**  
Senior Environmental  
Consultant

T +61 2 8907 2684

E [stephan.mitchell@arcadis.com](mailto:stephan.mitchell@arcadis.com)

Arcadis

Level 16/580 George Street  
Sydney NSW 2000

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## MOOREBANK LOGISTICS PARK – PRECINCT EAST

### Operational Air Quality Six Monthly Compliance Report #1

May – October 2020

**Author** Stephan Mitchell



**Checker** Heather Tilley



**Approver** Heather Tilley



**Report No** PREC-ARC-EN-RPT-0010

**Date** 19/11/2020

**Revision Text** 002

This report has been prepared for Tactical Group in accordance with the terms and conditions of appointment for MLP East Precinct Operational Air Monitoring Program MLP East Precinct Operational Air Monitoring Program dated 20 December 2019 201920 December 2019. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

### REVISIONS

Revision	Date	Description	Prepared by	Approved by
001	18/11/2020	Submission to Tactical Group for review	SM	HT
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# CONTENTS

<b>1 INTRODUCTION .....</b>	<b>1</b>
1.1 Background .....	1
1.2 Purpose.....	1
1.3 Limitations.....	1
<b>2 OVERVIEW.....</b>	<b>2</b>
2.1 Reporting period .....	2
2.2 Monitoring locations.....	2
2.3 Site operation .....	2
<b>3 WEATHER.....</b>	<b>4</b>
<b>3.1 Meteorological Conditions .....</b>	<b>4</b>
3.1.1 Prevailing wind conditions.....	4
3.1.2 Ambient temperature and rainfall .....	5
<b>3.2 Ambient Air Quality .....</b>	<b>5</b>
<b>4 MONITORING RESULTS .....</b>	<b>7</b>
4.1 Overview .....	7
4.2 Exceedances .....	7
4.2.1 Annual exceedances.....	7
4.2.2 24-hour exceedances .....	7
4.2.3 1 hour exceedance .....	12
4.3 Complaints .....	12
4.4 Ad-hoc monitoring.....	12
4.5 Conclusion .....	12
<b>APPENDIX A.....</b>	<b>14</b>

# 1 INTRODUCTION

## 1.1 Background

The Moorebank Logistics Park – Precinct East Operational Air Quality Monitoring Programme Framework (OAQMPPF) provides a framework to monitor air quality during operation of the Moorebank Logistic Park (MLP) Precinct East and has been developed to support the implementation of the Operational Air Quality Management Plan (OAQMP) monitoring and reporting requirements. The OAQMP includes requirements of the:

- EPBC Act Approval (2011/6229) Condition of Approval (CoA) 8f) which requires the implementation of a comprehensive air quality monitoring program (including locations, frequency and duration)
- Moorebank Precinct East (MPE) Stage 1 (SSD 6766):
  - Condition of Consent (CoC) F4(f)(iv) which requires measurement of air emissions generated by the Facility
  - Final Compilation of Mitigation Measures (FCMM) 2C which requires the implementation of an air quality monitoring programme during operation for nuisance dust and air emissions [PM<sub>10</sub> and nitrogen dioxide (NO<sub>2</sub>)].
- MPE Stage 2 (SSD 7628):
  - CoC C21(c)(iii) which requires the submission of six-monthly operational compliance reports for the life of the project
  - CoC B59(d)(i), (ii), (iii), (iv) and (vii) which require the identification of air quality monitoring methods and implementation of compliance monitoring for all emissions associated with operations of the Facility
  - FCMM 3C which requires real-time boundary monitoring be undertaken during operation of the Facility.

## 1.2 Purpose

This six-monthly air quality report has been prepared to meet reporting requirements of the CoC as outlined in Section 5 of the OAQMPPF.

This six-monthly air quality report includes:

- Summary of air quality data as graphs and tables (Appendix A)
- Weather data (Section 3)
- Identification of exceedances, complaints or ad hoc monitoring undertaken (Section 4)
- An overview of any investigations undertaken to determine the cause of the exceedance or complaint (Section 4).

## 1.3 Limitations

All findings contained in this report are based on downloaded monitoring data at the time of writing the report. Arcadis do not take responsibility for the accuracy or limitations of the downloaded data.

## 2 OVERVIEW

### 2.1 Reporting period

The MLP Precinct East operations commenced on 13 May 2020.

This six-monthly internal air quality report has been prepared to provide an overview of operational air quality results for the period between 13 May 2020 to 31 October 2020 (inclusive) to inform the six-monthly operational compliance reports required for the life of the project.

### 2.2 Monitoring locations

The locations of the continuous air quality monitoring stations are identified on Figure 2-1

For this reporting period, the site boundary was considered to be representative of the closest receptors (including the adjacent commercial premises). A summary of the time that the continuous air quality monitoring stations were operable is summarised in Table 2-1. Calibration records show that all monitors have been recently calibrated.

Table 2-1: Monitoring station uptime (%)

Monitoring station	May 2020	June 2020	July 2020	August 2020	September 2020	October 2020	Average	Calibration
AQM01	97	100	100	100	95	96	98	Feb 2019
AQM02	97	100	100	100	95	96	98	Feb 2020
AQM03	98	100	100	100	95	80	95	Feb 2020
AQM04	97	99*	100	100	95	95	98	Feb 2020

\*Possible error between 04/06/2020 and 22/06/2020 (results appear to have flatlined and did not vary as expected with real time monitoring)

### 2.3 Site operation

The MLP OEMP and sub-plans are applicable to the entire MLP Precinct East. The MLP Precinct East operates 24 hours, 7 days a week. This currently includes operation of the IMEX terminal, Rail Link, Warehouse 1, Warehouse 3 and Warehouse 4. Construction related to the remaining elements of MPE Stage 2 is ongoing and is being undertaken during standard working hours.

Moorebank Precinct West (MPW) Stage 2 is located west of Moorebank Avenue and is currently under construction. MPW Stage 2 is a separate project and operates under a different approval (SSD 7709) to MLP Precinct East. MPW Stage 2 has been granted approval to receive imported material outside of standard construction hours.

The locations of the air quality monitors means the activities for both MLP Precinct East and MPW Stage 2 have been captured.

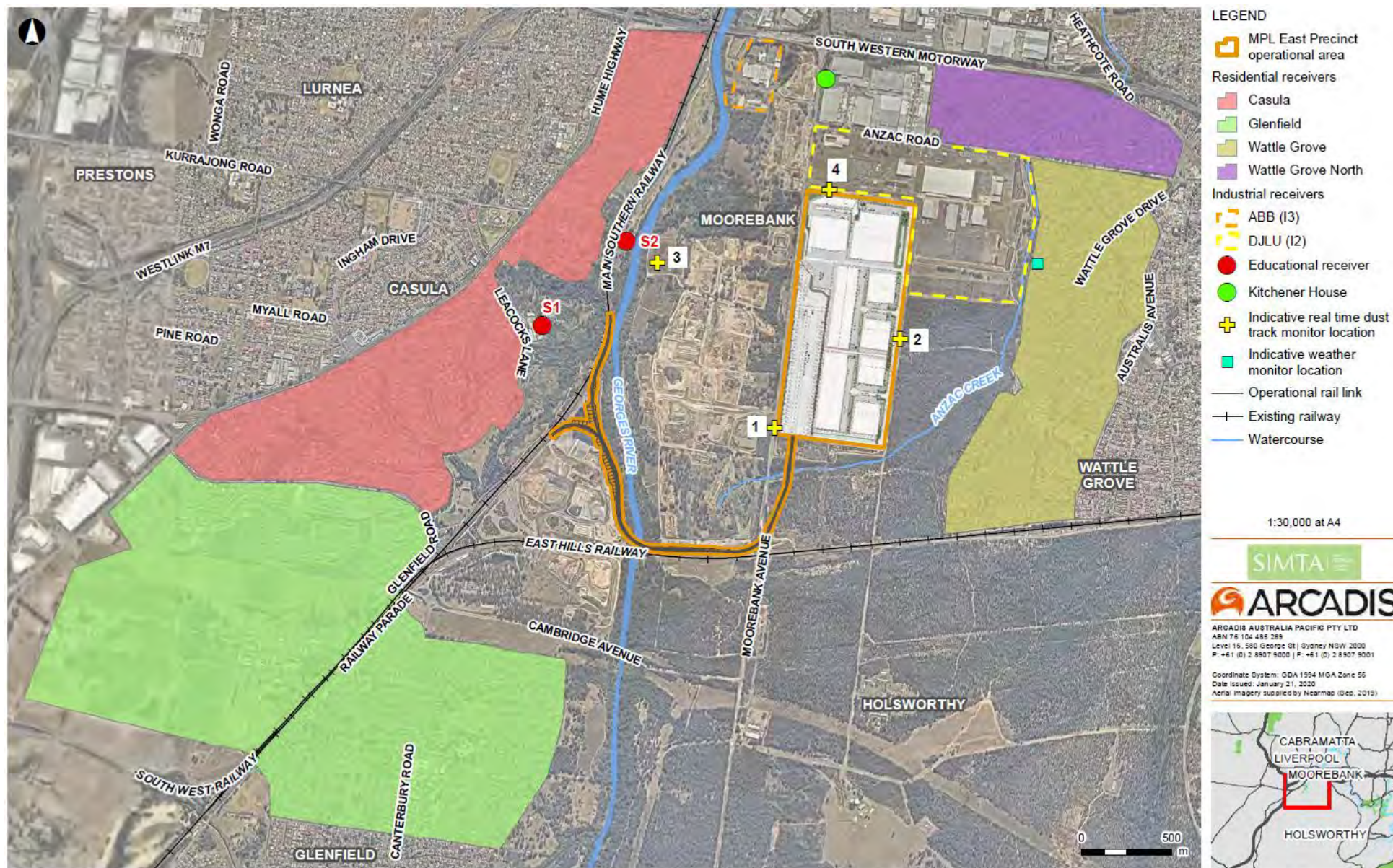


Figure 2-1: Continuous real-time air quality monitors

### 3 WEATHER

#### 3.1 Meteorological Conditions

##### 3.1.1 Prevailing wind conditions

Figure 3-1 shows the wind rose of recorded wind speed and direction data from a weather monitor located in Wattle Grove (around 500 m east of MLP Precinct East). Due to a data download error, prevailing wind conditions for September and October were unavailable.

Prevailing winds influence the dispersion of dust, and other air emissions potentially generated by the Facility. The recorded wind pattern during the reporting period was dominated by north westerly and north easterly airflow. Average recorded wind speed during the reporting period are low, around 0.3 m/s, indicating generally calm conditions (i.e. winds less than 0.5 m/s).

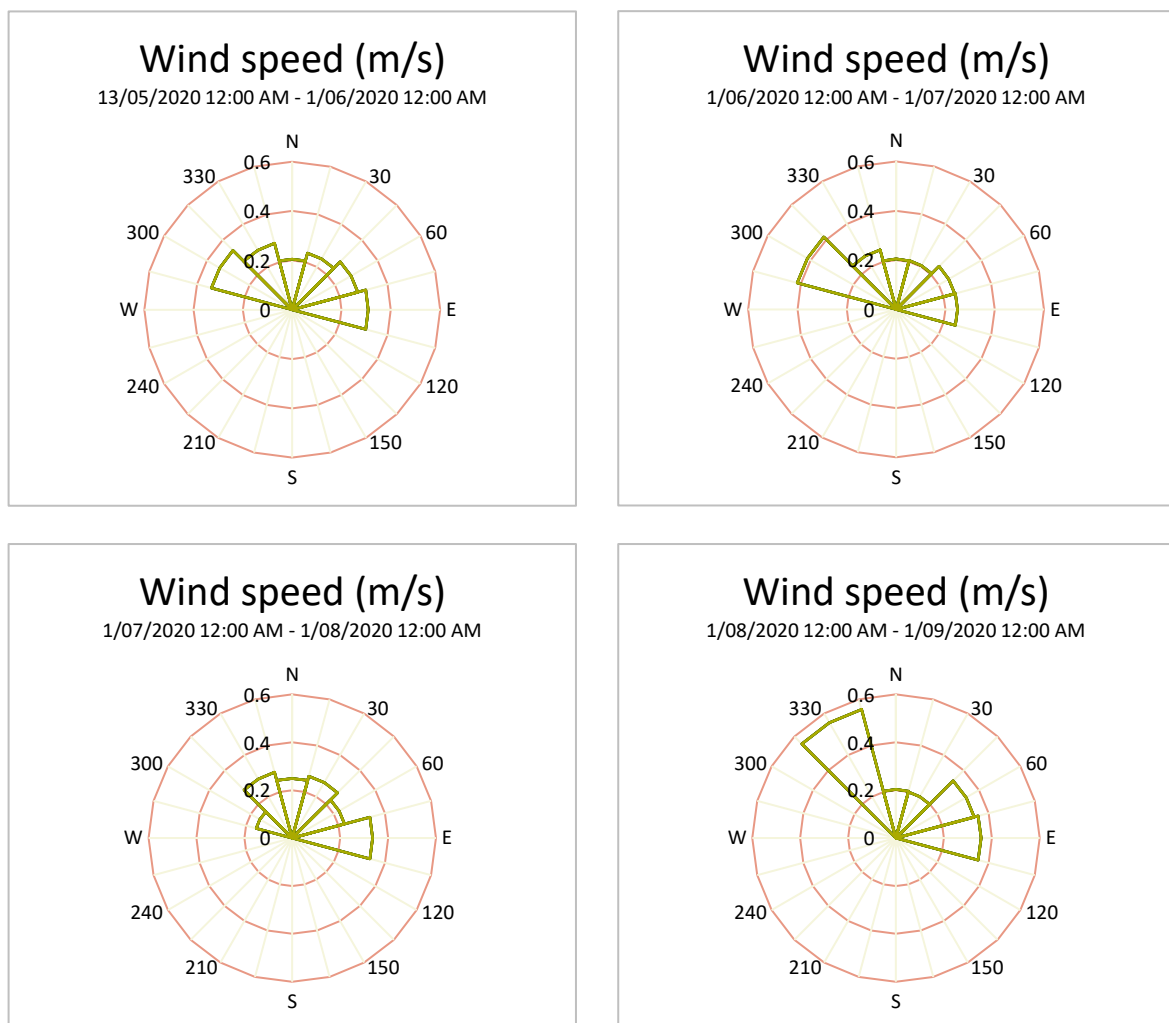


Figure 3-1: Wind roses (May to August)

### 3.1.2 Ambient temperature and rainfall

Monthly mean maximum temperatures and total rainfall recorded at the Bankstown Airport automatic weather station (AWS) is summarised in Table 3-1.

Table 3-1: Temperature

Month	Mean minimum temperature (°C)	Mean maximum temperature (°C)	Total rainfall (mm)
May 2020	9.1	20.2	66.2
June 2020	7.2	18.6	42
July 2020	7.1	18.0	123.2
August 2020	6.6	19.1	69.6
September 2020	10.0	22.9	31.0
October 2020	13.5	25.3	67.8

<http://www.bom.gov.au/climate/dwo/202010/html/IDCJDW2008.202010.shtml>

## 3.2 Ambient Air Quality

For the reporting period, air quality data from the Liverpool monitoring station was reviewed for PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>.

Using the air quality indices (AQI) metric, baseline air quality for the Liverpool area for particles (PM<sub>10</sub> and PM<sub>2.5</sub>) identified that the AQI generally ranged from 'Very Good' to 'Good' with daily exceptions that ranged to 'Fair' and 'Poor'. The AQI is generally used by government agencies to communicate to the public how polluted the air currently is or how polluted it is forecast to become.

From November 2020, the Department of Planning Industry and Environment (DPIE) has implemented air quality categories (AQC) for NSW and no longer uses AQI for air quality reporting.

These categories are based on air quality data readings which are taken continuously from the various monitoring sites throughout NSW, and are averaged to give hourly and daily air quality information. DPIE use minute data, and report concentrations as hourly and daily averages. All averages are arithmetic means. Air quality data is updated hourly and a daily air quality forecast is made for the Greater Sydney Metropolitan Region at 4pm each day.

The AQC range from Good to Extremely Poor and are summarised in Figure 3-2.

			Air quality categories (AQC)				
Air pollutant	Averaging period	Units	GOOD	FAIR	POOR	VERY POOR	EXTREMELY POOR
Ozone O <sub>3</sub>	1-hour	pphm	<6.7	6.7–10.0	10.0–15.0	15.0–20.0	20.0 and above
	4-hour rolling	pphm	<5.4	5.4–8.0	8.0–12.0	12.0–16.0	16.0 and above
Nitrogen dioxide NO <sub>2</sub>	1-hour	pphm	<8	8–12	12–18	18–24	24 and above
Visibility Neph	1-hour	bsp	<1.5	1.5–3.0	3.0–6.0	6.0–18.0	18.0 and above
Carbon monoxide CO	8-hour rolling	ppm	<6.0	6.0–9.0	9.0–13.5	13.5–18.0	18.0 and above
Sulfur dioxide SO <sub>2</sub>	1-hour	pphm	<13.3	13.3–20.0	20.0–30.0	30.0–40.0	40.0 and above
Particulate matter < 10 µm PM <sub>10</sub>	1-hour	µg/m <sup>3</sup>	<50	50–100	100–200	200–600	600 and above
Particulate matter < 2.5 µm PM <sub>2.5</sub>	1-hour	µg/m <sup>3</sup>	<25	25–50	50–100	100–300	300 and above

Figure 3-2: Air quality categories

<https://www.environment.nsw.gov.au/topics/air/understanding-air-quality-data/air-quality-categories>

## 4 MONITORING RESULTS

### 4.1 Overview

Monitoring data has been summarised into tables and graphs for PM<sub>2.5</sub>, PM<sub>10</sub> and NO<sub>2</sub> and are provided in Appendix A. The monitoring results have been assessed against the criteria identified in Table 4-1.

Table 4-1: Monitoring criteria

Monitoring focus	Averaging period	Criteria / Trigger
PM <sub>2.5</sub>	24 hour average	25 µg/m <sup>3</sup>
	Annual average	8 µg/m <sup>3</sup>
PM <sub>10</sub>	24 hour average	50 µg/m <sup>3</sup>
	Annual average	25 µg/m <sup>3</sup>
NO <sub>2</sub> (µg/m <sup>3</sup> )	1 hour average	246 µg/m <sup>3</sup>
	Annual average	62 µg/m <sup>3</sup>

### 4.2 Exceedances

#### 4.2.1 Annual exceedances

Continuous air quality monitoring for operations commenced on 13 May 2020. As such twelve months of data is not currently available for this six-monthly compliance report.

The combined rolling average for the first six months of monitoring is shown in tables and charts provided in Appendix A.

The combined rolling average is below the annual average criteria for PM<sub>2.5</sub>, PM<sub>10</sub> and NO<sub>2</sub>.

#### 4.2.2 24-hour exceedances

##### 4.2.2.1 PM<sub>2.5</sub> Monitoring

A summary of the exceedances of the 25 µg/m<sup>3</sup>/day limit recorded during the reporting period is provided in Table 4-2. The table includes the 24-hour average for PM<sub>2.5</sub> recorded at the Liverpool monitoring station for comparison and includes analysis of the exceedance.

##### 4.2.2.2 PM<sub>10</sub> Monitoring

A summary of the exceedances of the 50 µg/m<sup>3</sup>/day limit recorded during the reporting period is provided in Table 4-3. The table includes the 24-hour average for PM<sub>10</sub> recorded at the Liverpool monitoring station for comparison and includes analysis of the exceedance.

Table 4-2: Summary of exceedances of the PM<sub>2.5</sub> 25 µg/m<sup>3</sup>/day limit

Date of exceedance	AQM01	AQM02	AQM03	AQM04	Liverpool 24-hour average <sup>1</sup>	Analysis of exceedance	Train operation
11/06/2020		68.8	37.9		8.7	Analysis of monitoring data identified that that the high 24-hour average correlated to the higher PM <sub>2.5</sub> readings that occurred between 12am and 7am.	No trains operated on this day.
14/06/2020		27.8			12.8	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>2.5</sub> readings that occurred between 12am and 8am.	No trains operated on this day.
11/07/2020		26.5	35.4	38.0	20.5	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>2.5</sub> readings that occurred between 7pm and 7am.	No trains operated on this day.
2/07/2020			27.0		13.8	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>2.5</sub> readings that occurred between 12am and 7am.	Train exited MLP Precinct East at 3:34 PM.
25/07/2020			39.0		21.1	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>2.5</sub> readings that occurred between 6pm and 7am.	Train entered MLP Precinct East at 2:25 AM and exited at 11:27 PM.
26/07/2020		25.7	29.9		7.7	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>2.5</sub> readings that occurred between 12am and 6am.	No trains operated on this day.
5/09/2020			46.2		11.5	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>2.5</sub> readings that occurred between 12am and 6am.	No trains operated on this day.

<https://www.environment.nsw.gov.au/topics/air/monitoring-air-quality/sydney/monitoring-stations/liverpool>

<sup>1</sup> The 24-hour average is the average of the 1-hour averages recorded for the day (i.e. between 01:00 and 24:00)

Table 4-3: Summary of exceedances of the PM<sub>10</sub> 50µg/m<sup>3</sup>/day limit

Date of exceedance	AQM01	AQM02	AQM03	AQM04	Liverpool 24-hour average <sup>2</sup>	Analysis of exceedance	Train operation
11/06/2020	79.4	291.3	167.5		12.8	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 12am and 8am.	No trains operated on this day.
12/06/2020		150.0	67.7		16.0	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 7pm and 10pm.	No trains operated on this day.
13/06/2020	51.3	99.4	113.6		16.9	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred in either night or early morning periods.	No trains operated on this day.
14/06/2020		62.1			13.8	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 12am and 8am.	No trains operated on this day.
20/06/2020			82.1		19.0	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 12am and 8am.	Train exited MLP Precinct East at 6:46 PM.
29/06/2020			101.2		13.3	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred in the night and early morning periods before 8am.	Train entered MLP Precinct East at 3:11 PM and exited at 7:41 PM.
30/06/2020			85.7		26.2	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred in either the night or early morning periods before 8am.	Train entered MLP Precinct East at 11:39 AM.

<sup>2</sup> The 24-hour average is the average of the 1-hour averages recorded for the day (i.e. between 01:00 and 24:00)

Date of exceedance	AQM01	AQM02	AQM03	AQM04	Liverpool 24-hour average <sup>2</sup>	Analysis of exceedance	Train operation
10/07/2020			84.6		25.2	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred in either the night or early morning periods before 8am.	A train exited MLP Precinct East at 4:18 AM. Train also entered at 9:26 AM and exited 6:06 PM.
11/07/2020		52.2	164.2	97.6	21.5	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred in the night and early morning periods before 8am.	No trains operated on this day.
12/07/2020		90.7	122.3		13.0	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 12am and 6am.	No trains operated on this day.
13/07/2020			85.0		11.0	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 3am and 8am.	Train entered MLP Precinct East at 4:32 AM and exited at 2:15 PM.
25/07/2020			212.5		23.9	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred in the night and early morning periods before 8am.	Train entered MLP Precinct East at 2:25 AM and exited at 11:28 PM.
26/07/2020			135.0		7.5	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 12am and 7am.	No trains operated on this day.
02/08/2020			60.7		24.0	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 12am and 8am.	Train entered MLP Precinct East at 11:13 AM and exited 3:16 PM.
03/08/2020			69.5		35.6	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 12am and 1am.	Train exited the MLP Precinct East at 2:15 PM.

Date of exceedance	AQM01	AQM02	AQM03	AQM04	Liverpool 24-hour average <sup>2</sup>	Analysis of exceedance	Train operation
08/08/2020			80.5		8.5	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 1am and 7am.	No trains operated on this day.
05/09/2020	55.0	170.9	257.7		16.5	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 12am and 7am.	No trains operated on this day.
13/09/2020			59.8		19.4	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 1am and 6am.	No trains operated on this day.
08/10/2020	68.1	92.1	103.6	112.0	14.6	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 4am and 7am.	No trains operated on this day.
13/10/2020			103.6		24.4	Analysis of monitoring data identified that that the high 24-hour average correlated to higher PM <sub>10</sub> readings that occurred between 2am and 7am.	No trains operated on this day.

<https://www.environment.nsw.gov.au/topics/air/monitoring-air-quality/sydney/monitoring-stations/liverpool>

### 4.2.3 1 hour exceedance

No 1 hour criteria exceedances occurred during the reporting period for NO<sub>2</sub>.

## 4.3 Complaints

Two complaints in relation air quality were received in the reporting period. These complaints and follow up actions undertaken are summarised in Table 4-4.

Table 4-4: Complaints

Date of complaint	Complainant	Nature of complaint
20/10/2020	CCC member	A CCC member complained about dust coming up from the northern end of MPW. The project team investigated the complaint and informed the CCC member they could not conclusively identify any work that caused the dust complaint reported. The project team organised additional street sweeping and dust suppression vehicles to mitigate any possible dust issues.
15/09/2020	Community member via DPIE	A community member complained via DPIE about rubbish and sand on Moorebank Avenue. The project team organised additional street sweeping and dust suppression.

A review of the PM<sub>2.5</sub>, PM<sub>10</sub> and NO<sub>2</sub> data on the 20/10/2020 and 15/09/2020 did not identify any exceedances of the respective 24 average criteria.

## 4.4 Ad-hoc monitoring

No ad-hoc monitoring was undertaken between May 13 and October 31.

## 4.5 Conclusion

This six-monthly operational air quality report for the reporting period notes the following:

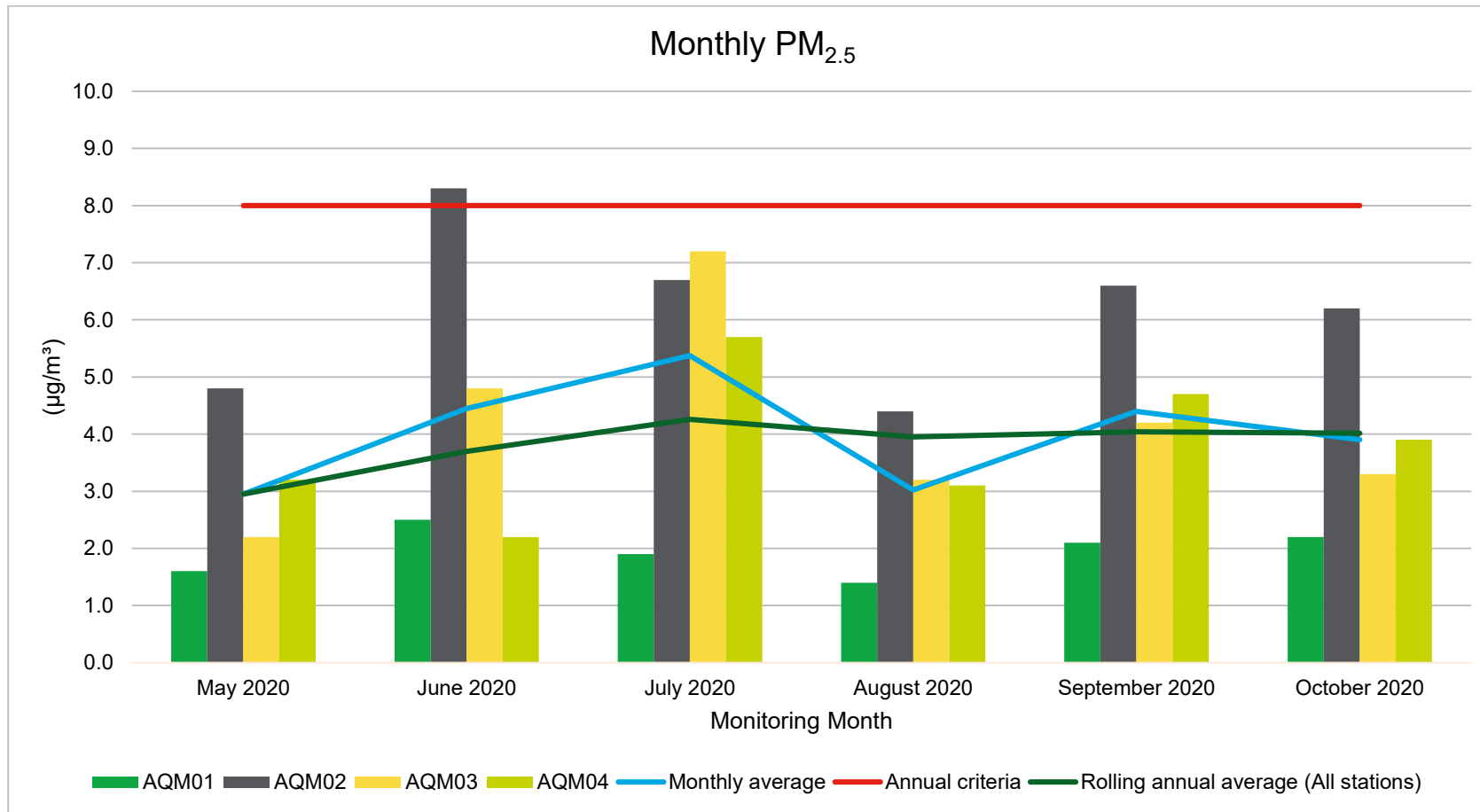
- No exceedances of the annual average criteria has occurred for either PM<sub>2.5</sub>, PM<sub>10</sub> or NO<sub>2</sub>
- No exceedances of the 1-hour average criteria or annual average criteria has occurred for NO<sub>2</sub>
- Exceedances of the 24-hour average criteria occurred for PM<sub>2.5</sub> and PM<sub>10</sub>
  - There were for seven exceedances (out of 172 days) of the PM<sub>2.5</sub> 24-hour average criteria during the reporting period (about 4%).
  - There were 20 exceedances (out of 172 days) of the PM<sub>10</sub> 24-hour average criteria during the reporting period (about 12%).
  - Most of the exceedances occurred in June and July 2020.
  - The exceedances correlate to higher readings in the night and early morning periods.
  - Investigations at MLP Precinct East upon receipt of the exceedances has not identified significant dust or emissions issues from MLP Precinct East. Alerts received were also communicated to MPW Stage 2 site teams (see next bullet point).
  - Most of these exceedances were recorded at AQM03 which is the monitor located on the western boundary of MPW Stage 2. MPW Stage 2 has approval to receive imported material outside of standard construction hours and has been undertaking this activity during the reporting period.

- AQM01 is the monitor located closest to the MLP Precinct East rail siding. As shown in Table 4-2 and Table 4-3, exceedances recorded at AQM01 occurred when there were no trains operating, and as such it is unlikely that operations at MLP Precinct East are a contributing factor causing the identified exceedances at AQM01, and similarly at AQM03 and AQM04.
- Exceedances at AQM02 predominantly occurred in June and July. Exceedance causes are unknown as Warehouse 3 and Warehouse 4 are sealed and limited night works have been undertaken.

## APPENDIX A

*Rolling particulate data (PM<sub>2.5</sub>)*

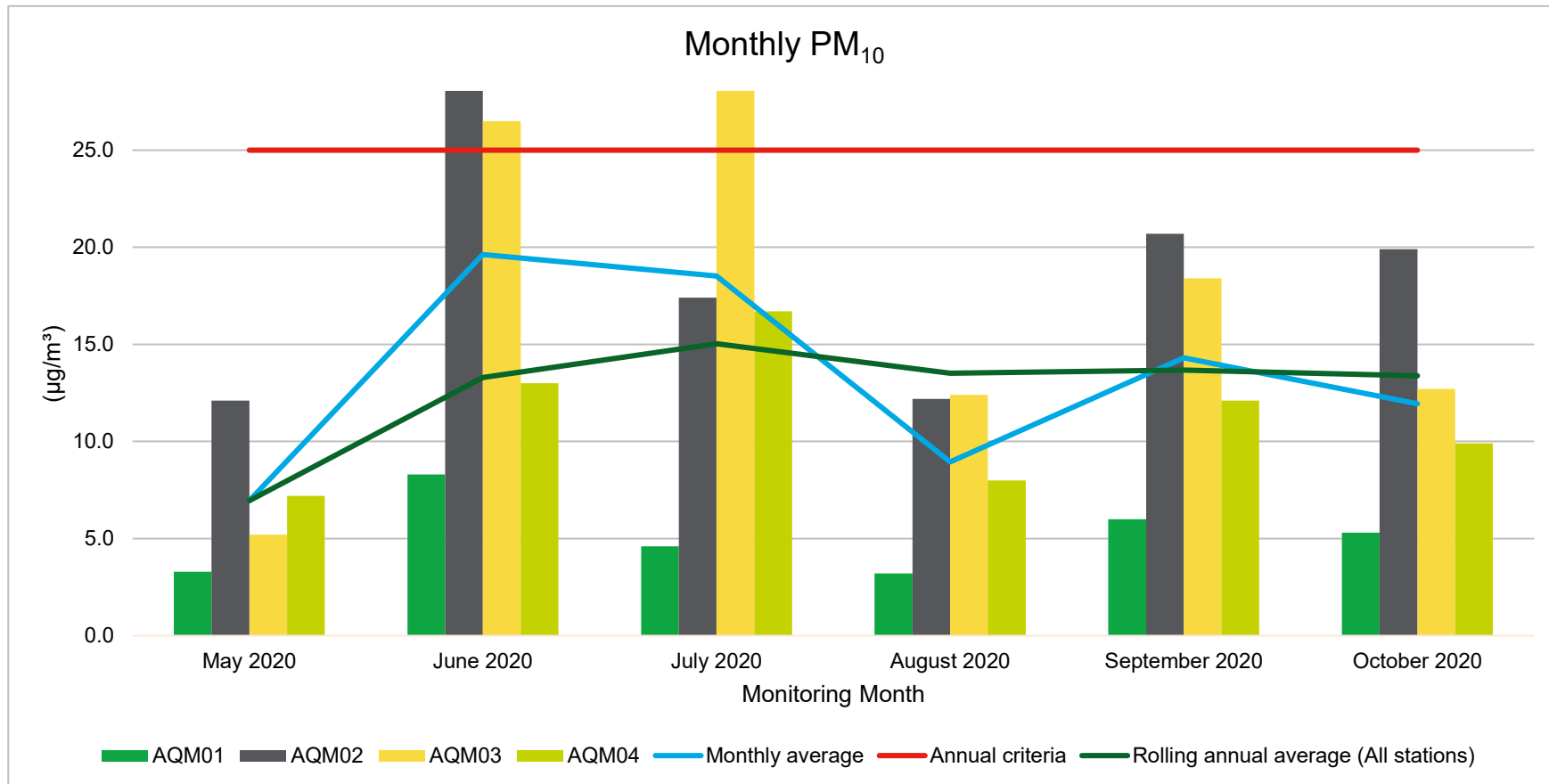
Month	Average AQM01 (µg/m <sup>3</sup> )	Average AQM02 (µg/m <sup>3</sup> )	Average AQM03 (µg/m <sup>3</sup> )	Average AQM04 (µg/m <sup>3</sup> )	Months Average All stations (µg/m <sup>3</sup> )	Rolling annual average All stations (µg/m <sup>3</sup> )	Annual average criteria (µg/m <sup>3</sup> )	Comments
May 2020	1.6	4.8	2.2	3.2	3.0	3.0	8	No exceedance of annual average criteria
June 2020	2.5	<b>8.3</b>	4.8	2.2	4.5	3.7	8	Individually, PM <sub>2.5</sub> in June 2020 at AQM02 was higher than annual average criteria, however across the reporting period, AQM02 was below the annual average criteria.
July 2020	1.9	6.7	7.2	5.7	5.4	4.3	8	No exceedance of annual average criteria
August 2020	1.4	4.4	3.2	3.1	3.0	4.0	8	No exceedance of annual average criteria
September 2020	2.1	6.6	4.2	4.7	4.4	4.0	8	No exceedance of annual average criteria
October 2020	2.2	6.2	3.3	3.9	3.9	4.0	8	No exceedance of annual average criteria
All months	2.0	6.2	4.2	3.8	4.0	4.0	8	No exceedance of annual average criteria



Monthly PM<sub>2.5</sub>

Rolling annual particulate data (PM<sub>10</sub>)

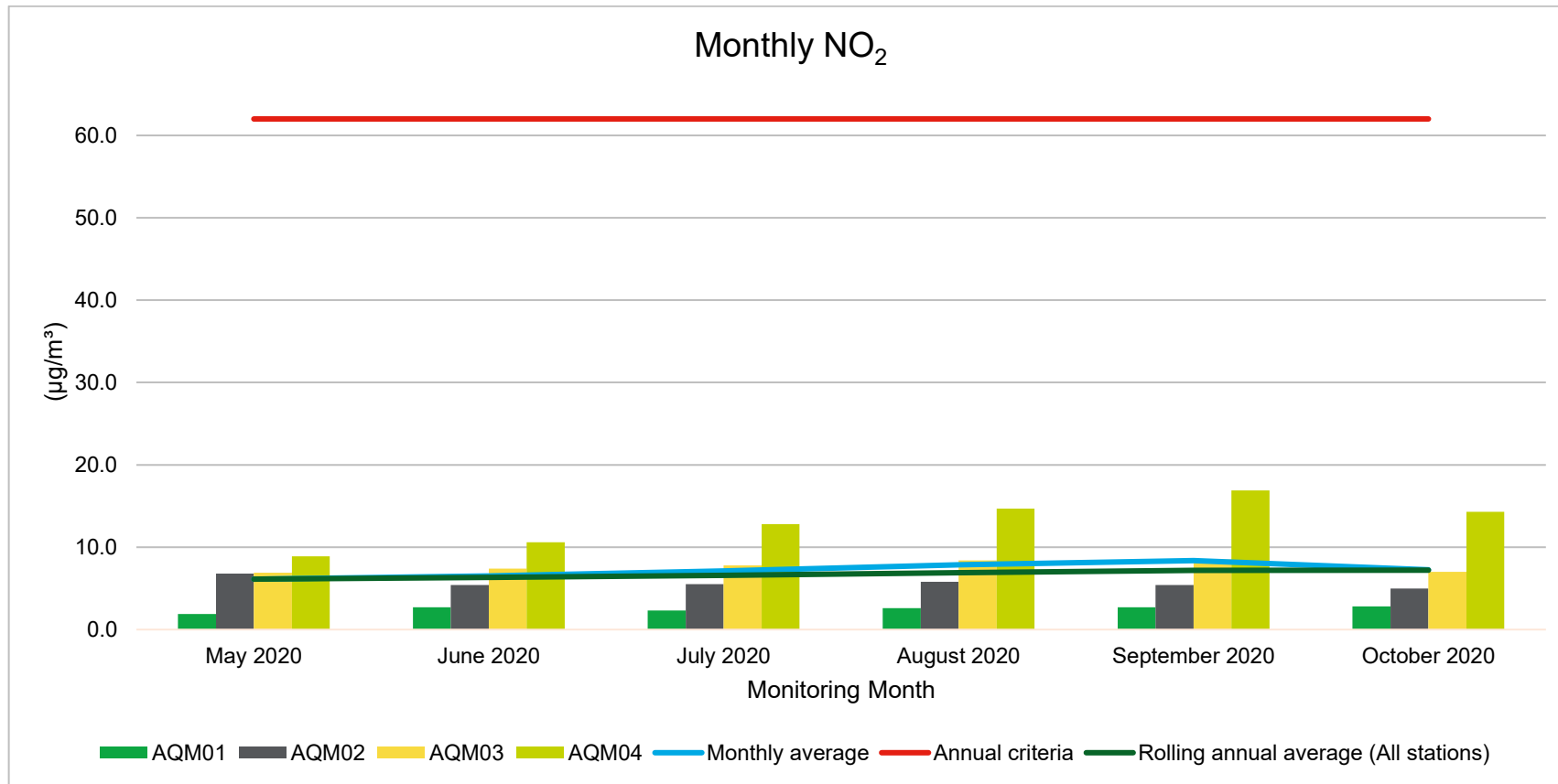
Month	Average AQM01 (µg/m <sup>3</sup> )	Average AQM02 (µg/m <sup>3</sup> )	Average AQM03 (µg/m <sup>3</sup> )	Average AQM04 (µg/m <sup>3</sup> )	Monthly Average (µg/m <sup>3</sup> )	Rolling annual average All stations (µg/m <sup>3</sup> )	Annual average criteria (µg/m <sup>3</sup> )	Comments
May 2020	3.3	12.1	5.2	7.2	7.0	7.0	25	No exceedance of annual average criteria
June 2020	8.3	<b>30.7</b>	<b>26.5</b>	13.0	19.6	13.3	25	Individually, PM <sub>2.5</sub> in June 2020 at AQM02 and AQM03 was higher than annual average criteria, however across the reporting period, AQM02 and AQM03 were below the annual average criteria.
July 2020	4.6	17.4	<b>35.4</b>	16.7	18.5	15.0	25	Individually, PM <sub>2.5</sub> in June 2020 was higher than annual average criteria, however across the reporting period, AQM02 was below the annual average criteria.
August 2020	3.2	12.2	12.4	8.0	9.0	13.5	25	No exceedance of annual average criteria
September 2020	6.0	20.7	18.4	12.1	14.3	13.7	25	No exceedance of annual average criteria
October 2020	5.3	19.9	12.7	9.9	12.0	13.4	25	No exceedance of annual average criteria
All months	5.1	18.8	18.4	11.2	13.4	13.4	25	No exceedance of annual average criteria



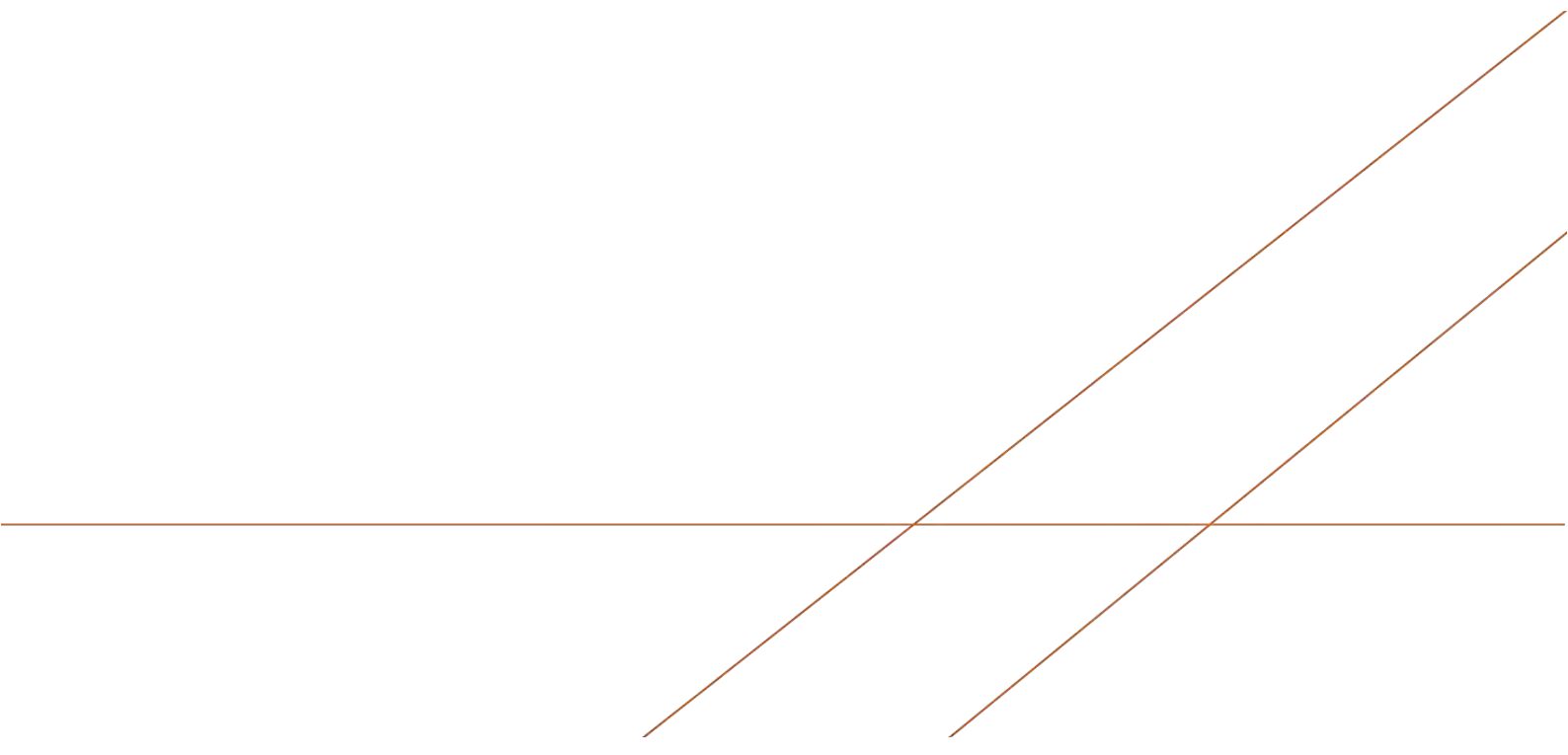
Monthly PM<sub>10</sub>

Rolling annual particulate data (NO<sub>2</sub>)

Month	Average AQM01 (ppb)	Average AQM02 (ppb)	Average AQM03 (ppb)	Average AQM04 (ppb)	Monthly Average (ppb)	Rolling annual average All stations (µg/m <sup>3</sup> )	Annual average criteria (µg/m <sup>3</sup> )	Comments
May 2020	1.9	6.8	6.9	8.9	6.1	6.1	62	No exceedance of annual average criteria
June 2020	2.7	5.4	7.4	10.6	6.5	6.3	62	No exceedance of annual average criteria
July 2020	2.3	5.5	7.8	12.8	7.1	6.6	62	No exceedance of annual average criteria
August 2020	2.6	5.8	8.4	14.7	7.9	6.9	62	No exceedance of annual average criteria
September 2020	2.7	5.4	8.5	16.9	8.4	7.2	62	No exceedance of annual average criteria
October 2020	2.8	5.0	7.0	14.3	7.3	7.2	62	No exceedance of annual average criteria
All months	2.5	5.7	7.7	13.0	7.2	7.2	62	No exceedance of annual average criteria



Monthly NO<sub>2</sub>



# MOOREBANK LOGISTIC PARK - PRECINCT EAST

## Operational Noise Monitoring for Moorebank Logistic Park - Q2 2020

22 July 2020

Tactical

TL116-05F04 Moorebank INP Monitoring Q2 2020 (r1).docx

## Document details

Detail	Reference
Doc reference:	TL116-05F04 Moorebank INP Monitoring Q2 2020 (r1).docx
Prepared for:	Tactical
Address:	Level 15, 124 Walker Street North Sydney NSW 2060
Attention:	Richard Mason

## Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
22.07.2020	Final	0	1	J. Liang	C. Weber	C. Weber

### Important Disclaimers:

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We have derived data in this report from information sourced from the Client (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination and re-evaluation of the data, findings, observations and conclusions expressed in this report.

We have prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

The information contained herein is for the purpose of acoustics only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics engineering including and not limited to structural integrity, fire rating, architectural buildability and fit-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.

External cladding disclaimer: No claims are made and no liability is accepted in respect of any external wall and/or roof systems (eg facade / cladding materials, insulation etc) that are: (a) not compliant with or do not conform to any relevant non-acoustic legislation, regulation, standard, instructions or Building Codes; or (b) installed, applied, specified or utilised in such a manner that is not compliant with or does not conform to any relevant non-acoustic legislation, regulation, standard, instructions or Building Codes.

## Contents

1	Introduction	1
1.1	Project overview	1
1.2	Scope of assessment	1
2	Summary of noise objectives	3
3	Measurement methodology and equipment	4
4	Measurement results	5
4.1	Measurement locations and time periods	5
4.2	Measurement results	6
5	Discussion	9
6	Conclusion	10
APPENDIX A	Description of technical terms	11
APPENDIX B	Detailed measurement location descriptions	12
B.1	M1 – Wattle Grove measurement location	12
B.2	M2 - Wattle Grove North measurement location	14
B.3	M3 – Casula measurement location	16
B.4	M4 - Glenfield measurement location	18

### List of tables

Table 1	MPE Stage 1 and 2 noise limits, dB(A)	3
Table 2	Measurement equipment	4
Table 3	Sensitive receivers and approximate distance from MLP East Precinct	5
Table 4	Attended measurement periods	5
Table 5	Attended noise measurement results	7

### List of figures

Figure 1	MLP East Precinct and nearest sensitive receivers	1
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# 1 Introduction

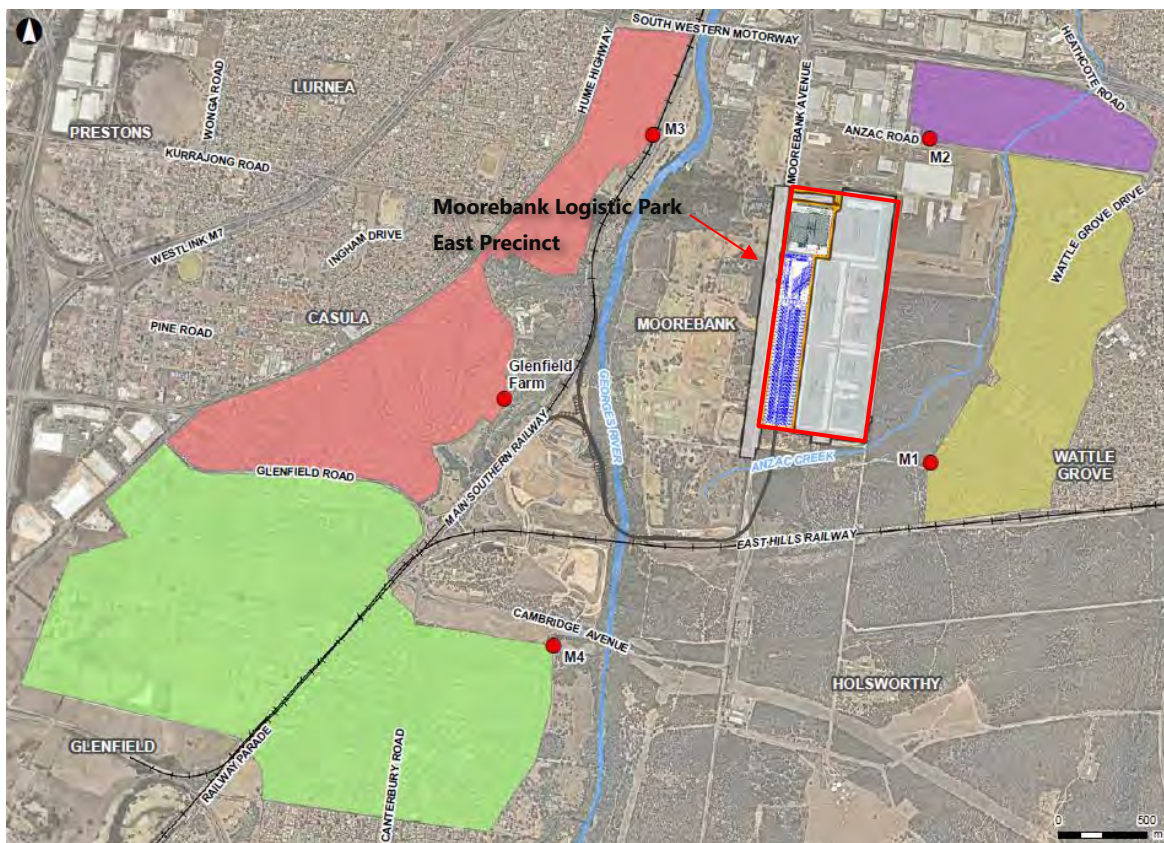
## 1.1 Project overview

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stages 1 and 2 of the Moorebank Precinct East (MPE) Project (SSD 6766 and SSD 7628 respectively), which together comprise the two stages of development under the MPE Concept Approval (MP10\_0193).

This operational noise monitoring has been conducted to assess noise impacts during operation of the east precinct for the second quarter in 2020.

The location of the Moorebank Logistics Park (MLP) East Precinct in relation to the nearest representative receivers (M1 to M4 and Glenfield Farm) is illustrated in Figure 1.

Figure 1 MLP East Precinct and nearest sensitive receivers



## 1.2 Scope of assessment

Renzo Tonin & Associates (NSW) Pty Ltd has been engaged by Tactical to perform attended noise measurements for the purpose of assessing compliance with the approval conditions. These

measurements have been performed, consistent with the requirements of the NSW *Industrial Noise Policy* (EPA, 2000) and the Operational Noise and Vibration Management Plan<sup>1</sup>.

Airborne noise measurements were performed at the four potentially most affected residential receivers in the vicinity of the MLP. The representative receivers are located in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North (see Figure 1).

Daytime construction noise is currently occurring at the MLP site. Construction noise has been excluded from the assessment.

A description of technical terms used within this report is provided in Appendix A.

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<sup>1</sup> OPERATIONAL NOISE AND VIBRATION MANAGEMENT PLAN - Moorebank Logistics Park – East Precinct (Revision 010 dated 24/9/2019)

## 2 Summary of noise objectives

Stages 1 and 2 of the MPE Project was approved under State Significant Development (SSD) Approvals 6766 and 7628, respectively.

The noise assessments for Stage 1 and 2 were prepared and assessed in accordance with the requirements of the NSW *Industrial Noise Policy* (EPA, 2000). However, the Determination Report for MPE Stage 2<sup>2</sup> identified that the recommended noise limits at Wattle Grove be amended to reflect the values derived in accordance with the *Noise Policy for Industry* (EPA, 2017).

A summary of the MPE Stage 1 and 2 noise limits from SSD 7628 is provided in Table 1.

**Table 1 MPE Stage 1 and 2 noise limits, dB(A)**

Sensitive receiver	Day <sup>1</sup>	Evening <sup>1</sup>	Night <sup>1</sup>	Night <sup>1</sup>
	L <sub>Aeq, 15 minute</sub>	L <sub>Aeq, 15 minute</sub>	L <sub>Aeq, 15 minute</sub>	L <sub>A1, 1 minute</sub>
Casula	35	35	35	52
Glenfield	35	35	35	52
Wattle Grove	35	35	35	52
Casula	35	35	35	52
Wattle Grove North <sup>2</sup>	35	35	35	52

Notes:

To determine compliance with the L<sub>Aeq,15 minute</sub> noise limits, noise from the development is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy must also be applied to the measured noise levels where applicable.

To determine compliance with the L<sub>A1,1 minute</sub> noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).

The noise emission limits identified above apply under meteorological conditions of:

- (i) wind speeds of up to 3 m/s at 10 metres above ground level; or
- (ii) 'F' atmospheric stability class.

Note 1: In accordance with the INP, day is the period from 7:00 am to 6:00 pm Monday to Saturday; or 8:00 am to 6:00 pm on Sundays and public holidays; evening is the period from 6:00 pm to 10:00 pm; and night is the remaining periods.

Note 2: Wattle Grove North receiver is not included in SSD 7628, but is listed as a sensitive receiver in the Operational Noise and Vibration Management Plan (Section 3.3).

<sup>2</sup> NSW Planning Assessment Commission Determination Report – Moorebank Intermodal Terminal, Stage 2, Moorebank Precinct East (SSD 7628).

### 3 Measurement methodology and equipment

All noise measurements were performed with a Type 1 sound level meter and Type 1 microphone calibrator. The measurement equipment calibration certificates were current at the time of the measurements. Before and after each series of measurements, the calibration of the sound level meter was verified using a reference calibration of 94 dB at 1 kHz. The difference between pre- and post-calibration levels was within 0.5 dB for all measurements.

Airborne noise measurements were performed in accordance with the requirements of the *NSW Industrial Noise Policy (EPA 2000)*.

A summary of measurement equipment is provided in Table 2.

**Table 2 Measurement equipment**

Description	Make	Model	Serial No	Last Date Calibrated
Type 1 sound level meter	NTi	XL2	A2A-07815-E0	09/11/2018
Sound level meter calibrator	Brueel & Kjaer	4231	3017534	24/02/2020

## 4 Measurement results

### 4.1 Measurement locations and time periods

15-hours of on-site attended measurements were performed between 2 July and 8 July 2020. The measurements were performed during representative daytime (7am to 6pm), evening (6pm to 10pm) and night-time (10pm to 7am) periods, consistent with the approved 24-hour operations.

Prior to the measurements, it was confirmed that the MLP site was operational to ensure that the measurements were representative of current options. It is understood that the facility is not currently operating at full capacity.

A summary of the attended measurement locations and the approximate distances to the MLP East Precinct is provided in Table 3. Additional details are provided in Appendix B.

A summary of the attended measurement periods is provided in Table 4.

**Table 3 Sensitive receivers and approximate distance from MLP East Precinct**

Measurement locations	Approximate distance (m) from MLP East Precinct
M1 - Wattle Grove	770
M2 - Wattle Grove North	1,050
M3 - Casula	960
M4 - Glenfield	1,250

**Table 4 Attended measurement periods**

Location	Measurement period 1	Measurement period 2
<b>Measurements during 7am to 6pm daytime period – 2 July 2020</b>		
M1 - Wattle Grove	10:52am to 11:24am (Note 2)	2:21pm to 2:51pm (Note 2)
M2 - Wattle Grove North	11:40am to 12:11pm (Note 3)	3:03pm to 3:35pm (Note 3)
M3 - Casula	12:25pm to 12:56pm (Note 4)	3:45pm to 4:17pm (Note 4)
M4 - Glenfield	1:27pm to 1:59pm (Note 5)	4:38pm to 5:09pm (Note 5)
<b>Measurements during 6pm to 10pm evening period – 6 July 2020</b>		
M1 - Wattle Grove	7:18pm to 7:49pm (Note 2)	-
M2 - Wattle Grove North	7:59pm to 8:29pm (Note 3)	-
M3 - Casula	8:39pm to 9:10pm (Note 4)	-
M4 - Glenfield	9:28pm to 9:59pm (Note 5)	-
<b>Measurements during 10pm to 7am night-time period – 6-8 July 2020</b>		
M1 - Wattle Grove	10:53pm to 11:25pm (Note 1)	5:16am to 5:51am (Note 1)
M2 - Wattle Grove North	11:34pm to 12:04pm (Note 3)	6:00am to 6:31am (Note 3)
M3 - Casula	12:13pm to 12:44pm (Note 4)	6:39am to 6:54am (Note 4)
M4 - Glenfield	10:00pm to 10:30pm (Note 5)	-

Location	Measurement period 1	Measurement period 2
Note 1: Measurements performed at 18 Corryton Ct		
Note 2: Measurements performed at 25 Yallum Ct		
Note 3: Measurements performed at 39 Anzac Rd		
Note 4: Measurements performed at St Andrews Park		
Note 5: Measurements performed at 26 Goodenough St		

## 4.2 Measurement results

Results from the attended noise measurements at all measurement locations is provided in Table 5. All noise measurements were performed over 15-minute measurement durations in accordance with the requirements of the approval conditions and the INP.

Table 5 Attended noise measurement results

ID	Address	Assessment period	L <sub>Aeq, 15minute</sub> noise limit, dB(A)	L <sub>A1, 1-minute</sub> noise limit, dB(A)	Measurement period	Measured noise levels, dB(A)		Estimated MLP noise contribution, dB(A)		Comments and measured L <sub>AFmax</sub> noise levels from typical events	MLP Noise Levels Comply?
						L <sub>Aeq, 15minute</sub>	L <sub>AF,90%</sub>	L <sub>Aeq, 15minute.</sub>	L <sub>AFmax</sub>		
<b>M1 - Wattle Grove</b>											
1	25 Yallum Ct.	Day	35	-	2/07/2020 10:52 11:08	51	47	Note 1	Note 1	Background noise dominated by noise from MLP East precinct construction activities: Construction 49-52dBA, bird 61-72dBA, Aircraft 54-60dBA, road traffic 51-52dBA, Nature 50-52dBA	Yes
2	25 Yallum Ct.	Day	35	-	2/07/2020 11:08 11:24	49	46	Note 1	Note 1	Background noise dominated by noise from MLP East precinct construction activities: Construction 49-52dBA, bird 65-69dBA, dog 50-55.5dBA, rail traffic 49-52dBA, Nature 47-51dBA	Yes
3	25 Yallum Ct.	Day	35	-	2/07/2020 14:21 14:36	51	48	Note 1	Note 1	Background noise dominated by noise from MLP East precinct construction activities: Construction 49-55dBA, bird 62-66dBA, rail traffic 51-52dBA, Nature 55-58dBA	Yes
4	25 Yallum Ct.	Day	35	-	2/07/2020 14:36 14:51	49	46	Note 1	Note 1	Background noise dominated by noise from MLP East precinct construction activities: Construction 49-54dBA, bird 57-60dBA, Aircraft 54-56dBA, rail traffic 51-52dBA	Yes
5	25 Yallum Ct.	Evening	35	-	6/07/2020 19:18 19:34	44	38	Note 1	Note 1	Background noise dominated by noise from road traffic on Wattle Grove Dr: Road traffic 41-48dBA, Rail traffic 49-52.8dBA, Dog 39-45dBA, Resident 40-43dBA, Nature 38-39dBA	Yes
6	25 Yallum Ct.	Evening	35	-	6/07/2020 19:34 19:49	44	38	Note 1	Note 1	Background noise dominated by noise from road traffic on Wattle Grove Dr: Road traffic 45-48dBA, Rail traffic 50-55dBA, Dog 39-45dBA, Resident 40-41dBA, Nature 38-39dBA	Yes
7	25 Yallum Ct.	Night	35	52	6/07/2020 22:53 23:08	40	34	Note 1	Note 1	Background noise dominated by noise from MLP East precinct construction activities: Construction 38-39dBA, Rail traffic 50-53dBA, Aircraft 40-42dBA, Nature 35-37dBA, Wattle Grove Dr: 40-41dBA	Yes
8	18 Corryton Ct.	Night	35	52	6/07/2020 23:10 23:25	40	34	Note 1	Note 1	Background noise dominated by noise from MLP East precinct construction activities: Construction 38-46dBA, Rail traffic 50-53dBA, Nature 35-38dBA, Road traffic Wattle Grove Dr: 40-42dBA	Yes
9	18 Corryton Ct.	Night	35	52	8/07/2020 05:16 05:32	37	35	Note 1	Note 1	Background noise dominated by noise from MLP East precinct construction activities: Construction 35-45dBA, Rail traffic 46-47dBA, Nature 35-36dBA	Yes
10	18 Corryton Ct.	Night	35	52	8/07/2020 05:33 05:51	42	37	Note 1	Note 1	Background noise dominated by noise from MLP East precinct construction activities: Construction 38-62dBA, Rail traffic 46-47dBA, Nature 35-36dBA	Yes
<b>M2 - Wattle Grove North</b>											
11	39 Anzac Rd	Day	35	-	2/07/2020 11:40 11:55	69	55	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 75-82dBA, Residential 60-62dBA, Bird 62-64dBA	Yes
12	39 Anzac Rd	Day	35	-	2/07/2020 11:56 12:11	69	56	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 75-82dBA	Yes
13	39 Anzac Rd	Day	35	-	2/07/2020 15:03 15:20	72	59	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 80-86dBA, Truck loading 60-62dBA, Siren 80-88dBA, Bird 65-62dBA	Yes
14	39 Anzac Rd	Day	35	-	2/07/2020 15:20 15:35	71	58	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 77-85dBA, Bird 62-60dBA	Yes
15	39 Anzac Rd	Evening	35	-	6/07/2020 19:59 19:14	67	50	Note 1	Note 1	Background noise dominated by noise from Anzac Rd" Road traffic 81-82dBA	Yes
16	39 Anzac Rd	Evening	35	-	6/07/2020 20:14 20:29	66	48	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 78-83dBA, Aircraft 47-51dBA	Yes
17	39 Anzac Rd	Night	35	52	6/07/2020 23:34 23:49	62	42	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 80-81dBA, Bird 60-62dBA	Yes
18	39 Anzac Rd	Night	35	52	6/07/2020 23:49 00:04	62	40	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 78-83dBA, Moorebank Ave traffic 47-48dBA	Yes
19	39 Anzac Rd	Night	35	52	8/07/2020 06:00 06:15	70	50	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 78-88dBA, Moorebank Ave traffic 47-50dBA	Yes
20	39 Anzac Rd	Night	35	52	8/07/2020 06:16 06:31	70	52	Note 1	Note 1	Background noise dominated by noise from Anzac Rd: Road traffic 78-83dBA, Moorebank Ave traffic 47-49dBA	Yes
<b>M3 - Casula</b>											
21	St Andrews Park	Day	35	-	2/07/2020 12:25 12:40	61	53	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 53-55dBA, Loco 78-79dBA, Rail traffic 72-73dBA, Children playing 51-56dBA, Residential 56-56dBA	Yes
22	St Andrews Park	Day	35	-	2/07/2020 12:41 12:56	60	53	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 54-55dBA, Loco 79-70dBA, Rail traffic 68-69dBA, Residential 54-57dBA	Yes
23	St Andrews Park	Day	35	-	2/07/2020 15:45 16:00	60	49	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 51-56dBA, Loco 70-73dBA, Rail traffic 67-75dBA, Residential 60-64dBA	Yes
24	St Andrews Park	Day	35	-	2/07/2020 16:01 16:17	59	50	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 50-55dBA, Rail traffic 75-77dBA, Children playing 62-63dBA	Yes
25	St Andrews Park	Evening	35	-	6/07/2020 20:39 20:54	59	47	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 51-53dBA, Rail traffic 58-70dBA	Yes
26	St Andrews Park	Evening	35	-	6/07/2020 20:55 21:10	56	44	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 52-54dBA, Rail traffic 67-70dBA	Yes
27	St Andrews Park	Night	35	52	7/07/2020 00:13 00:28	47	41	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 44-45dBA, Rail traffic 70-72dBA, Aircraft 41-42dBA	Yes
28	St Andrews Park	Night	35	52	7/07/2020 00:29 00:44	57	48	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 52-54dBA, Rail traffic 67-70dBA, Construction 45-46dBA	Yes
29	St Andrews Park	Night	35	52	8/07/2020 06:39 06:54	57	47	Note 1	Note 1	Background noise dominated by noise from M5 Motorway: Road traffic 47-55dBA, Rail traffic 73-74dBA	Yes

ID	Address	Assessment period	L <sub>Aeq, 15minute</sub> noise limit, dB(A)	L <sub>A1, 1-minute</sub> noise limit, dB(A)	Measurement period	Measured noise levels, dB(A)		Estimated MLP noise contribution, dB(A)		Comments and measured L <sub>AFmax</sub> noise levels from typical events	MLP Noise Levels Comply?
						L <sub>Aeq, 15minute</sub>	L <sub>AF,90%</sub>	L <sub>Aeq, 15minute.</sub>	L <sub>AFmax</sub>		
<b>M4 – Glenfield</b>											
30	26 Goodenough St	Day	35	-	2/07/2020 13:27 13:42	52	48	Note 1	Note 1	Background noise dominated by noise from Cambridge Ave: Road traffic 53-54dBA, Bird 55-64dBA, High Voltage power line buzzing 54-55dBA	Yes
31	26 Goodenough St	Day	35	-	2/07/2020 13:44 13:59	55	51	Note 1	Note 1	Background noise dominated by noise from Cambridge Ave: Road traffic 53-55dBA, Bird 54-69dBA, Rail traffic 53-54dBA, High Voltage power line buzzing 54-55dBA	Yes
32	26 Goodenough St	Day	35	-	2/07/2020 16:38 16:53	53	50	Note 1	Note 1	Background noise dominated by noise from Cambridge Ave: Road traffic 53-54dBA, Bird 53-64dBA, Aircraft 54-55dBA, High Voltage line buzzing 54-55dBA	Yes
33	26 Goodenough St	Day	35	-	2/07/2020 16:54 17:09	53	50	Note 1	Note 1	Background noise dominated by noise from Cambridge Ave: Road traffic 53-55dBA, Bird 55-60dBA, High Voltage power line buzzing 54-55dBA	Yes
34	26 Goodenough St	Evening	35	52	6/07/2020 21:28 21:43	52	47	Note 1	Note 1	Background noise dominated by noise from Cambridge Ave: Road traffic 55-60dBA, Rail traffic 45-47, Dog 48-49dBA	Yes
35	26 Goodenough St	Evening	35	52	6/07/2020 21:44 21:59	50	45	Note 1	Note 1	Background noise dominated by noise from Cambridge Ave: Road traffic 56-60dBA, Rail traffic 45-47dBA	Yes
36	26 Goodenough St	Night	35	52	6/07/2020 22:00 22:15	49	45	Note 1	Note 1	Background noise dominated by noise from Cambridge Ave: Road traffic 52-57dBA, Rail traffic 45-46dBA, Dog 45-52dBA	Yes
37	26 Goodenough St	Night	35	52	6/07/2020 22:15 22:30	49	45	Note 1	Note 1	Background noise dominated by noise from Cambridge Ave: Road traffic 52-62dBA, Rail traffic 46-50dBA	Yes

Note 1: Since noise levels from the MLP were not audible during the measurement period, it was not possible to estimate the MLP noise contribution

## 5 Discussion

Based on the attended measurement results in Section 4, it can be seen that the measured  $L_{Aeq(15\text{minute})}$  noise levels at all locations and during all measurement periods were above the 35 dB(A) noise limit.

At Location M1 (Wattle Grove), the closest measurement location to the MLP, the measured  $L_{Aeq(15\text{minute})}$  noise level was 37 dB(A) between 5:16am and 5:32am. During this quietest period, MLP noise emissions were not audible.

In all cases, the measured  $L_{Aeq(15\text{minute})}$  noise levels were dominated by extraneous noise sources apart from the MLP operations. Noise sources from MLP operations were not audible during any of the measurement periods at all four representative measurement locations. Since MLP noise emissions were not audible, it was not possible to estimate the industrial noise contribution from the MLP facility.

Based on the results of the attended noise measurements performed during the day, evening and night-time periods between 2 July and -7 July 2020, it is concluded that the current noise levels comply with the operational noise limits in SSD 7628.

## 6 Conclusion

This report presents the results of airborne noise measurements at four representative receivers in proximity to the Moorebank Logistics Park (MLP). The measurements were performed in accordance with the requirements of the NSW *Industrial Noise Policy* (INP) the Operational noise and vibration management plan to verify compliance with the noise limits in SSD approval 7628. The measurements were performed during the daytime, evening and night-time periods between 2 July and -7 July 2020.

At all measurement locations, the measured  $L_{Aeq(15\text{minute})}$  noise levels were dominated by extraneous noise sources apart from the MLP operations. Noise sources from MLP operations were not audible during any of the measurement periods. Since MLP noise emissions were not audible, it was not possible to estimate the industrial noise contribution from the MLP facility.

Based on the results of the attended noise measurements, and given that MLP noise levels were not audible at any of the measurement locations, it is concluded that the current noise levels comply with the operational noise limits in SSD 7628.

## APPENDIX A Description of technical terms

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
LMax	The maximum sound pressure level measured over a given period.
LMin	The minimum sound pressure level measured over a given period.

## APPENDIX B Detailed measurement location descriptions

### B.1 M1 – Wattle Grove measurement location

An aerial photo of Wattle Grove measurement location is provided in Figure B1.

Figure B1 Wattle Grove measurement location



At the Wattle Grove location, noise measurements were performed at a free field measurement positions near the fence facing the facility. Two measurement positions were selected near Corryton Ct and Yallum Ct. At both positions, the microphone was positioned at a height of 1.5 m above ground level. The measurement locations are approximately 770 metres from the MLP. A picture of the measurement setup near Yallum Ct is provided in Figure B2.

Figure B2 25 Yallum Ct measurement location



## B.2 M2 - Wattle Grove North measurement location

An aerial photo of the Wattle Grove North measurement location is provided in Figure B3.

Figure B3 Wattle Grove North measurement location



At Wattle Grove North, noise measurements were performed at a free field measurement locations on both sides of Anzac Road. At both positions, the microphone was positioned at a height of 1.5 m above ground level. The measurement location is approximately 1050 meters from MLP. Pictures of the measurements setup near Anzac Rd are provided in Figure B4.

Figure B4 Anzac Road measurement locations



### B.3 M3 – Casula measurement location

An aerial photo of the Casula measurement locations is provided in B5.

Figure B5 Casula measurement location



At Casula, noise measurements were performed at a free field measurement location within St Andrews Park. The microphone was positioned at a height of 1.5 m above ground level. Measurements were performed at two locations due to safety considerations during the night-time measurements. The measurement location is approximately 960 meters from MLP. A picture of the measurement setup is provided in Figure B6.

Figure B6 St Andrews Park measurement locations



## B.4 M4 - Glenfield measurement location

An aerial photo of the Glenfield measurement locations is provided in Figure B7.

Figure B7 Glenfield measurement location



At Glenfield, noise measurements were performed at a free field measurement location at the eastern end of Goodenough St. At this position, the microphone was positioned at a height of 1.5 m above ground level. The measurement location is approximately 1250 meters from MLP. Pictures of the measurement setup are provided in Figure B8.

Figure B8 26 Goodenough Road measurement location



# MOOREBANK LOGISTIC PARK - PRECINCT EAST

## Container Noise Barrier Management Plan Measurements – September 2020

20 October 2020

Tactical Group

TL116-05F06 Container Noise Barrier Measurements (r1).docx

## Document details

Detail	Reference
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## Contents

1	Introduction	1
1.1	Project overview	1
2	Summary of noise objectives	3
2.1	Sensitive Receivers	3
2.2	Noise management criteria	3
3	Container noise barrier arrangement	6
4	Noise measurements	7
4.1	Noise measurement approach	7
4.2	Measurement equipment	7
4.3	Measurement methodology	8
5	Noise measurement results	10
5.1	Near-field locations	10
5.2	Far-field attended measurements at sensitive residential receivers	10
5.3	Far-field unattended noise measurements	11
5.4	Weather conditions	11
6	Noise modelling results	14
6.1	Overview of noise modelling	14
6.2	General modelling assumptions	14
6.3	Noise model predictions	14
7	Discussion	16
8	Conclusion	17
APPENDIX A	Glossary of terminology	18

## List of tables

Table 1	Sensitive receivers and approximate distance from MPE container stacking area	3
Table 2	Noise management criteria, dB(A)	4
Table 3	Container noise barriers arrangement	6
Table 4	Measurement equipment	8
Table 5	Summary of near-field noise measurement results	10
Table 6	Far-field unattended noise measurement results	11
Table 7	Summary of attended and unattended noise measurement results at the nearest sensitive residential receivers (far field)	12
Table 8	Predicted noise level at nearest residential receivers	15

## List of figures

Figure 1	MPE East Precinct, container noise barrier stacking area and nearest sensitive residential receivers	5
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Figure 2	Near-field measurement location	9
Figure 3	Near-field measurement setup	9

# 1 Introduction

## 1.1 Project overview

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stages 1 and 2 of the Moorebank Precinct East (MPE) Project (SSD 6766 and SSD 7628 respectively), which together comprise the two stages of development under the MPE Concept Approval (MP10\_0193).

This report has been prepared to address the requirements of Approval Condition F5A in State Significant Development (SSD) 6766. Specifically, this report includes noise measurement results performed to meet the requirements in clauses b), c) and d). The requirements of Condition F5A are copied verbatim below.

*F5A. The Applicant shall prepare and implement (following approval) a Container Noise Barrier Management Plan (CNBMP) <sup>1</sup>. The plan shall be prepared by a suitably experienced and qualified acoustics consultant and shall outline the management practices and procedures that are to be followed during night-time operation of the site and for the stacking of containers to be used as noise barriers. The plan shall include, but not necessarily be limited to:*

- a) the preparation of a specification for the stacking of containers to achieve the required level of noise reduction so as to comply with the project specific noise levels\*\* and the sleep disturbance trigger levels\*\*\* for the night-time period\* at the nearest affected residential receivers and which is to include such details as the minimum numbers of containers, their locations, stacking heights, orientation and maximum gap between containers. The Plan shall include any restrictions on stacking of containers above two high if this is found necessary.*
- b) the measurement of noise from operation of the site and an assessment of compliance with the project specific noise levels and the sleep disturbance trigger levels at the nearest affected residential receivers at the following times:*

*(i) not less than 3 months and not more than 6 months after commencement of operation, noise surveys shall be conducted on three separate nights for a period of not less than 2 hours whilst train wagons are being loaded with containers;*

*(ii) thereafter for 6 months on one night per month for a period of not less than 2 hours whilst train wagons are being loaded with containers. Noise*

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<sup>1</sup> Arcadis & Renzo Tonin & Associates, *Operational Noise and Vibration Management Plan for Moorebank Logistics Park – East Precinct*, Revision 012, dated 27/3/2020, available [https://simta.com.au/wordpress/wp-content/uploads/2020/04/ONVMP\\_V12\\_redacted.pdf](https://simta.com.au/wordpress/wp-content/uploads/2020/04/ONVMP_V12_redacted.pdf), accessed 8/10/2020

*measurements shall be conducted in accordance with the EPA's Industrial Noise Policy.*

*c) the details of each noise survey shall be documented in a report with a drawing showing the observed location of containers which are subject to the Plan, the measurement equipment used, its calibration status, environmental conditions, receiver locations, methodology, a detailed description of the activities on site, the results obtained and whether or not compliance has been achieved with the project specific noise levels and the sleep disturbance trigger levels at the nearest affected residential receivers.*

*d) if the report concludes that the project specific noise levels and the sleep disturbance trigger levels for the night-time period at the nearest affected residential receivers are not being complied with, then recommendations shall be made by the acoustic consultant to amend the Plan accordingly and the Applicant shall implement those recommendations as soon as practical provided they are feasible and reasonable.*

*e) the Plan shall include a description of the roles and responsibilities for relevant employees involved in the operation of the CNBMP, including relevant training and induction provisions for ensuring that employees are aware of their environmental and compliance obligations under the Plan.*

*The Plan shall be submitted for the approval of the Secretary no later than one month prior to the commencement of operation. Copies of the detailed reports and the Plan (as amended) shall be provided to the Secretary and made available on the Project Website.*

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on the Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

## 2 Summary of noise objectives

### 2.1 Sensitive Receivers

The potentially most affected residential receivers in the vicinity of the container stacking area (where trains are loaded / unloaded), are located in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North. A summary of the monitoring locations and the approximate distance to the container stacking area is provided in Table 1. The locations and noise catchment areas (NCAs), in relation to the container stacking area are illustrated in Figure 1

**Table 1 Sensitive receivers and approximate distance from MPE container stacking area**

Noise Catchment Area (NCA)	Monitoring location ID	Approximate distance (m) from MPE Precinct
NCA 1: Wattle Grove	M1	770
NCA 2: Wattle Grove North	M2	1050
NCA 3: Casula	M3	960
NCA 4: Glenfield	M4	1250
NCA 3: Glenfield Farm	n/a	1400

### 2.2 Noise management criteria

The operational noise management criteria, consistent with the approval conditions are outlined in Section 3.4 of the Container Noise Barrier Management Plan (CNBMP<sup>1</sup>) and summarised in Table 2. The  $L_{Aeq(period)}$  criteria are applicable during the day, evening and night-time periods and the  $L_{Amax}$  sleep disturbance screening criteria are applicable during night-time periods.

The meteorological conditions under which the criteria are applicable are summarised in the table notes and are consistent with the requirements outlined in Approval Condition FC5. An additional receiver location (Glenfield Farm) has been included in the assessment, as described in Section 3.5 of the CNBMP.

**Table 2 Noise management criteria, dB(A)**

Sensitive receiver	Day <sup>1</sup>	Evening <sup>1</sup>	Night <sup>1</sup>	Night <sup>1</sup>
	L <sub>Aeq, 15 minute</sub>	L <sub>Aeq, 15 minute</sub>	L <sub>Aeq, 15 minute</sub>	L <sub>A1 (1 min)/L<sub>Amax</sub></sub>
Wattle Grove (NCA 1)	35	35	35	52
Wattle Grove North (NCA 2)	35	35	35	51
Casula (NCA 3)	35	35	35	47
Glenfield (NCA 4)	35	35	35	50
Glenfield Farm (NCA3)	35	35	35	47

## Notes:

To determine compliance with the L<sub>Aeq, 15 minute</sub> noise limits, noise from the development is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy - INP). The modification factors in Section 4 of the INP must also be applied to the measured noise levels where applicable.

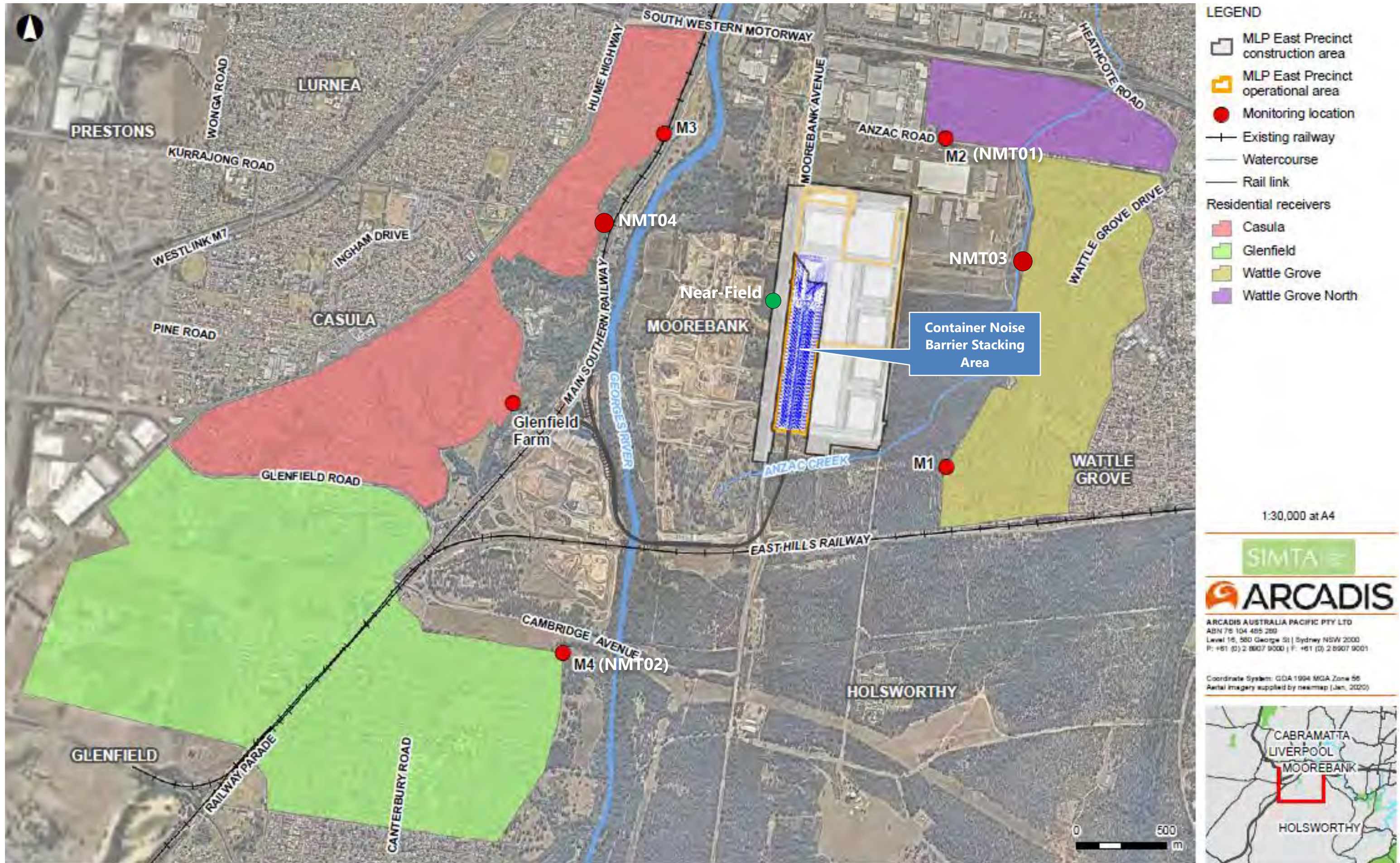
To determine compliance with the L<sub>A1</sub> noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the INP).

The noise emission limits identified above apply under meteorological conditions of:

- (i) wind speeds of up to 3 m/s at 10 metres above ground level; or
- (ii) 'F' atmospheric stability class.

Note 1: In accordance with the INP, day is the period from 7:00 am to 6:00 pm Monday to Saturday; or 8:00 am to 6:00 pm on Sundays and public holidays; evening is the period from 6:00 pm to 10:00 pm; and night is the remaining periods.

Figure 1 MPE East Precinct, container noise barrier stacking area and nearest sensitive residential receivers



**LEGEND**

- MLP East Precinct construction area
- MLP East Precinct operational area
- Monitoring location
- Existing railway
- Watercourse
- Rail link

**Residential receivers**

- Casula
- Glenfield
- Wattle Grove
- Wattle Grove North

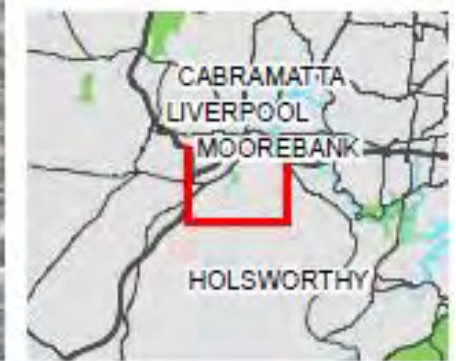
1:30,000 at A4

**SIMTA**

**ARCADIS**

ARCADIS AUSTRALIA PACIFIC PTY LTD  
 ABN 76 104 485 289  
 Level 15, 580 George St | Sydney NSW 2000  
 P: +61 (0) 2 8007 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA 1994 MGA Zone 56  
 Aerial imagery supplied by nearmap (Jan, 2020)



### 3 Container noise barrier arrangement

During the night-time measurements, container stacks were located adjacent to the western boundary of the MPE (See Figure 2 and Figure 3). Table 3 provides a summary of the container noise barrier arrangements.

Section 3.6.2 of the CNBMP provides a summary of the approved container noise barrier stacking arrangements. It was confirmed during the attended measurements that the height of the container noise barrier closest to Moorebank Avenue was one 'tier' higher than the inner rows and the stacking of containers on top of the container noise barrier did not occur during the night-time period.

**Table 3 Container noise barriers arrangement**

Location	MPE
Dimensions of container stacks	52m (length) x 14m (width) x 2.6m(Height)
Gap between container stacks	7m & 2m
Stacking height	3 containers high
Orientation	Stacked parallel to the rail link

## 4 Noise measurements

### 4.1 Noise measurement approach

The objective of the noise measurements is to evaluate the noise levels associated with container unloading and stacking during a night-time period at the nearest sensitive receivers, and determine if the noise measurement results comply with the noise management criteria in Table 2.

Approval Condition F5A requires noise measurements to be performed on three separate nights for a period of not less than 2 hours, whilst train wagons are being loaded with containers. Based on current operations, the loading and unloading of wagons during night-time periods is infrequent. On average, there is one loading/unloading event per week during night-time periods.

During the night-time period when container stacking operations are taking place, the measurement approach includes performing attended noise measurements at near-field locations within approximately 100 m of the operations. At the near-field measurement locations, it is possible to observe the container stacking operations and reliably measure the source noise levels of maximum ( $L_{Amax}$ ) and steady ( $L_{Aeq}$ ) noise sources. The time of these events can also be noted.

At the far-field noise measurement locations (refer Table 1 and Figure 1), a combination of attended and unattended noise measurements are performed to evaluate if noise emissions from the container stacking operations are audible at the nearest sensitive residential receivers. This is achieved by listening to the noise recordings at the far-field locations during the same time periods when noise emissions were audible at the near-field measurement locations.

Where the noise levels at the far-field noise measurement locations are not audible and it is not possible to quantify the container stacking operations directly (as was the case in this study), the near-field noise measurement results can be used in conjunction with noise modelling, to calculate the container noise stacking operational noise levels at the far-field locations.

### 4.2 Measurement equipment

The measurement equipment included two NTi XL2 sound level meters and four Envirosuite permanent noise monitors. The XL2 sound level meters were utilised for the attended noise measurements in the near- and far-fields. Four Envirosuite permanent noise monitors are set up at representative locations in the community, and are labelled NMT01 to NMT04 in Figure 1.

All of the noise monitoring equipment are Class 1 instruments, with calibration certificates current at the time of the measurements. Before and after each series of attended measurements, the calibration of the XL2 sound level meters were verified using a reference calibration of 94 dB at 1 kHz. The difference between pre- and post-calibration levels was within 0.5 dB for all measurements.

A summary of measurement equipment and calibration dates is provided in Table 4.

**Table 4 Measurement equipment**

Location	Description	Make	Model	Serial No	Last Date Calibrated
Far Field attended	Class 1 sound level meter	NTi	XL2	A2A-02386-D2	08/07/2019
Near Field attended	Class 1 sound level meter	NTi	XL2	A2A-13500-E0	22/01/2020
Near and Far field attended	Class 1 sound level meter calibrator	B&K	4231	2677710	16/03/2020
NMT01	Permanent noise monitor	B&K	2250	3025394	12/03/2019
NMT02	Permanent noise monitor	B&K	2250	3025271	12/03/2019
NMT03	Permanent noise monitor	B&K	2250	3025351	12/03/2019
NMT04	Permanent noise monitor	B&K	2250	3025317	12/03/2019

### 4.3 Measurement methodology

Attended noise measurements were performed at near-field locations on Moorebank Avenue to capture the freight train unloading events. The measurement were performed between 4:30 am and 7:30 am on 4 September 2020. The position of the near-field measurement location is shown in Figure 2. The near-field measurement setup is shown in Figure 3.

Concurrent with the near-field measurements, a combination of attended and unattended noise measurements were performed at the property boundary of the nearest sensitive residential receivers.

Figure 2 Near-field measurement location

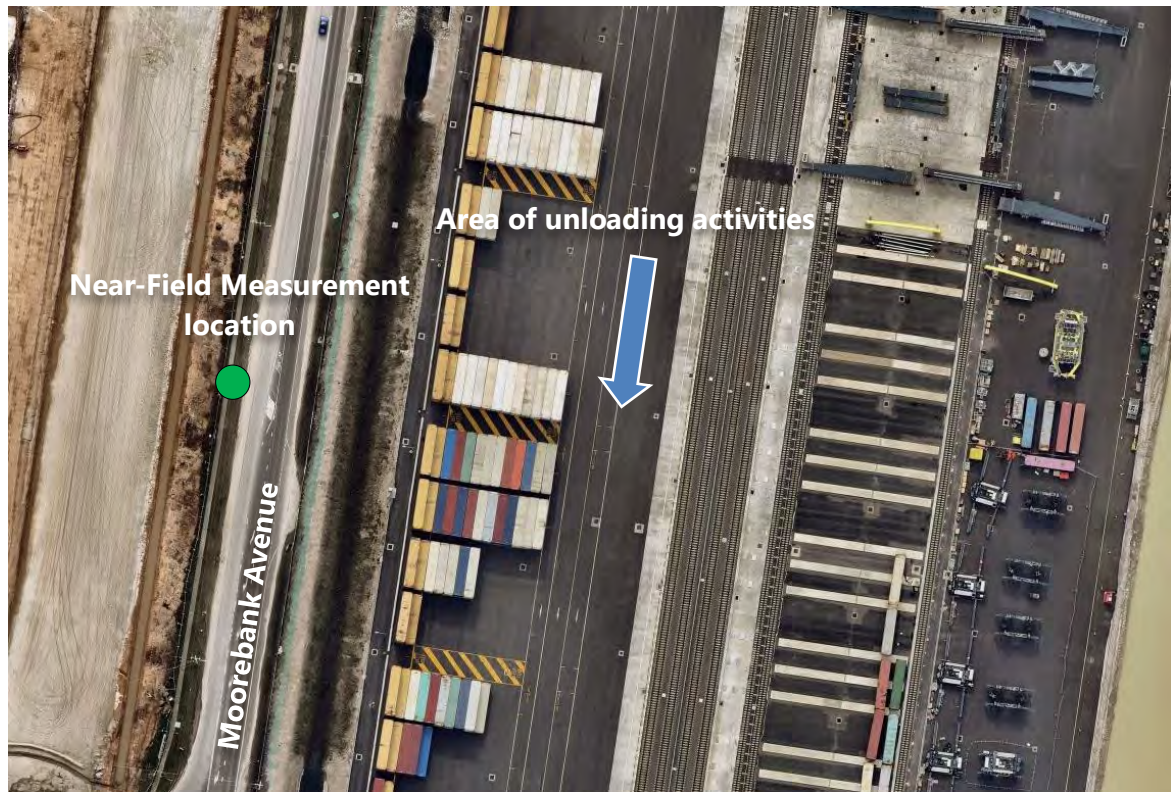
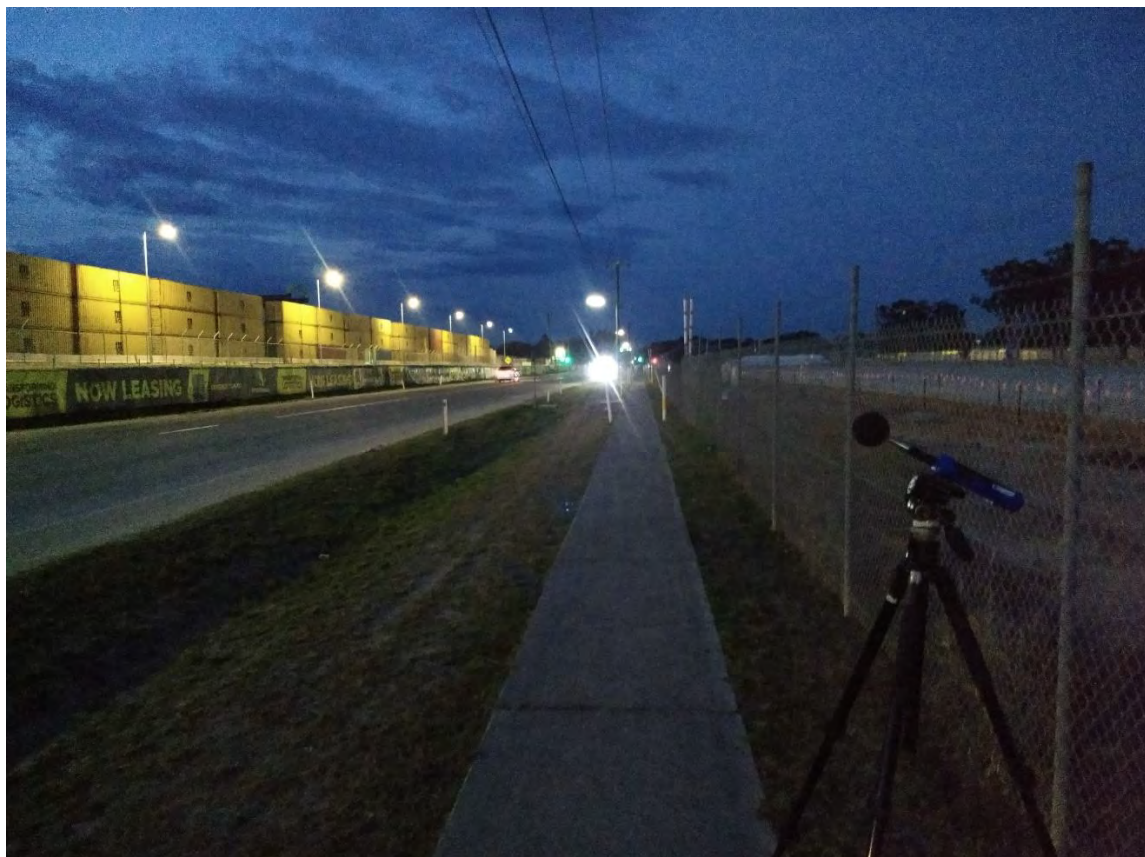


Figure 3 Near-field measurement setup



## 5 Noise measurement results

### 5.1 Near-field locations

Attended noise measurements were performed at a representative near-field measurement location approximately 50 m from the western boundary of the container noise barrier.

Several on-site activities were recorded during the attended noise measurements. These included Reacher Stackers unloading containers from the freight train onto trucks, Reacher Stackers unloading containers from the freight train and stacking them behind the container noise barriers at the eastern boundary, and locomotive idling noise.

The typical worst-case  $L_{Aeq(15 \text{ minute})}$  noise level is related to the above activities and was considered in the modelling described in Section 6.

A summary of the near-field noise measurement results is provided in Table 5. The reported noise levels represent the typical worst-case noise events observed during the measurement survey.

**Table 5 Summary of near-field noise measurement results**

Activity noise sources	Time	Measurement Duration, t (sec)	Measurement Distance, m	Measured noise levels, dB(A)	
				$L_{Aeq(t)}$	$L_{AFmax}$
<b>Freight train</b>					
Engine Idling	5:25 am	12	110	52	54
<b>Reacher Stacker</b>					
Grabbing & Dropping Sound	5:14 am	3	95	59	68
Engine revving	5:17 am	11	60	57	58
Engine Idling	5:17 am	17	55	57	57
Reverse Beeping	5:16 am	11	60	62	64

Note: After 5:30am, it was not possible to quantify the noise contribution from site activities in the presence of high ambient noise from continuous road traffic on Moorebank Avenue.

### 5.2 Far-field attended measurements at sensitive residential receivers

Attended noise measurements were performed at the residential boundary of the nearest residential receivers at locations M3, M4 and NMT 04 (refer Figure 1). Results from the attended noise measurements are provided in Table 7.

At the three far-field noise measurement locations, noise emissions from the container unloading activities were not audible in the presence of the ambient noise environment. At measurement location M3, this included the time period when the loudest grabbing / dropping sound was observed at the near-field location (5:14am).

### 5.3 Far-field unattended noise measurements

Continuous noise monitoring is currently being performed at four noise-sensitive locations in accordance with Approval Condition B64 (SSD 7628) (see Section 4.1.2 of ONVMP).

During the attended noise measurements, the permanent noise monitors were configured to perform audio recordings and short-term statistical noise measurements. This setup allowed the unattended measurement results to be post-processed to determine if the container unloading operations are audible at the sensitive receiver locations.

Following the attended measurements, the noise measurements results were downloaded and analysed. It was confirmed that the container unloading activities were not audible in the presence of the ambient noise environment, including the time period when the loudest grabbing / dropping sound was observed at the near-field location (5:14am).

A summary of the noise measurement results during the time period when the loudest grabbing / dropping sound was audible at the near-field location is provided in Table 6. During this period, the grabbing / dropping noise was not audible in the sound recordings.

A summary of the measured  $L_{Aeq(15\text{minute})}$  noise levels during the 4:30 am to 7:30 am period is provided in Table 7.

**Table 6 Far-field unattended noise measurement results**

Monitoring station	Approximate distance (m) from MPE East Precinct	Time period	Measured $L_{A,1\text{min}}$ Noise Level, dB(A)	Audibility
NMT 01	550	5:14 am to 5:15 am	53	Site activities not audible
NMT 02	1250	5:14 am to 5:15 am	53	Site activities not audible
NMT 03	700	5:14 am to 5:15 am	50	Site activities not audible
NMT 04	1000	5:14 am to 5:15 am	47	Site activities not audible

### 5.4 Weather conditions

Observations of the weather conditions were made using a hand-held MS6252B digital anemometer. The air temperature during the survey was 17°C, relative humidity 50%, average wind speed 0.5 m/s (SW) and 40% cloud cover. There was no precipitation.

The weather conditions during the survey were conducive for measuring noise under typical environmental conditions.

**Table 7 Summary of attended and unattended noise measurement results at the nearest sensitive residential receivers (far field)**

ID	Address	Measurement Method	Assessment period	L <sub>Aeq, 15minute</sub> noise criterion, dB(A)	L <sub>A1, 1 minute</sub> noise criterion, dB(A)	Measurement period	Measured noise levels, dB(A)		Estimated MPE noise contribution, dB(A)		Comments and measured L <sub>Amax</sub> noise levels from typical events	MPE Noise Levels Comply?
							L <sub>Aeq, 15minute</sub>	L <sub>AF,90%</sub>	L <sub>Aeq, 15minute-</sub>	L <sub>AFmax</sub>		
<b>M3 – Casula</b>												
1	St Andrews Park	Attended	Night	35	47	04/09/20 05:13 - 05:28	57	47	Note 1	Note 1	Background noise dominated by noise from the M5 traffic noise: M5 49-50dBA, Animal 49-50dBA, Rail Traffic 75-78 dBA	Yes
2	St Andrews Park	Attended	Night	35	47	04/09/20 05:33 - 05:48	62	55	Note 1	Note 1	Background noise dominated by noise from the M5 traffic noise: M5 49-50dBA, Animal 59-60dBA, Rail Traffic 80-81 dBA, Road traffic 57-59dBA	Yes
3	St Andrews Park	Attended	Night	35	47	04/09/20 05:57 - 06:12	60	59	Note 1	Note 1	Background noise dominated by noise from the M5 traffic noise: M5 49-51dBA, Animal 59-60dBA, Rail Traffic 79-80 dBA, Road traffic 52-53dBA, Distance Construction noise 54-55	Yes
<b>14 Dunmore Crescent</b>												
4	14 Dunmore Crescent	Attended	Night	35	50	04/09/20 04:47 - 05:02	48	46	Note 1	Note 1	Background noise dominated by noise from the Hume Highway: Road Traffic 49-51dBA, Rail Traffic 51-52dBA, Animal noise 47-48 dBA	Yes
5	14 Dunmore Crescent	Attended	Night/Day	35	50	04/09/20 06:55 - 07:10	51	50	Note 1	Note 1	Background noise dominated by noise from the Hume Highway: Road Traffic 49-51dBA, Rail Traffic 51-52dBA, Animal noise 47-48 dBA	Yes
6	14 Dunmore Crescent	Attended	Day	35	-	19/02/20 07:10 - 07:25	61	51	Note 1	Note 1	Background noise dominated by noise from the Hume Highway: Road Traffic 50-51dBA, Rail Traffic 50-51dBA	Yes
7	14 Dunmore Crescent	Attended	Day	35	-	19/02/20 07:26 - 07:41	55	53	Note 1	Note 1	Background noise dominated by noise from the Hume Highway: Road Traffic 50-51dBA, Rail Traffic 50-51dBA, Freight Train 56-57dBA	Yes
<b>M4 – Glenfield</b>												
8	26 Goodenough Street	Attended	Night	35	51	04/09/20 06:26 - 06:41	56	54	Note 1	Note 1	Background noise dominated by noise from the Cambridge Ave: Road Traffic 58-59 dBA, Animal 58-59dBA	Yes
<b>NMT 01 - Wattle Grove North</b>												
9	22 Glenelg Court	Unattended	Night	35	52	04/09/20 04:30- 04:45	55	52	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 04:45- 05:00	52	49	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 05:00- 05:15	52	47	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 05:15- 05:30	54	49	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 05:30- 05:45	56	54	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 05:45- 06:00	56	54	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 06:00- 06:15	57	54	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 06:15- 06:30	57	53	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 06:30- 06:45	57	53	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 06:45- 07:00	57	53	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:00- 07:15	58	55	-	-	Refer Table 6	Yes
Day	35	-	04/09/20 07:15- 07:30	57	54	-	-	Refer Table 6	Yes			
<b>NMT 02 – Glenfield</b>												
10	26 Goodenough Street	Unattended	Night	35	51	04/09/20 04:30- 04:45	50	46	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 04:45- 05:00	50	46	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 05:00- 05:15	53	50	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 05:15- 05:30	52	48	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 05:30- 05:45	54	52	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 05:45- 06:00	55	53	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 06:00- 06:15	56	53	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 06:15- 06:30	55	54	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 06:30- 06:45	59	54	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 06:45- 07:00	55	54	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:00- 07:15	57	54	-	-	Refer Table 6	Yes
Day	35	-	04/09/20 07:15- 07:30	56	54	-	-	Refer Table 6	Yes			

ID	Address	Measurement Method	Assessment period	L <sub>Aeq, 15minute</sub> noise criterion, dB(A)	L <sub>A1, 1 minute</sub> noise criterion, dB(A)	Measurement period	Measured noise levels, dB(A)		Estimated MPE noise contribution, dB(A)		Comments and measured L <sub>Amax</sub> noise levels from typical events	MPE Noise Levels Comply?
							L <sub>Aeq, 15minute</sub>	L <sub>AF,90%</sub>	L <sub>Aeq, 15minute</sub>	L <sub>AFmax</sub>		
<b>NMT 03 – Wattle Grove</b>												
11	31 Martindale Court	Unattended	Night	35	47	04/09/20 04:30- 04:45	50	48	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 04:45- 05:00	51	50	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 05:00- 05:15	50	48	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 05:15- 05:30	56	48	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 05:30- 05:45	53	52	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 05:45- 06:00	55	52	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 06:00- 06:15	52	52	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 06:15- 06:30	51	50	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 06:30- 06:45	53	50	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 06:45- 07:00	57	51	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:00- 07:15	54	51	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:15- 07:30	55	53	-	-	Refer Table 6	Yes
<b>NMT 04 – Casula</b>												
12	14 Dunmore Crescent	Unattended	Night	35	50	04/09/20 04:30- 04:45	57	44	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 04:45- 05:00	51	41	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 05:00- 05:15	50	42	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 05:15- 05:30	51	46	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 05:30- 05:45	52	49	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 05:45- 06:00	53	48	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 06:00- 06:15	51	49	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 06:15- 06:30	55	50	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 06:30- 06:45	57	52	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 06:45- 07:00	56	54	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:00- 07:15	55	52	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:15- 07:30	61	54	-	-	Refer Table 6	Yes

Note 1: Since noise levels from the MPE were not audible during the measurement period, it was not possible to estimate the MPE noise contribution

## 6 Noise modelling results

### 6.1 Overview of noise modelling

Since noise levels from the container unloading operations were not audible at the nearest residential receivers, and it was not possible to measure the MLE noise contribution directly, computer noise modelling was employed to calculate the container noise stacking operational noise levels at the far-field locations. The source noise levels in the computer noise model are based on the typical worst-case attended noise measurement results at the near-field location (see Table 5).

### 6.2 General modelling assumptions

The CadnaA (version 2020) noise model has been utilised to predict the far-field noise levels at the nearest residential receivers. The noise predictions are based on the CONCAWE noise prediction algorithms.

The CONCAWE method was originally developed for predicting the long-distance propagation of noise from petrochemical complexes. It is especially suited to predicting noise propagation over large distances because it accounts for a range of atmospheric conditions that can significantly influence the propagation of noise over large distances.

Noting that the nearest residential receiver in the vicinity of MPE Facility is at least 770 m from the site, the CONCAWE environmental noise prediction method is an appropriate method for predicting the noise propagation. The noise modelling calculations account for the following:

- Ground topography;
- Buildings and structures (including the container noise barrier);
- All sources behave as point, or moving point sources;
- Ground absorption;
- Representative operational noise sources as required; and
- Meteorological conditions.

### 6.3 Noise model predictions

A summary of the predicted noise levels at the nearest residential receiver locations are compared with the project specified noise criteria in Table 8. The noise predictions are based on the typical worst-case noise measurements at the near-field measurement location and represent unloading operations which include locomotive idling, Reacher Stacker operations and truck operations. The predicted noise levels are evaluated at the property boundary of the nearest residential receivers.

A separate noise modelling scenario was run for the  $L_{AFmax}$  grabbing / dropping sound in order to evaluate the potential sleep disturbance impacts.

**Table 8 Predicted noise levels at nearest residential receivers**

Location	Distance (m)	$L_{Aeq(15minute)}$ noise management criteria, dB(A)	$L_{A1, 1minute}$ noise management criteria, dB(A)	Predicted noise levels, dB(A)	
				$L_{Aeq(15minute)}$	$L_{AFmax} /$ $L_{A1, 1minute}$
M1 - Wattle Grove	770	35	52	30	44
M2 - Wattle Grove North	1,050	35	51	21	29
M3 - Casula	960	35	47	26	39
M4 - Glenfield	1,250	35	50	14	28
Glenfield Farm	1,500	35	47	22	36

## 7 Discussion

Attended noise measurements at near-field distances of up to 100 m have been used to quantify the source noise levels of typical operations associated with container unloading and stacking operations. The highest noise levels occurred at 5:14 am, generating a  $L_{Amax}$  noise level of 57 dB(A) at a distance of 95 m (container grabbing / dropping sound).

At the far-field noise measurement locations, noise emissions from the container unloading and stacking operations were not audible during the night-time measurement period in the presence of other ambient noise sources. The noise recordings at the permanent noise monitoring sites were reviewed during the time period when the highest container grabbing / dropping sound was observed at the near-field measurement locations. This  $L_{Amax}$  noise event was not audible at the permanent noise monitoring locations or at the attended far-field noise measurement location (M3).

Since the airborne noise levels from container unloading operations were not audible, computer noise modelling was performed, based on the near-field noise measurement results, to quantify the noise contribution from typical worst-case site activities. The noise level calculations in Table 8 verify that the predicted noise levels comply with the  $L_{Aeq(15 \text{ minute})}$  and  $L_{A1(1 \text{ minute})}$  noise management criteria at the nearest sensitive receivers.

## 8 Conclusion

This report presents the results of container noise barrier measurements representative near-and far-field locations in proximity to Moorebank Precinct East (MPE). The measurements were performed in accordance with the requirements of the NSW *Industrial Noise Policy* (INP) and the Container Noise Barrier Management Plan to verify compliance with the noise limits in SSD Approval 6766. The measurements were performed during the night-time period on 4 September 2020 during container unloading and stacking operations.

At the nearest residential receivers, the measured  $L_{Aeq(15\text{minute})}$  noise levels were dominated by extraneous noise sources apart from the MPE activities. MPE noise sources were not audible during any of the measurement periods at the nearest residential receivers. On this basis, near-field measurement data was utilised in conjunction with computer noise modelling to quantify the typical worst-case noise contribution from the facility.

Based on the calculated noise levels in Table 8, it is concluded that the current noise levels comply with the project-specific noise management criteria and sleep disturbance screening levels in Approval Condition F5A of SSD 6766.

## APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).																																														
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.																																														
Assessment period	The period in a day over which assessments are made.																																														
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.																																														
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).																																														
Decibel [dB]	<p>The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:</p> <table border="0"> <tr> <td>threshold of hearing</td> <td>0 dB</td> <td>The faintest sound we can hear</td> </tr> <tr> <td></td> <td>10 dB</td> <td>Human breathing</td> </tr> <tr> <td></td> <td>20 dB</td> <td></td> </tr> <tr> <td>almost silent</td> <td>30 dB</td> <td>Quiet bedroom or in a quiet national park location</td> </tr> <tr> <td></td> <td>40 dB</td> <td>Library</td> </tr> <tr> <td>generally quiet</td> <td>50 dB</td> <td>Typical office space or ambience in the city at night</td> </tr> <tr> <td></td> <td>60 dB</td> <td>CBD mall at lunch time</td> </tr> <tr> <td>moderately loud</td> <td>70 dB</td> <td>The sound of a car passing on the street</td> </tr> <tr> <td></td> <td>80 dB</td> <td>Loud music played at home</td> </tr> <tr> <td>loud</td> <td>90 dB</td> <td>The sound of a truck passing on the street</td> </tr> <tr> <td></td> <td>100 dB</td> <td>Indoor rock band concert</td> </tr> <tr> <td>very loud</td> <td>110 dB</td> <td>Operating a chainsaw or jackhammer</td> </tr> <tr> <td></td> <td>120 dB</td> <td>Jet plane take-off at 100m away</td> </tr> <tr> <td></td> <td>130 dB</td> <td></td> </tr> <tr> <td>extremely loud</td> <td>140 dB</td> <td>Military jet take-off at 25m away</td> </tr> </table>		threshold of hearing	0 dB	The faintest sound we can hear		10 dB	Human breathing		20 dB		almost silent	30 dB	Quiet bedroom or in a quiet national park location		40 dB	Library	generally quiet	50 dB	Typical office space or ambience in the city at night		60 dB	CBD mall at lunch time	moderately loud	70 dB	The sound of a car passing on the street		80 dB	Loud music played at home	loud	90 dB	The sound of a truck passing on the street		100 dB	Indoor rock band concert	very loud	110 dB	Operating a chainsaw or jackhammer		120 dB	Jet plane take-off at 100m away		130 dB		extremely loud	140 dB	Military jet take-off at 25m away
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dB(A)	A-weighted decibels. The A-weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.																																														
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.																																														

Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L <sub>Max</sub>	The maximum sound pressure level measured over a given period.
L <sub>Min</sub>	The minimum sound pressure level measured over a given period.
L <sub>1</sub>	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L <sub>10</sub>	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L <sub>90</sub>	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L <sub>eq</sub>	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

# MOOREBANK LOGISTIC PARK - PRECINCT EAST

## Container Noise Barrier Management Plan Measurements – September 2020

20 October 2020

Tactical Group

TL116-05F06 Container Noise Barrier Measurements (r1).docx

## Document details

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We have prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

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## Contents

1	Introduction	1
1.1	Project overview	1
2	Summary of noise objectives	3
2.1	Sensitive Receivers	3
2.2	Noise management criteria	3
3	Container noise barrier arrangement	6
4	Noise measurements	7
4.1	Noise measurement approach	7
4.2	Measurement equipment	7
4.3	Measurement methodology	8
5	Noise measurement results	10
5.1	Near-field locations	10
5.2	Far-field attended measurements at sensitive residential receivers	10
5.3	Far-field unattended noise measurements	11
5.4	Weather conditions	11
6	Noise modelling results	14
6.1	Overview of noise modelling	14
6.2	General modelling assumptions	14
6.3	Noise model predictions	14
7	Discussion	16
8	Conclusion	17
APPENDIX A	Glossary of terminology	18

## List of tables

Table 1	Sensitive receivers and approximate distance from MPE container stacking area	3
Table 2	Noise management criteria, dB(A)	4
Table 3	Container noise barriers arrangement	6
Table 4	Measurement equipment	8
Table 5	Summary of near-field noise measurement results	10
Table 6	Far-field unattended noise measurement results	11
Table 7	Summary of attended and unattended noise measurement results at the nearest sensitive residential receivers (far field)	12
Table 8	Predicted noise level at nearest residential receivers	15

## List of figures

Figure 1	MPE East Precinct, container noise barrier stacking area and nearest sensitive residential receivers	5
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Figure 2	Near-field measurement location	9
Figure 3	Near-field measurement setup	9

# 1 Introduction

## 1.1 Project overview

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stages 1 and 2 of the Moorebank Precinct East (MPE) Project (SSD 6766 and SSD 7628 respectively), which together comprise the two stages of development under the MPE Concept Approval (MP10\_0193).

This report has been prepared to address the requirements of Approval Condition F5A in State Significant Development (SSD) 6766. Specifically, this report includes noise measurement results performed to meet the requirements in clauses b), c) and d). The requirements of Condition F5A are copied verbatim below.

*F5A. The Applicant shall prepare and implement (following approval) a Container Noise Barrier Management Plan (CNBMP) <sup>1</sup>. The plan shall be prepared by a suitably experienced and qualified acoustics consultant and shall outline the management practices and procedures that are to be followed during night-time operation of the site and for the stacking of containers to be used as noise barriers. The plan shall include, but not necessarily be limited to:*

- a) the preparation of a specification for the stacking of containers to achieve the required level of noise reduction so as to comply with the project specific noise levels\*\* and the sleep disturbance trigger levels\*\*\* for the night-time period\* at the nearest affected residential receivers and which is to include such details as the minimum numbers of containers, their locations, stacking heights, orientation and maximum gap between containers. The Plan shall include any restrictions on stacking of containers above two high if this is found necessary.*
- b) the measurement of noise from operation of the site and an assessment of compliance with the project specific noise levels and the sleep disturbance trigger levels at the nearest affected residential receivers at the following times:*

*(i) not less than 3 months and not more than 6 months after commencement of operation, noise surveys shall be conducted on three separate nights for a period of not less than 2 hours whilst train wagons are being loaded with containers;*

*(ii) thereafter for 6 months on one night per month for a period of not less than 2 hours whilst train wagons are being loaded with containers. Noise*

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<sup>1</sup> Arcadis & Renzo Tonin & Associates, *Operational Noise and Vibration Management Plan for Moorebank Logistics Park – East Precinct*, Revision 012, dated 27/3/2020, available [https://simta.com.au/wordpress/wp-content/uploads/2020/04/ONVMP\\_V12\\_redacted.pdf](https://simta.com.au/wordpress/wp-content/uploads/2020/04/ONVMP_V12_redacted.pdf), accessed 8/10/2020

*measurements shall be conducted in accordance with the EPA's Industrial Noise Policy.*

*c) the details of each noise survey shall be documented in a report with a drawing showing the observed location of containers which are subject to the Plan, the measurement equipment used, its calibration status, environmental conditions, receiver locations, methodology, a detailed description of the activities on site, the results obtained and whether or not compliance has been achieved with the project specific noise levels and the sleep disturbance trigger levels at the nearest affected residential receivers.*

*d) if the report concludes that the project specific noise levels and the sleep disturbance trigger levels for the night-time period at the nearest affected residential receivers are not being complied with, then recommendations shall be made by the acoustic consultant to amend the Plan accordingly and the Applicant shall implement those recommendations as soon as practical provided they are feasible and reasonable.*

*e) the Plan shall include a description of the roles and responsibilities for relevant employees involved in the operation of the CNBMP, including relevant training and induction provisions for ensuring that employees are aware of their environmental and compliance obligations under the Plan.*

*The Plan shall be submitted for the approval of the Secretary no later than one month prior to the commencement of operation. Copies of the detailed reports and the Plan (as amended) shall be provided to the Secretary and made available on the Project Website.*

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on the Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

## 2 Summary of noise objectives

### 2.1 Sensitive Receivers

The potentially most affected residential receivers in the vicinity of the container stacking area (where trains are loaded / unloaded), are located in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North. A summary of the monitoring locations and the approximate distance to the container stacking area is provided in Table 1. The locations and noise catchment areas (NCAs), in relation to the container stacking area are illustrated in Figure 1

**Table 1 Sensitive receivers and approximate distance from MPE container stacking area**

Noise Catchment Area (NCA)	Monitoring location ID	Approximate distance (m) from MPE Precinct
NCA 1: Wattle Grove	M1	770
NCA 2: Wattle Grove North	M2	1050
NCA 3: Casula	M3	960
NCA 4: Glenfield	M4	1250
NCA 3: Glenfield Farm	n/a	1400

### 2.2 Noise management criteria

The operational noise management criteria, consistent with the approval conditions are outlined in Section 3.4 of the Container Noise Barrier Management Plan (CNBMP<sup>1</sup>) and summarised in Table 2. The  $L_{Aeq(Period)}$  criteria are applicable during the day, evening and night-time periods and the  $L_{Amax}$  sleep disturbance screening criteria are applicable during night-time periods.

The meteorological conditions under which the criteria are applicable are summarised in the table notes and are consistent with the requirements outlined in Approval Condition FC5. An additional receiver location (Glenfield Farm) has been included in the assessment, as described in Section 3.5 of the CNBMP.

**Table 2 Noise management criteria, dB(A)**

Sensitive receiver	Day <sup>1</sup>	Evening <sup>1</sup>	Night <sup>1</sup>	Night <sup>1</sup>
	L <sub>Aeq, 15 minute</sub>	L <sub>Aeq, 15 minute</sub>	L <sub>Aeq, 15 minute</sub>	L <sub>A1 (1 min)/L<sub>Amax</sub></sub>
Wattle Grove (NCA 1)	35	35	35	52
Wattle Grove North (NCA 2)	35	35	35	51
Casula (NCA 3)	35	35	35	47
Glenfield (NCA 4)	35	35	35	50
Glenfield Farm (NCA3)	35	35	35	47

## Notes:

To determine compliance with the L<sub>Aeq, 15 minute</sub> noise limits, noise from the development is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy - INP). The modification factors in Section 4 of the INP must also be applied to the measured noise levels where applicable.

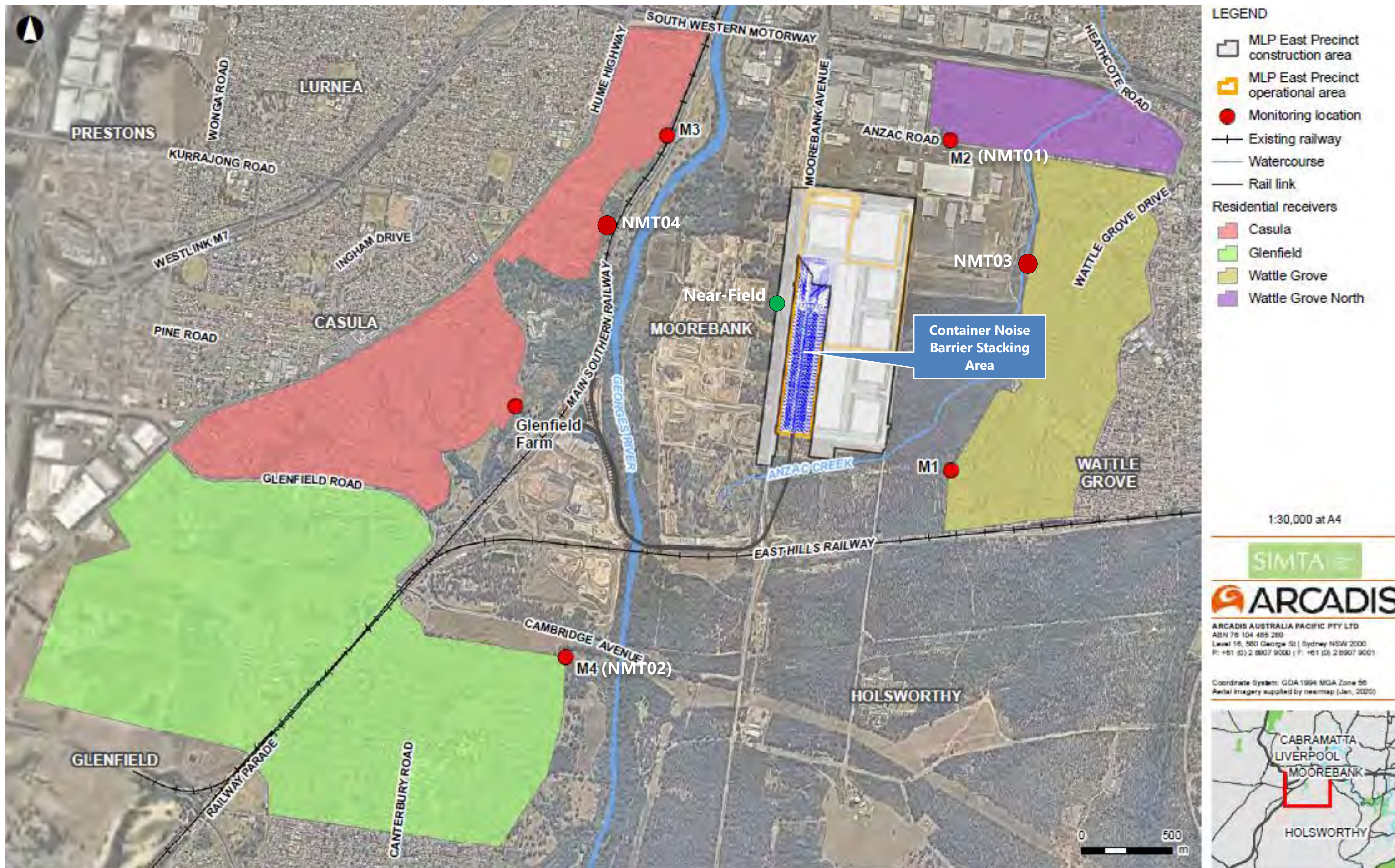
To determine compliance with the L<sub>A1</sub> noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the INP).

The noise emission limits identified above apply under meteorological conditions of:

- (i) wind speeds of up to 3 m/s at 10 metres above ground level; or
- (ii) 'F' atmospheric stability class.

Note 1: In accordance with the INP, day is the period from 7:00 am to 6:00 pm Monday to Saturday; or 8:00 am to 6:00 pm on Sundays and public holidays; evening is the period from 6:00 pm to 10:00 pm; and night is the remaining periods.

Figure 1 MPE East Precinct, container noise barrier stacking area and nearest sensitive residential receivers



**LEGEND**

- MLP East Precinct construction area
- MLP East Precinct operational area
- Monitoring location
- Existing railway
- Watercourse
- Rail link

**Residential receivers**

- Casula
- Glenfield
- Wattle Grove
- Wattle Grove North

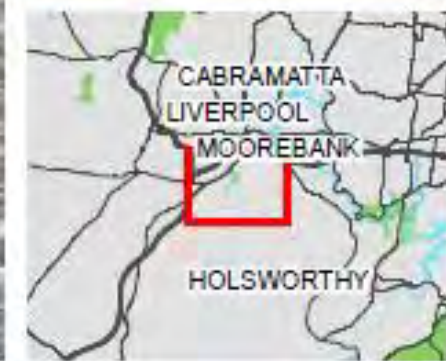
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**SIMTA**

**ARCADIS**

ARCADIS AUSTRALIA PACIFIC PTY LTD  
 ABN 76 104 485 289  
 Level 15, 580 George St | Sydney NSW 2000  
 P: +61 (0) 2 8007 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA 1994 MGA Zone 56  
Aerial imagery supplied by nearmap (Jan. 2020)



### 3 Container noise barrier arrangement

During the night-time measurements, container stacks were located adjacent to the western boundary of the MPE (See Figure 2 and Figure 3). Table 3 provides a summary of the container noise barrier arrangements.

Section 3.6.2 of the CNBMP provides a summary of the approved container noise barrier stacking arrangements. It was confirmed during the attended measurements that the height of the container noise barrier closest to Moorebank Avenue was one 'tier' higher than the inner rows and the stacking of containers on top of the container noise barrier did not occur during the night-time period.

**Table 3 Container noise barriers arrangement**

Location	MPE
Dimensions of container stacks	52m (length) x 14m (width) x 2.6m(Height)
Gap between container stacks	7m & 2m
Stacking height	3 containers high
Orientation	Stacked parallel to the rail link

## 4 Noise measurements

### 4.1 Noise measurement approach

The objective of the noise measurements is to evaluate the noise levels associated with container unloading and stacking during a night-time period at the nearest sensitive receivers, and determine if the noise measurement results comply with the noise management criteria in Table 2.

Approval Condition F5A requires noise measurements to be performed on three separate nights for a period of not less than 2 hours, whilst train wagons are being loaded with containers. Based on current operations, the loading and unloading of wagons during night-time periods is infrequent. On average, there is one loading/unloading event per week during night-time periods.

During the night-time period when container stacking operations are taking place, the measurement approach includes performing attended noise measurements at near-field locations within approximately 100 m of the operations. At the near-field measurement locations, it is possible to observe the container stacking operations and reliably measure the source noise levels of maximum ( $L_{Amax}$ ) and steady ( $L_{Aeq}$ ) noise sources. The time of these events can also be noted.

At the far-field noise measurement locations (refer Table 1 and Figure 1), a combination of attended and unattended noise measurements are performed to evaluate if noise emissions from the container stacking operations are audible at the nearest sensitive residential receivers. This is achieved by listening to the noise recordings at the far-field locations during the same time periods when noise emissions were audible at the near-field measurement locations.

Where the noise levels at the far-field noise measurement locations are not audible and it is not possible to quantify the container stacking operations directly (as was the case in this study), the near-field noise measurement results can be used in conjunction with noise modelling, to calculate the container noise stacking operational noise levels at the far-field locations.

### 4.2 Measurement equipment

The measurement equipment included two NTi XL2 sound level meters and four Envirosuite permanent noise monitors. The XL2 sound level meters were utilised for the attended noise measurements in the near- and far-fields. Four Envirosuite permanent noise monitors are set up at representative locations in the community, and are labelled NMT01 to NMT04 in Figure 1.

All of the noise monitoring equipment are Class 1 instruments, with calibration certificates current at the time of the measurements. Before and after each series of attended measurements, the calibration of the XL2 sound level meters were verified using a reference calibration of 94 dB at 1 kHz. The difference between pre- and post-calibration levels was within 0.5 dB for all measurements.

A summary of measurement equipment and calibration dates is provided in Table 4.

**Table 4 Measurement equipment**

Location	Description	Make	Model	Serial No	Last Date Calibrated
Far Field attended	Class 1 sound level meter	NTi	XL2	A2A-02386-D2	08/07/2019
Near Field attended	Class 1 sound level meter	NTi	XL2	A2A-13500-E0	22/01/2020
Near and Far field attended	Class 1 sound level meter calibrator	B&K	4231	2677710	16/03/2020
NMT01	Permanent noise monitor	B&K	2250	3025394	12/03/2019
NMT02	Permanent noise monitor	B&K	2250	3025271	12/03/2019
NMT03	Permanent noise monitor	B&K	2250	3025351	12/03/2019
NMT04	Permanent noise monitor	B&K	2250	3025317	12/03/2019

### 4.3 Measurement methodology

Attended noise measurements were performed at near-field locations on Moorebank Avenue to capture the freight train unloading events. The measurement were performed between 4:30 am and 7:30 am on 4 September 2020. The position of the near-field measurement location is shown in Figure 2. The near-field measurement setup is shown in Figure 3.

Concurrent with the near-field measurements, a combination of attended and unattended noise measurements were performed at the property boundary of the nearest sensitive residential receivers.

Figure 2 Near-field measurement location

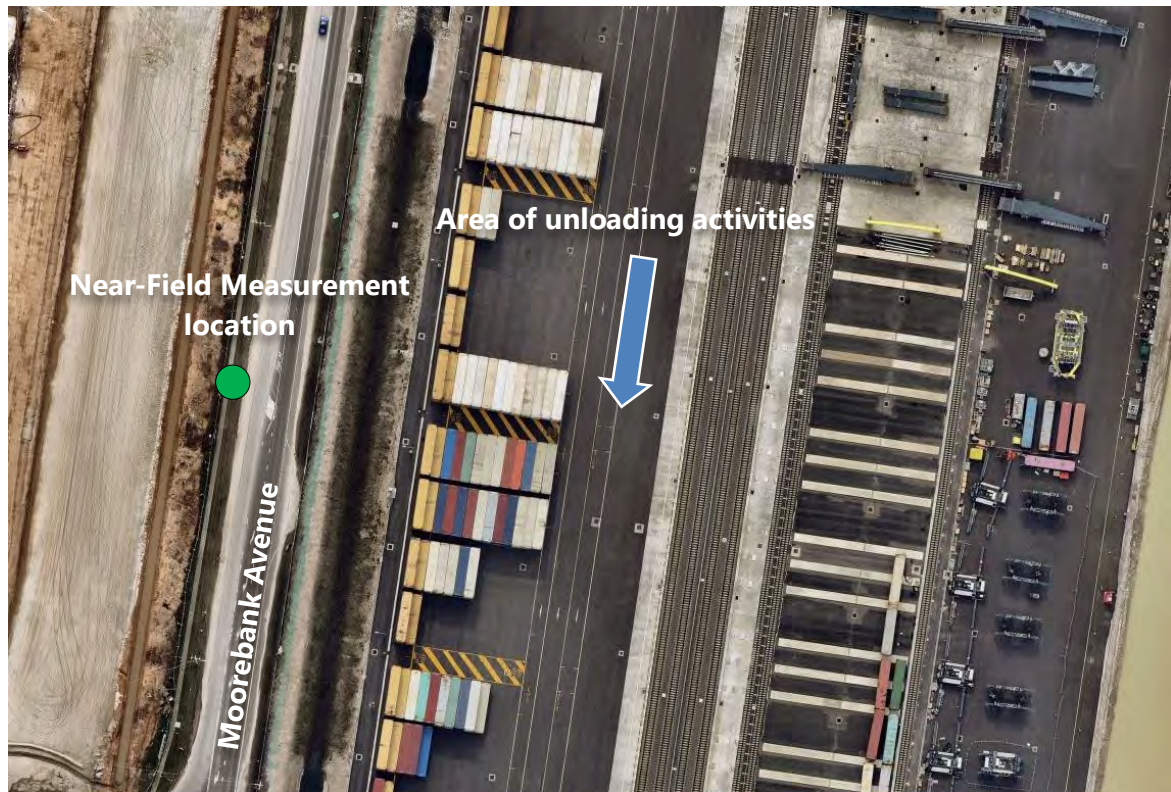


Figure 3 Near-field measurement setup



## 5 Noise measurement results

### 5.1 Near-field locations

Attended noise measurements were performed at a representative near-field measurement location approximately 50 m from the western boundary of the container noise barrier.

Several on-site activities were recorded during the attended noise measurements. These included Reacher Stackers unloading containers from the freight train onto trucks, Reacher Stackers unloading containers from the freight train and stacking them behind the container noise barriers at the eastern boundary, and locomotive idling noise.

The typical worst-case  $L_{Aeq(15 \text{ minute})}$  noise level is related to the above activities and was considered in the modelling described in Section 6.

A summary of the near-field noise measurement results is provided in Table 5. The reported noise levels represent the typical worst-case noise events observed during the measurement survey.

**Table 5 Summary of near-field noise measurement results**

Activity noise sources	Time	Measurement Duration, t (sec)	Measurement Distance, m	Measured noise levels, dB(A)	
				$L_{Aeq(t)}$	$L_{AFmax}$
<b>Freight train</b>					
Engine Idling	5:25 am	12	110	52	54
<b>Reacher Stacker</b>					
Grabbing & Dropping Sound	5:14 am	3	95	59	68
Engine revving	5:17 am	11	60	57	58
Engine Idling	5:17 am	17	55	57	57
Reverse Beeping	5:16 am	11	60	62	64

Note: After 5:30am, it was not possible to quantify the noise contribution from site activities in the presence of high ambient noise from continuous road traffic on Moorebank Avenue.

### 5.2 Far-field attended measurements at sensitive residential receivers

Attended noise measurements were performed at the residential boundary of the nearest residential receivers at locations M3, M4 and NMT 04 (refer Figure 1). Results from the attended noise measurements are provided in Table 7.

At the three far-field noise measurement locations, noise emissions from the container unloading activities were not audible in the presence of the ambient noise environment. At measurement location M3, this included the time period when the loudest grabbing / dropping sound was observed at the near-field location (5:14am).

### 5.3 Far-field unattended noise measurements

Continuous noise monitoring is currently being performed at four noise-sensitive locations in accordance with Approval Condition B64 (SSD 7628) (see Section 4.1.2 of ONVMP).

During the attended noise measurements, the permanent noise monitors were configured to perform audio recordings and short-term statistical noise measurements. This setup allowed the unattended measurement results to be post-processed to determine if the container unloading operations are audible at the sensitive receiver locations.

Following the attended measurements, the noise measurements results were downloaded and analysed. It was confirmed that the container unloading activities were not audible in the presence of the ambient noise environment, including the time period when the loudest grabbing / dropping sound was observed at the near-field location (5:14am).

A summary of the noise measurement results during the time period when the loudest grabbing / dropping sound was audible at the near-field location is provided in Table 6. During this period, the grabbing / dropping noise was not audible in the sound recordings.

A summary of the measured  $L_{Aeq(15\text{minute})}$  noise levels during the 4:30 am to 7:30 am period is provided in Table 7.

**Table 6 Far-field unattended noise measurement results**

Monitoring station	Approximate distance (m) from MPE East Precinct	Time period	Measured $L_{A,1\text{min}}$ Noise Level, dB(A)	Audibility
NMT 01	550	5:14 am to 5:15 am	53	Site activities not audible
NMT 02	1250	5:14 am to 5:15 am	53	Site activities not audible
NMT 03	700	5:14 am to 5:15 am	50	Site activities not audible
NMT 04	1000	5:14 am to 5:15 am	47	Site activities not audible

### 5.4 Weather conditions

Observations of the weather conditions were made using a hand-held MS6252B digital anemometer. The air temperature during the survey was 17°C, relative humidity 50%, average wind speed 0.5 m/s (SW) and 40% cloud cover. There was no precipitation.

The weather conditions during the survey were conducive for measuring noise under typical environmental conditions.

**Table 7 Summary of attended and unattended noise measurement results at the nearest sensitive residential receivers (far field)**

ID	Address	Measurement Method	Assessment period	L <sub>Aeq, 15minute</sub> noise criterion, dB(A)	L <sub>A1, 1 minute</sub> noise criterion, dB(A)	Measurement period	Measured noise levels, dB(A)		Estimated MPE noise contribution, dB(A)		Comments and measured L <sub>Amax</sub> noise levels from typical events	MPE Noise Levels Comply?
							L <sub>Aeq, 15minute</sub>	L <sub>AF,90%</sub>	L <sub>Aeq, 15minute-</sub>	L <sub>AFmax</sub>		
<b>M3 – Casula</b>												
1	St Andrews Park	Attended	Night	35	47	04/09/20 05:13 - 05:28	57	47	Note 1	Note 1	Background noise dominated by noise from the M5 traffic noise: M5 49-50dB(A), Animal 49-50dB(A), Rail Traffic 75-78 dB(A)	Yes
2	St Andrews Park	Attended	Night	35	47	04/09/20 05:33 - 05:48	62	55	Note 1	Note 1	Background noise dominated by noise from the M5 traffic noise: M5 49-50dB(A), Animal 59-60dB(A), Rail Traffic 80-81 dB(A), Road traffic 57-59dB(A)	Yes
3	St Andrews Park	Attended	Night	35	47	04/09/20 05:57 - 06:12	60	59	Note 1	Note 1	Background noise dominated by noise from the M5 traffic noise: M5 49-51dB(A), Animal 59-60dB(A), Rail Traffic 79-80 dB(A), Road traffic 52-53dB(A), Distance Construction noise 54-55	Yes
<b>14 Dunmore Crescent</b>												
4	14 Dunmore Crescent	Attended	Night	35	50	04/09/20 04:47 - 05:02	48	46	Note 1	Note 1	Background noise dominated by noise from the Hume Highway: Road Traffic 49-51dB(A), Rail Traffic 51-52dB(A), Animal noise 47-48 dB(A)	Yes
5	14 Dunmore Crescent	Attended	Night/Day	35	50	04/09/20 06:55 - 07:10	51	50	Note 1	Note 1	Background noise dominated by noise from the Hume Highway: Road Traffic 49-51dB(A), Rail Traffic 51-52dB(A), Animal noise 47-48 dB(A)	Yes
6	14 Dunmore Crescent	Attended	Day	35	-	19/02/20 07:10 - 07:25	61	51	Note 1	Note 1	Background noise dominated by noise from the Hume Highway: Road Traffic 50-51dB(A), Rail Traffic 50-51dB(A)	Yes
7	14 Dunmore Crescent	Attended	Day	35	-	19/02/20 07:26 - 07:41	55	53	Note 1	Note 1	Background noise dominated by noise from the Hume Highway: Road Traffic 50-51dB(A), Rail Traffic 50-51dB(A), Freight Train 56-57dB(A)	Yes
<b>M4 – Glenfield</b>												
8	26 Goodenough Street	Attended	Night	35	51	04/09/20 06:26 - 06:41	56	54	Note 1	Note 1	Background noise dominated by noise from the Cambridge Ave: Road Traffic 58-59 dB(A), Animal 58-59dB(A)	Yes
<b>NMT 01 - Wattle Grove North</b>												
9	22 Glenelg Court	Unattended	Night	35	52	04/09/20 04:30- 04:45	55	52	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 04:45- 05:00	52	49	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 05:00- 05:15	52	47	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 05:15- 05:30	54	49	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 05:30- 05:45	56	54	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 05:45- 06:00	56	54	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 06:00- 06:15	57	54	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 06:15- 06:30	57	53	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 06:30- 06:45	57	53	-	-	Refer Table 6	Yes
			Night	35	52	04/09/20 06:45- 07:00	57	53	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:00- 07:15	58	55	-	-	Refer Table 6	Yes
Day	35	-	04/09/20 07:15- 07:30	57	54	-	-	Refer Table 6	Yes			
<b>NMT 02 – Glenfield</b>												
10	26 Goodenough Street	Unattended	Night	35	51	04/09/20 04:30- 04:45	50	46	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 04:45- 05:00	50	46	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 05:00- 05:15	53	50	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 05:15- 05:30	52	48	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 05:30- 05:45	54	52	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 05:45- 06:00	55	53	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 06:00- 06:15	56	53	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 06:15- 06:30	55	54	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 06:30- 06:45	59	54	-	-	Refer Table 6	Yes
			Night	35	51	04/09/20 06:45- 07:00	55	54	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:00- 07:15	57	54	-	-	Refer Table 6	Yes
Day	35	-	04/09/20 07:15- 07:30	56	54	-	-	Refer Table 6	Yes			

ID	Address	Measurement Method	Assessment period	L <sub>Aeq, 15minute</sub> noise criterion, dB(A)	L <sub>A1, 1 minute</sub> noise criterion, dB(A)	Measurement period	Measured noise levels, dB(A)		Estimated MPE noise contribution, dB(A)		Comments and measured L <sub>Amax</sub> noise levels from typical events	MPE Noise Levels Comply?
							L <sub>Aeq, 15minute</sub>	L <sub>AF,90%</sub>	L <sub>Aeq, 15minute</sub>	L <sub>AFmax</sub>		
<b>NMT 03 – Wattle Grove</b>												
11	31 Martindale Court	Unattended	Night	35	47	04/09/20 04:30- 04:45	50	48	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 04:45- 05:00	51	50	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 05:00- 05:15	50	48	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 05:15- 05:30	56	48	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 05:30- 05:45	53	52	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 05:45- 06:00	55	52	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 06:00- 06:15	52	52	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 06:15- 06:30	51	50	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 06:30- 06:45	53	50	-	-	Refer Table 6	Yes
			Night	35	47	04/09/20 06:45- 07:00	57	51	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:00- 07:15	54	51	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:15- 07:30	55	53	-	-	Refer Table 6	Yes
<b>NMT 04 – Casula</b>												
12	14 Dunmore Crescent	Unattended	Night	35	50	04/09/20 04:30- 04:45	57	44	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 04:45- 05:00	51	41	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 05:00- 05:15	50	42	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 05:15- 05:30	51	46	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 05:30- 05:45	52	49	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 05:45- 06:00	53	48	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 06:00- 06:15	51	49	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 06:15- 06:30	55	50	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 06:30- 06:45	57	52	-	-	Refer Table 6	Yes
			Night	35	50	04/09/20 06:45- 07:00	56	54	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:00- 07:15	55	52	-	-	Refer Table 6	Yes
			Day	35	-	04/09/20 07:15- 07:30	61	54	-	-	Refer Table 6	Yes

Note 1: Since noise levels from the MPE were not audible during the measurement period, it was not possible to estimate the MPE noise contribution

## 6 Noise modelling results

### 6.1 Overview of noise modelling

Since noise levels from the container unloading operations were not audible at the nearest residential receivers, and it was not possible to measure the MLE noise contribution directly, computer noise modelling was employed to calculate the container noise stacking operational noise levels at the far-field locations. The source noise levels in the computer noise model are based on the typical worst-case attended noise measurement results at the near-field location (see Table 5).

### 6.2 General modelling assumptions

The CadnaA (version 2020) noise model has been utilised to predict the far-field noise levels at the nearest residential receivers. The noise predictions are based on the CONCAWE noise prediction algorithms.

The CONCAWE method was originally developed for predicting the long-distance propagation of noise from petrochemical complexes. It is especially suited to predicting noise propagation over large distances because it accounts for a range of atmospheric conditions that can significantly influence the propagation of noise over large distances.

Noting that the nearest residential receiver in the vicinity of MPE Facility is at least 770 m from the site, the CONCAWE environmental noise prediction method is an appropriate method for predicting the noise propagation. The noise modelling calculations account for the following:

- Ground topography;
- Buildings and structures (including the container noise barrier);
- All sources behave as point, or moving point sources;
- Ground absorption;
- Representative operational noise sources as required; and
- Meteorological conditions.

### 6.3 Noise model predictions

A summary of the predicted noise levels at the nearest residential receiver locations are compared with the project specified noise criteria in Table 8. The noise predictions are based on the typical worst-case noise measurements at the near-field measurement location and represent unloading operations which include locomotive idling, Reacher Stacker operations and truck operations. The predicted noise levels are evaluated at the property boundary of the nearest residential receivers.

A separate noise modelling scenario was run for the  $L_{AFmax}$  grabbing / dropping sound in order to evaluate the potential sleep disturbance impacts.

**Table 8 Predicted noise levels at nearest residential receivers**

Location	Distance (m)	$L_{Aeq(15minute)}$ noise management criteria, dB(A)	$L_{A1, 1minute}$ noise management criteria, dB(A)	Predicted noise levels, dB(A)	
				$L_{Aeq(15minute)}$	$L_{AFmax} /$ $L_{A1, 1minute}$
M1 - Wattle Grove	770	35	52	30	44
M2 - Wattle Grove North	1,050	35	51	21	29
M3 - Casula	960	35	47	26	39
M4 - Glenfield	1,250	35	50	14	28
Glenfield Farm	1,500	35	47	22	36

## 7 Discussion

Attended noise measurements at near-field distances of up to 100 m have been used to quantify the source noise levels of typical operations associated with container unloading and stacking operations. The highest noise levels occurred at 5:14 am, generating a  $L_{Amax}$  noise level of 57 dB(A) at a distance of 95 m (container grabbing / dropping sound).

At the far-field noise measurement locations, noise emissions from the container unloading and stacking operations were not audible during the night-time measurement period in the presence of other ambient noise sources. The noise recordings at the permanent noise monitoring sites were reviewed during the time period when the highest container grabbing / dropping sound was observed at the near-field measurement locations. This  $L_{Amax}$  noise event was not audible at the permanent noise monitoring locations or at the attended far-field noise measurement location (M3).

Since the airborne noise levels from container unloading operations were not audible, computer noise modelling was performed, based on the near-field noise measurement results, to quantify the noise contribution from typical worst-case site activities. The noise level calculations in Table 8 verify that the predicted noise levels comply with the  $L_{Aeq(15 \text{ minute})}$  and  $L_{A1(1 \text{ minute})}$  noise management criteria at the nearest sensitive receivers.

## 8 Conclusion

This report presents the results of container noise barrier measurements representative near-and far-field locations in proximity to Moorebank Precinct East (MPE). The measurements were performed in accordance with the requirements of the NSW *Industrial Noise Policy* (INP) and the Container Noise Barrier Management Plan to verify compliance with the noise limits in SSD Approval 6766. The measurements were performed during the night-time period on 4 September 2020 during container unloading and stacking operations.

At the nearest residential receivers, the measured  $L_{Aeq(15\text{minute})}$  noise levels were dominated by extraneous noise sources apart from the MPE activities. MPE noise sources were not audible during any of the measurement periods at the nearest residential receivers. On this basis, near-field measurement data was utilised in conjunction with computer noise modelling to quantify the typical worst-case noise contribution from the facility.

Based on the calculated noise levels in Table 8, it is concluded that the current noise levels comply with the project-specific noise management criteria and sleep disturbance screening levels in Approval Condition F5A of SSD 6766.

## APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).																																														
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.																																														
Assessment period	The period in a day over which assessments are made.																																														
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.																																														
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).																																														
Decibel [dB]	<p>The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:</p> <table border="0"> <tr> <td>threshold of hearing</td> <td>0 dB</td> <td>The faintest sound we can hear</td> </tr> <tr> <td></td> <td>10 dB</td> <td>Human breathing</td> </tr> <tr> <td>almost silent</td> <td>20 dB</td> <td></td> </tr> <tr> <td></td> <td>30 dB</td> <td>Quiet bedroom or in a quiet national park location</td> </tr> <tr> <td>generally quiet</td> <td>40 dB</td> <td>Library</td> </tr> <tr> <td></td> <td>50 dB</td> <td>Typical office space or ambience in the city at night</td> </tr> <tr> <td>moderately loud</td> <td>60 dB</td> <td>CBD mall at lunch time</td> </tr> <tr> <td></td> <td>70 dB</td> <td>The sound of a car passing on the street</td> </tr> <tr> <td>loud</td> <td>80 dB</td> <td>Loud music played at home</td> </tr> <tr> <td></td> <td>90 dB</td> <td>The sound of a truck passing on the street</td> </tr> <tr> <td>very loud</td> <td>100 dB</td> <td>Indoor rock band concert</td> </tr> <tr> <td></td> <td>110 dB</td> <td>Operating a chainsaw or jackhammer</td> </tr> <tr> <td>extremely loud</td> <td>120 dB</td> <td>Jet plane take-off at 100m away</td> </tr> <tr> <td>threshold of pain</td> <td>130 dB</td> <td></td> </tr> <tr> <td></td> <td>140 dB</td> <td>Military jet take-off at 25m away</td> </tr> </table>		threshold of hearing	0 dB	The faintest sound we can hear		10 dB	Human breathing	almost silent	20 dB			30 dB	Quiet bedroom or in a quiet national park location	generally quiet	40 dB	Library		50 dB	Typical office space or ambience in the city at night	moderately loud	60 dB	CBD mall at lunch time		70 dB	The sound of a car passing on the street	loud	80 dB	Loud music played at home		90 dB	The sound of a truck passing on the street	very loud	100 dB	Indoor rock band concert		110 dB	Operating a chainsaw or jackhammer	extremely loud	120 dB	Jet plane take-off at 100m away	threshold of pain	130 dB			140 dB	Military jet take-off at 25m away
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dB(A)	A-weighted decibels. The A-weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.																																														
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.																																														

Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L <sub>Max</sub>	The maximum sound pressure level measured over a given period.
L <sub>Min</sub>	The minimum sound pressure level measured over a given period.
L <sub>1</sub>	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L <sub>10</sub>	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L <sub>90</sub>	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L <sub>eq</sub>	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

# MOOREBANK LOGISTIC PARK - PRECINCT EAST

## Caesarstone Warehouse Operational Compliance Measurements

1 December 2020

Qube Property Management Services Pty Ltd c/- Tactical Group

TL116-05.4F08 Caesarstone Warehouse Ops (r2).docx

## Document details

Detail	Reference
Doc reference:	TL116-05.4F08 Caesarstone Warehouse Ops (r2).docx
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## Document control

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## Contents

1	Introduction	5
1.1	Warehouse operations description – Caesarstone	6
1.1.1	Location	6
1.1.2	Operational activities and facilities and hours of operation	6
1.2	Nearby sensitive receivers	6
2	Summary of noise objectives	9
2.1	Compliance assessment noise requirements	9
2.2	Operational noise limits	9
2.3	Discussion of assessment noise limits	10
3	Measurement methodology and results	12
3.1	Compliance measurement methodology	12
3.2	Instrumentation	13
3.3	Receiver unattended noise measurement results	13
3.3.1	Meteorological conditions	16
3.4	On-site attended operational activity noise measurement results	18
3.5	Unattended noise measurements	18
3.6	Modelled operational scenarios	20
3.6.1	Observed operations for modelling	20
3.6.1.1	Ute and despatching operations (Caesarstone south)	21
3.6.1.2	Qube container handling operational area	21
3.6.2	Assessment noise source levels	22
3.6.3	Reasonable worst-case intrusiveness scenarios (15-minute period)	22
3.7	Modelling methodology	25
3.7.1	Overview of noise modelling	25
3.7.2	General modelling assumptions	25
3.7.3	Model validation	26
3.8	Noise compliance assessment	26
4	Conclusion	29
APPENDIX A	Glossary of terminology	31
APPENDIX B	Logger location 1 – Caesarstone - North side	33
APPENDIX C	Logger location 2 – Caesarstone – South side	34

## List of tables

Table 1	Noise sensitive receivers and approximate distance from MPE warehouse (Caesarstone)	7
Table 2	SSD 7628 CoC B80 noise limits, dB(A)	10
Table 3	Noise measurement equipment	13

Table 4	Permanent noise monitoring stations	13
Table 5	Receiver permanent noise monitoring locations	14
Table 6	Summary of permanent noise monitoring results at the nearest sensitive residential receivers	15
Table 7	On-site attended measurement results	18
Table 8	Assessment noise source levels	22
Table 9	Representative 'reasonable' worst-case 15-minute intrusive assessment scenarios	24
Table 10	Comparison between measured and modelled noise levels	26
Table 11	Predicted noise levels - Reasonable worst-case scenarios for warehouse (Caesarstone)	27

### List of figures

Figure 1	Warehouse location (Caesarstone), MPE precinct and the nearest residential receivers	8
Figure 2	Residential receiver noise monitoring locations	17
Figure 3	Unattended noise logger locations and main noise generation areas (imagery: Nearmap, 2020)	20

# 1 Introduction

Renzo Tonin & Associates was engaged by Tactical on behalf of Qube Property Management Services Pty Ltd (QUBE) to undertake an operational noise compliance assessment of the warehouse operations carried out by Caesarstone (Warehouse 3A (WH3A)) within the Moorebank Precinct East (MPE), located within the Moorebank Logistics Park (MLP) at Moorebank, NSW.

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stages 1 and 2 of the MPE Project (SSD 6766 and SSD 7628 respectively), which together comprise the two stages of development under the MPE Concept Approval (MP10\_0193). Warehouse operations, including the site that is operated by Caesarstone (WH3A), fall under the area and activities approved as part of SSD 7628.

This report has been prepared to address the operational noise monitoring requirements outlined in the MPE Operational Noise and Vibration Management Plan<sup>1</sup> (MPE ONVMP) required for the warehouse operations carried out by Caesarstone. Specifically, this report has been prepared to address the requirements of Condition of Consent (CoC) B85 in State Significant Development (SSD) 7628, as detailed in Section 3.2.2 of the MPE ONVMP.

Appendix A contains a glossary of acoustic terms used in this report.

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<sup>1</sup> Arcadis & Renzo Tonin & Associates, Operational Noise and Vibration Management Plan for Moorebank Logistics Park – East Precinct, Revision 012, dated 27/3/2020, available [https://simta.com.au/wordpress/wp-content/uploads/2020/04/ONVMP\\_V12\\_redacted.pdf](https://simta.com.au/wordpress/wp-content/uploads/2020/04/ONVMP_V12_redacted.pdf), accessed 8/10/2020

## 1.1 Warehouse operations description – Caesarstone

### 1.1.1 Location

The MLP is located approximately 27 kilometres south-west of the Sydney Central Business District and approximately 26 kilometres west of Port Botany, within the Liverpool Local Government Area. The MLP is divided into an East Precinct and a West Precinct, located east and west of Moorebank Avenue respectively, as shown in Figure 1.

### 1.1.2 Operational activities and facilities and hours of operation

Caesarstone undertakes storage and distribution activities from the warehouse designated WH3A within the MPE. The day to day activities include:

- Receipt and despatch of containers from and to the IMEX terminal
- Loading and unloading of containers
- Storage of stone product
- Despatching and receiving product to commercial customers using internal equipment such as gantry cranes and forklifts
- Internal product moving and loading activities, including use of gantry cranes and forklifts
- General office administrative and support functions.

The despatch activities mostly occur from the south side of the Caesarstone warehouse, typically between the hours of 9:00am and 8:00pm, with the busiest period around 9:00am to 11:00am. The noise generating vehicle movements associated with the general commercial customer activities mostly occur from the southern side of the warehouse. The northern side of the warehouse is the designated area where containers from the IMEX terminal or other sources are transported to and stored for unloading to within the warehouse. These two main areas are shown in Figure 3.

## 1.2 Nearby sensitive receivers

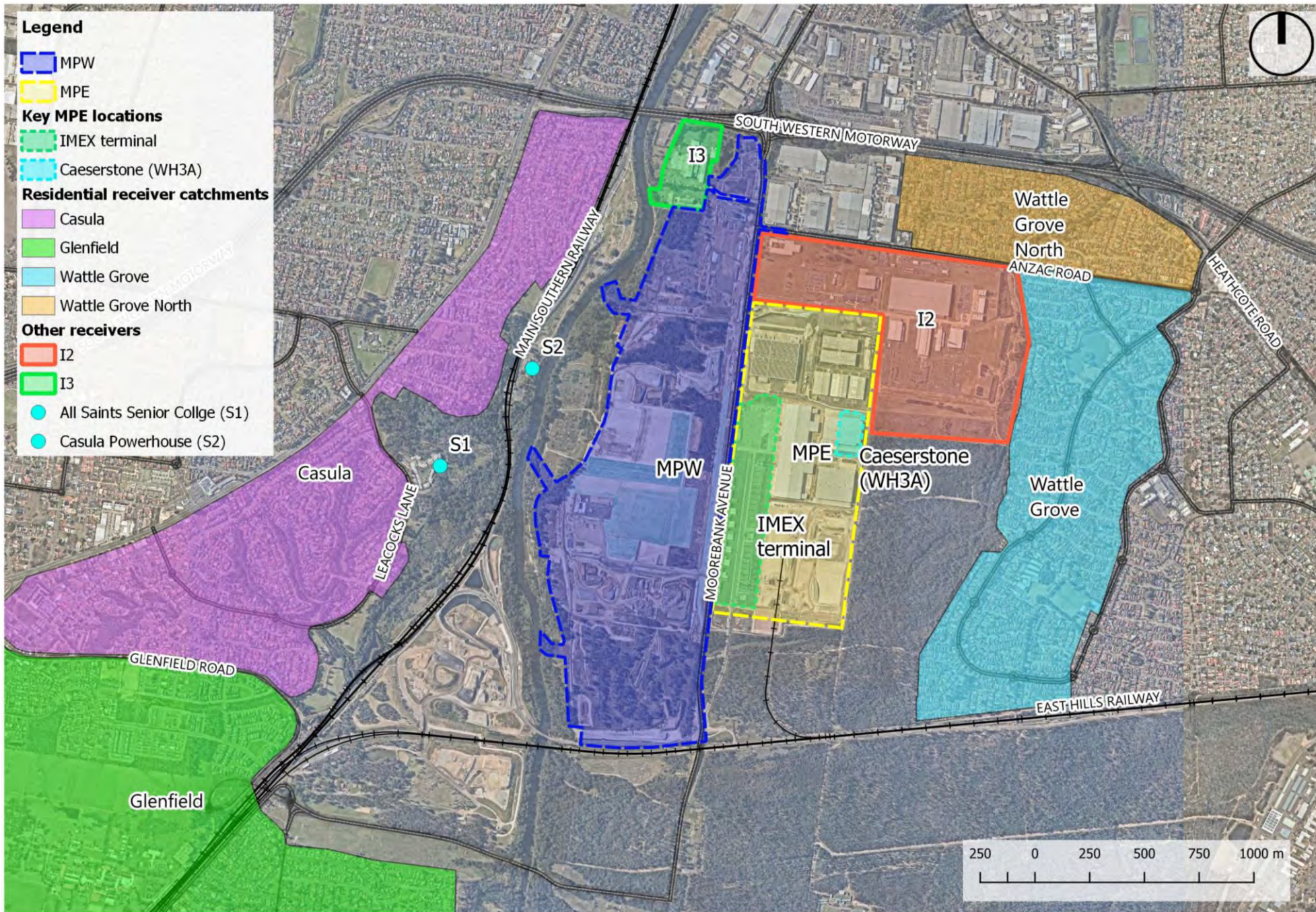
The potentially most affected residential receivers in the vicinity of the MPE, when noise intensive activities at the Caesarstone warehouse are occurring, are located in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North. A summary of the approximate distance to the nearest residential receiver in the surround noise catchment areas (NCAs) is provided in Table 1. The locations of the NCAs or receivers, are shown in Figure 1.

**Table 1 Noise sensitive receivers and approximate distance from MPE warehouse (Caesarstone)**

Sensitive receiver (Noise Catchment Area (NCA) or Receiver ID)	Receiver type	Approximate distance from MPE precinct warehouse (Caesarstone), metres
Wattle Grove (NCA 1)	Residential	700
Wattle Grove North (NCA 2)		820
Casula (NCA 3)		1,400
Glenfield (NCA 4)		2,700
All Saints Senior College (S1)	Educational	1,800
Casula Powerhouse (S2)		1,400
Defence Joint Logistics Unit (DJLU) (I2)	Industrial	130
ABB (I3)		1,120

Notes: 1. Moorebank Precinct West (MPW) has not been assessed as the final receiver locations have not been confirmed or constructed.

Figure 1 Warehouse location (Caesarstone), MPE precinct and the nearest residential receivers



## 2 Summary of noise objectives

### 2.1 Compliance assessment noise requirements

The management of operational noise emission from warehouse activities within MPE Stage 2 is outlined in the MPE ONVMP. Specifically, this report has been prepared to address the requirements of CoC B85 in SSD 7628, as detailed in Section 4.1.1 of the MPE ONVMP.

This report includes noise monitoring performed to address the requirements in CoC B85, as detailed in Table 4-1 in Section 4.1.1 of the MPE ONVMP.

The requirements of CoC B85 state:

*B85 The Applicant must carry out noise monitoring of mechanical plant and other noisy equipment for a minimum period of one week where valid data is collected following occupation of each warehouse. The monitoring program must be carried out by a suitably qualified and experienced person(s) and a Monitoring Report for Mechanical Plant must be submitted to the Secretary within two months of occupation or each tenancy to verify predicted mechanical plant and equipment noise levels.*

CoC B85 requires that the monitored noise levels be compared against the predicted levels reviewed in accordance with CoC B84.

The noise impacts from warehouse operations were assessed as part of the EIS noise and vibration impact assessment (MPE Stage 2 Noise and Vibration Impact Assessment, Wilkinson Murray, Report No. 12186-S2, Version C, 29 November 2016 (MPE Stage 2 N&V assessment)). The individual noise impacts of warehouse operations were not quantified as part of the EIS. As such, noise level predictions for the warehouse activities are not available for verification with CoC B85.

As per Table 4-1 in Section 4.1.1 of the MPE ONVMP, Table 3-20 and Table 3-21 of the MPE ONVMP detail the predicted  $L_{Aeq\ 15\ minute}$  intrusiveness and  $L_{Amax}$  sleep disturbance noise limit levels respectively for the overall MPE operations (not for individual warehouses).

As such, for the purposes of addressing CoC B85, instead of comparing the facility noise emission against the noise level predicted in accordance with CoC B84, this report aims to assess the noise levels from the mechanical plant and other noisy equipment that operate within the facility directly against the noise limits presented in Table 5 of condition B80.

### 2.2 Operational noise limits

The operational noise limits applicable for the warehouse operations within MPE are presented in Table 5 of SSD 7628 CoC B80 and are reproduced in Table 2. These noise limits are as per Table 3-5 of

the MPE ONVMP. The noise limits are applicable not only to all operational noise sources approved under SSD 7628, but are inclusive of operations as part of MPE Stage 1, approval SSD 6766.

The  $L_{Aeq(15 \text{ minute})}$  criteria are applicable during the day, evening and night-time periods and the  $L_{A1(1 \text{ minute})}$  sleep disturbance noise limits at residential receivers are applicable during the night-time period.

The noise limits are applicable under prevailing meteorological conditions of wind speeds of up to 3 m/s at 10 metres above ground level or stability category 'F' temperature inversion conditions.

**Table 2 SSD 7628 CoC B80 noise limits, dB(A)**

Sensitive receiver	Day <sup>1</sup>	Evening <sup>1</sup>	Night <sup>1</sup>	Night <sup>1</sup>
	$L_{Aeq, 15 \text{ minute}}$	$L_{Aeq, 15 \text{ minute}}$	$L_{Aeq, 15 \text{ minute}}$	$L_{A1(1 \text{ min})}$
Wattle Grove (NCA 1)	35	35	35	52
Wattle Grove North (NCA 2)	35	35	35	52
Casula (NCA 3)	35	35	35	52
Glenfield (NCA 4)	35	35	35	52

Notes:

1. In accordance with the INP, day is the period from 7:00 am to 6:00 pm Monday to Saturday; or 8:00 am to 6:00 pm on Sundays and public holidays; evening is the period from 6:00 pm to 10:00 pm; and night is the remaining periods.
2. To determine compliance with the  $L_{Aeq,15 \text{ minute}}$  noise limits, noise from the development is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 7 Noise Policy for Industry - NPfI) The modification factors in Section 4 of the INP must also be applied to the measured noise levels where applicable.
3. To determine compliance with the  $L_{A1}$  noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 7 of the NPfI).
4. The noise emission limits identified above apply under meteorological conditions of:
  - (i) wind speeds of up to 3 m/s at 10 metres above ground level; or
  - (ii) 'F' atmospheric stability class.

## 2.3 Discussion of assessment noise limits

As noted in Section 2.2, the noise limits detailed in SSD 7628 CoC B80 are applicable not only to all operational noise sources approved under SSD 7628, but are also inclusive of operations as part of the MPE Stage 1 approval for SSD 6766. Importantly, when assessing compliance with the noise limits, the most affected residential receiver for any individual operations will not necessarily be at the same location. Additionally, it is unlikely that the reasonable worst-case noise levels from any individual operations would also occur in the same 15-minute period.

As part of the recent modification application for SSD 7709 Moorebank Precinct West (MPW) – Stage 2, MOD 1 - Building height increase (July 2020), a review of the applicable operational noise requirements across Moorebank Precinct West (MPW) and Moorebank Precinct East (MPE) was undertaken (Renzo Tonin & Associates document reference TJ741-11F05 (r4), dated 30 June 2020). The review identified that there are number of approval conditions that are applicable across both the MPW and MPE sites for operational noise, and that in the application of these approvals to the site activities, it became apparent that the operational noise requirements were not consistent across the MPE and MPW sites.

Additionally, the review identified that the operational noise limits across MPE and MPW were set substantially below both the noise criteria and the predicted noise levels (even with feasible and reasonable mitigation measures) established during the environmental assessment stages and considering the cumulative operational noise levels from all MPE and MPW operations.

The review recommended that an overall approach for cumulative operational noise management of the Moorebank intermodal terminal precinct (for East and West precinct) for a “whole of complex” approach be adopted, and that consistent noise management objectives for the Moorebank intermodal terminal precinct’s operational noise be adopted to cover all operations within MPE and MPW. Appropriate and achievable noise management objectives consistent with EPA’s noise policies were also developed in the review.

Following the modification application for SSD 7709 (MOD 1), the submission received from the NSW Environment Protection Authority (NSW EPA) noted the following:

*However, the current noise limits are set below the predicted noise levels and are not based on the Project Specific Noise Levels (PSNL) derived under the then-applicable Industrial Noise Policy 2000 (now superseded by the Noise Policy for Industry 2017)... The EPA considers that the resulting noise limits are not achievable for MPW, nor are they achievable for the cumulative MPW and MPE sites.*

Also Liverpool City Council included in their submission:

*Council considers that site regulation in regard to noise management may be assisted by adopting a precinct approach consistent with the NSW EPA’s Noise Policy for Industry (2017)... Whilst it is acknowledged that current criteria in the Approval may be impracticable, it will be necessary for the Department to consider applying suitable noise limits that are achievable and capable of protecting the amenity and wellbeing of sensitive receivers.*

As such, this operational compliance assessment does not include further quantification of cumulative noise levels, and demonstrates that Caesarstone warehouse operations can achieve the noise limits set out in SSD 7628 CoC B80 in isolation during reasonable worst-case operations.

It is recommended that noise levels from this assessment achieve the required noise limits set out in Table 5 of SSD 7628 CoC B80, and that the site specific noise levels should be considered as part of the operational noise management applicable to the overall Moorebank intermodal terminal precinct.

## 3 Measurement methodology and results

### 3.1 Compliance measurement methodology

The Noise Policy for Industry (NPfI) provides guidance in Chapter 7 for monitoring the performance of a noise-generating industrial facility. In Section 7.1.1, the NPfI provides guidance as to how to review noise emissions of a site where the existing ambient noise levels are already high, resulting in the direct quantification of the noise under investigation not being possible via noise measurements at the receiver location. Additionally, it provides guidance about using noise modelling to review the performance of an industrial operation that is co-located with separate but noise-generating industrial sites impacting the same receiver. To satisfy the requirements of CoC B85, the following noise monitoring and assessment steps have been undertaken:

1. Review of permanent noise monitoring at nearby residential receivers during periods when noise intensive activities were taking place within the Caesarstone warehouse facility to determine if noise levels would allow for quantification of operational noise emissions, and to check if operational noise emissions are quantifiable at the receiver locations during periods of noise intensive on-site activities (Section 3.3).
2. On-site attended monitoring of noise-generating activities to quantify noise emission levels of mechanical plant and other noise-generating activities as part of typical warehouse operations (Section 3.4).
3. Unattended noise monitoring within the Caesarstone warehouse facility for a period of two weeks, with concurrent video, to identify the reasonable worst-case operational scenarios for each major noise-generating area (Section 3.5).

The review of unattended noise monitoring data measurements established that the existing ambient noise levels at the nearest receivers were high and controlled by noise sources outside of MPW, in addition to a number of industrial noise-generating facilities being co-located. As such, direct quantification or estimation of operational noise emissions from the warehouse operations at the sensitive receiver locations was not possible. Noise emissions from the warehouse facility (Caesarstone) have been evaluated using a combination of on-site attended and unattended noise monitoring, combined with noise modelling, in order to quantify the industrial noise emissions from Caesarstone operations.

Following the noise monitoring, the following steps were undertaken to assess the noise level contributions at the nearby sensitive receivers:

1. Review observations of warehouse operations, in addition to the noise monitoring results and associated video, to then determine the reasonable worst-case operational scenarios.
2. Setup and calibrate the noise model for the reasonable worst-case operational scenarios.

- Calculate the operational noise levels from the warehouse operations to all nearby receivers and determine the noise level contribution at the property with the highest noise levels within each NCA.

### 3.2 Instrumentation

A range of noise monitoring equipment was used to undertake the compliance noise monitoring. A summary of measurement equipment and calibration dates is provided in Table 3.

All of the noise monitoring equipment are Class 1 instruments, with calibration certificates current at the time of the measurements. Before and after each series of attended measurements, the calibration of the sound level meters were verified using a reference calibration of 94 dB at 1 kHz. The difference between pre- and post-calibration levels was within 0.5 dB for all measurements.

**Table 3 Noise measurement equipment**

Monitoring location/ purpose	Equipment	Serial No	Last date calibrated
On-site attended noise measurements	NTi XL2	A2A-05312-E0	10/10/2018
Unattended on-site noise measurements (Caesarstone North)	NTi XL2	A2A-1352A-E0	20/12/2019
Unattended on-site noise measurements (Caesarstone South)	NTi XL2	A2A-09356-E0	01/05/2019
Field calibration	B&K 4231	2677710	16/03/2020

Four Envirosuite permanent noise monitors are set up at nearest representative residential locations in the community and are labelled NMT01 to NMT04 in Figure 2.

**Table 4 Permanent noise monitoring stations**

Monitoring location	Description	Equipment	Serial No	Last Date Calibrated
NMT01	Permanent noise monitor	B&K 2250	3025394	12/03/2019
NMT02	Permanent noise monitor	B&K 2250	3025271	12/03/2019
NMT03	Permanent noise monitor	B&K 2250	3025351	12/03/2019
NMT04	Permanent noise monitor	B&K 2250	3025317	12/03/2019

### 3.3 Receiver unattended noise measurement results

As detailed in Section 1.2, the residential receivers nearby to the Caesarstone warehouse facility are located in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North.

As the most intensive period of operational activities at WH3A (Caesarstone) was during the morning period from 10:00 am, noise monitoring data from the permanent noise monitoring stations have been reviewed for the period of 8:00 am and 10:30 am 10 September 2020 during which onsite noise intensive activities were taking place. The permanent noise monitoring stations were configured to record audio and undertaken short-term statistical noise measurements. During this measurement period, attended noise measurements were undertaken on-site of noise generating activities

(see Section 3.4). This assisted to confirm that noise intensive activities were occurring on-site during the reviewed period of permanent noise monitoring data and noise recordings.

A summary of the monitoring locations and the approximate distance to the warehouse (Caesarstone) is provided in Table 5. These locations along with the noise catchment areas (NCAs) are presented in Figure 2.

**Table 5 Receiver permanent noise monitoring locations**

Monitoring location ID	Monitoring location (applicable NCA) (see Figure 2)	Approximate distance (m) from warehouse (Caesarstone)
NMT01	22 Glenelg Court, Wattle Grove (Wattle Grove North – NCA2)	810
NMT02	26 Goodenough Street, Glenfield (Glenfield – NCA4)	2,700
NMT03	31 Martindale Court, Wattle Grove (Wattle Grove – NCA1)	700
NMT04	14 Dunmore Crescent, Casula (Casula – NCA3)	1,600

The results of the permanent noise monitoring results on 10 September 2020 are presented in Table 6.

Attended noise measurements were undertaken at these locations as part of the operational noise compliance monitoring during Quarter 1 2020 (*Renzo Tonin and Associates report, TL116-05F04 Moorebank INP Monitoring Q2 2020 (r1), dated 22 July 2020*) and Quarter 2 2020 (*Renzo Tonin and Associates report, TL116-05F03 Moorebank INP Monitoring Q1 2020 (r2), dated 17 April 2020*), during the daytime period. Noise levels similar to those measured for the periods presented in Table 6 were measured at each of the locations. Audio recordings from a sample of the Table 6 measurements were reviewed, and while the main controlling noise sources could not clearly be distinguished, they were likely controlled by road traffic from nearby arterial roads and other environmental noise sources (ie. birds, helicopters) outside of the MLP site. This is consistent with these previous noise measurements.

Because the noise limits are 35 dB(A)  $L_{Aeq\ 15\ minute}$ , the ambient noise levels were greater than 48 dB(A)  $L_{Aeq\ 15\ minute}$ , and the background noise levels greater than 41 dB(A)  $L_{A90\ 15\ minute}$ , and given that on-site activity noise levels are expected to result in noise levels less than 35 dB(A)  $L_{Aeq\ 15\ minute}$  at all residential receiver locations, noise from Caesarstone warehouse on-site activities was not expected to be audible and/or distinguishable. Furthermore, if any noise generating activity was audible, direct quantification or estimation of operational noise emissions from the warehouse operations at the sensitive receiver locations would not be possible in the presence of the ambient noise level environment.

**Table 6 Summary of permanent noise monitoring results at the nearest sensitive residential receivers**

Measurement period	Measured noise level (15 minute), dB(A)			
	L <sub>Amax</sub>	L <sub>A1</sub>	L <sub>Aeq</sub>	L <sub>90</sub>
<b>NMT01 (22 Glenelg Court, Wattle Grove)</b>				
10/09/2020 8:00 am to 8:15 am	75	64	58	47
10/09/2020 8:15 am to 8:30 am	72	64	58	46
10/09/2020 8:30 am to 8:45 am	80	64	58	46
10/09/2020 8:45 am to 9:00 am	70	63	56	46
10/09/2020 9:00 am to 9:15 am	69	63	55	46
10/09/2020 9:15 am to 9:30 am	76	73	63	44
10/09/2020 9:30 am to 9:45 am	78	74	63	44
10/09/2020 9:45 am to 10:00 am	68	62	53	43
10/09/2020 10:00 am to 10:15 am	66	62	54	44
10/09/2020 10:15 am to 10:30 am	66	63	55	46
<b>NMT02 (26 Goodenough Street, Glenfield)</b>				
10/09/2020 8:00 am to 8:15 am	77	66	55	48
10/09/2020 8:15 am to 8:30 am	70	61	51	46
10/09/2020 8:30 am to 8:45 am	73	64	52	45
10/09/2020 8:45 am to 9:00 am	74	67	53	45
10/09/2020 9:00 am to 9:15 am	78	59	51	45
10/09/2020 9:15 am to 9:30 am	75	61	51	42
10/09/2020 9:30 am to 9:45 am	73	64	51	43
10/09/2020 9:45 am to 10:00 am	73	65	53	44
10/09/2020 10:00 am to 10:15 am	72	60	49	43
10/09/2020 10:15 am to 10:30 am	72	64	51	43
<b>NMT03 (31 Martindale Court, Wattle Grove)</b>				
10/09/2020 8:00 am to 8:15 am	73	67	55	43
10/09/2020 8:15 am to 8:30 am	75	58	48	41
10/09/2020 8:30 am to 8:45 am	74	69	56	41
10/09/2020 8:45 am to 9:00 am	74	61	50	41
10/09/2020 9:00 am to 9:15 am	74	58	48	41
10/09/2020 9:15 am to 9:30 am	69	66	56	42
10/09/2020 9:30 am to 9:45 am	73	69	59	54
10/09/2020 9:45 am to 10:00 am	71	60	54	44
10/09/2020 10:00 am to 10:15 am	77	65	53	42
10/09/2020 10:15 am to 10:30 am	71	66	54	42

Measurement period	Measured noise level (15 minute), dB(A)			
	L <sub>Amax</sub>	L <sub>A1</sub>	L <sub>Aeq</sub>	L <sub>90</sub>
<b>NMT04 (14 Dunmore Crescent, Casula)</b>				
10/09/2020 8:00 am to 8:15 am	72	61	52	46
10/09/2020 8:15 am to 8:30 am	80	61	53	47
10/09/2020 8:30 am to 8:45 am	71	64	54	47
10/09/2020 8:45 am to 9:00 am	68	64	56	50
10/09/2020 9:00 am to 9:15 am	73	71	61	51
10/09/2020 9:15 am to 9:30 am	75	69	56	49
10/09/2020 9:30 am to 9:45 am	75	64	54	49
10/09/2020 9:45 am to 10:00 am	73	71	58	49
10/09/2020 10:00 am to 10:15 am	68	61	53	49
10/09/2020 10:15 am to 10:30 am	82	75	62	50

- Notes:
- Noise levels at this location are affected by occasional adjacent train movements
  - Data periods shaded in dark grey at weather affected based upon the MLP meteorological data monitoring station, due to prevailing winds. 10:00am to 10:15am and 9:15am to 9:30am should be excluded due to average wind speeds not < 5m/s.

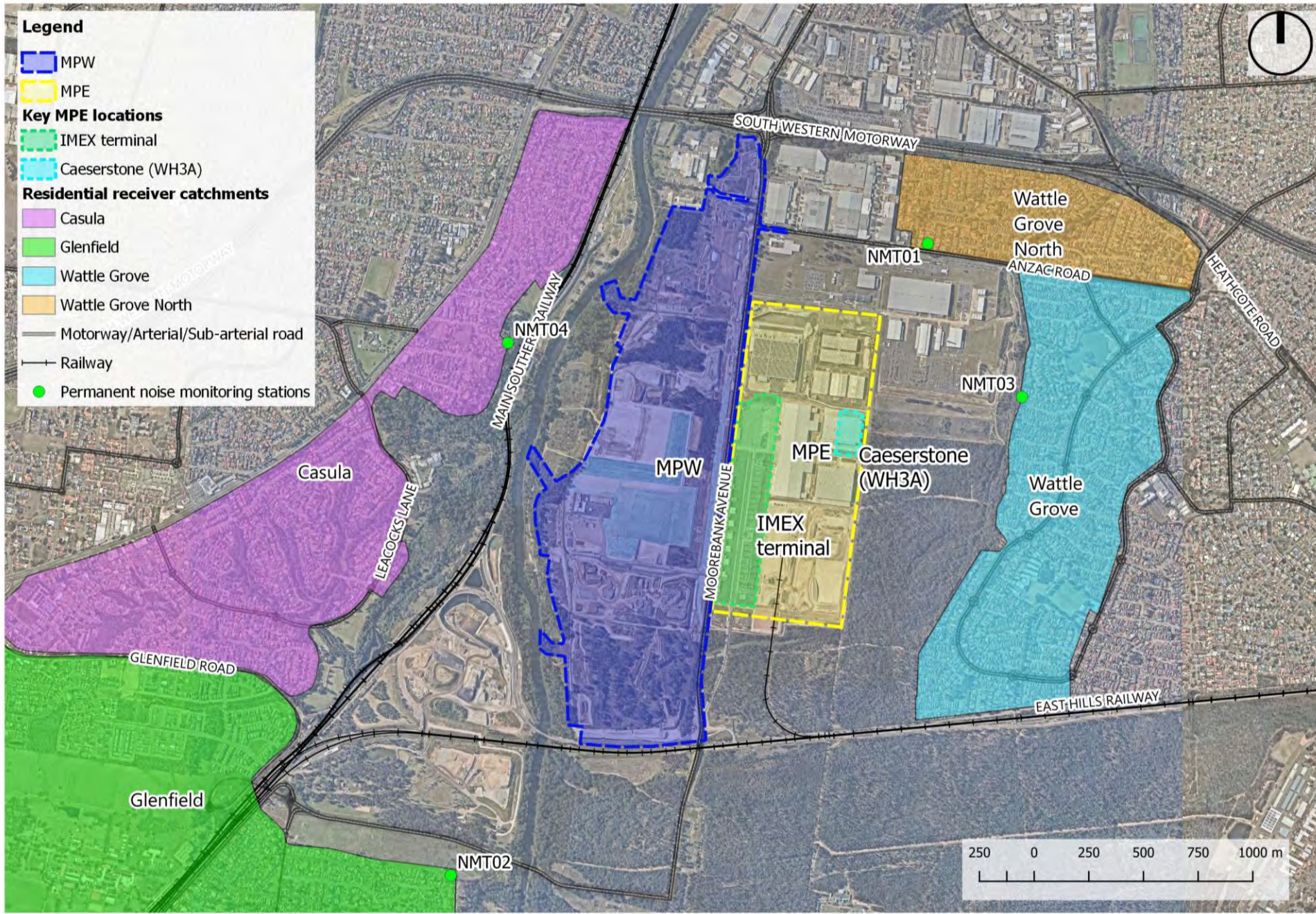
### 3.3.1 Meteorological conditions

Meteorological conditions for the permanent noise monitoring stations has been reviewed for the monitoring period to determine the prevailing wind conditions. Temperature inversion conditions were not considered, as no onsite noise generating activities were observed during the night period (10:00pm to 7:00am). Data from the MLP meteorological data monitoring station adjacent to Moorebank Avenue, within the MPE site, established in accordance with CoC A54 SSD 7709 has been reviewed. It was determined from the review that the receiver permanent noise monitoring noise measurements were undertaken with periods of worst-case prevailing meteorological conditions in accordance with SSD7628 B80.

The meteorological conditions experienced during receiver permanent noise monitoring on 10 September 2020 are summarised below:

- During the measurement period at the facility, the equivalent average wind speed was 1-6 m/s and generally from the SSE, varying from E to SW. 25% of the measurement period was E to SE winds. Periods of data where the average wind speed was greater than 5m/s have been excluded as per the NPfl. All other measurements were not impacted by excessive wind during any of the measurement periods.
- No rain occurred during any of the measurement periods.
- The temperature during the measurement period ranged between 18°C and 24°C, and the cloud conditions were generally clear skies with a few scattered clouds.

Figure 2 Residential receiver noise monitoring locations



### 3.4 On-site attended operational activity noise measurement results

Attended noise measurements of individual operational items and typical operations were undertaken at Caesarstone on 10 September 2020, in order to quantify the noise emissions from noise-generating operational activities. These noise levels have been used to assist in establishing the source noise levels in the noise model.

During all measurements, the specific noise source being measured was the dominant noise source. Observations were made of the on-site operations, which have then been reviewed in conjunction with the video data to model 'reasonable' worst-case operational scenarios over the assessment periods. Critical on-site attended measurement results are summarised in Table 7.

**Table 7 On-site attended measurement results**

Activity noise sources	Date	Time	Measurement duration (t), sec	Measurement distance, m	Measured noise levels, dB(A)	
					L <sub>Aeq(t)</sub>	L <sub>Afmax</sub>
<b>Ute</b>						
Ute pass-by	10/9/2020	2:21 pm	14	25	60	62
Ute Idling	10/9/2020	8:30 am	10	20	52	54
<b>Combi-lift<sup>1</sup></b>						
Grabbing & dropping sound	7/9/2020	7:19 am	2	44	67	71
Engine revving	7/9/2020	7:19 am	10	23	75	76
Engine	7/9/2020	7:20 am	20	38	60	61
Reverse beeper	7/9/2020	7:19 am	12	23	71	74
<b>Internal warehouse noise levels (noise breakout)</b>						
Internal noise sources at loading dock door (loading, internal overhead crane)	10/9/2020	8:30 am	480	At loading dock doorway	66	87
<b>Mechanical plant</b>						
Warehouse smoke exhaust fan <sup>2</sup>	16/9/2020	7:51 am	15	11	62	62
Air condenser unit	10/9/2020	5:36 am	60	1	47	48

- Notes:
1. Same Combi-lift is used at Caesarstone warehouse with similar container handling activities taking place. As such, noise source levels are based on attended measurement from the Target container handling area on the 7 September 2020.
  2. Fan noise levels were not quantifiable from an accessible location, and so fan noise levels are based upon internal noise measurement undertaken at ATS Building Products warehouse, 16 September 2020, as similar model fans are installed within that warehouse.

### 3.5 Unattended noise measurements

Unattended noise measurements were undertaken over the period between 2 September and 15 September 2020 at a location adjacent to the Caesarstone office building on both side of the warehouse. Two main areas of noise-generating operations were identified across the warehouse site, one on the northern side of the warehouse and one on the southern side. These are shown in Figure 3.

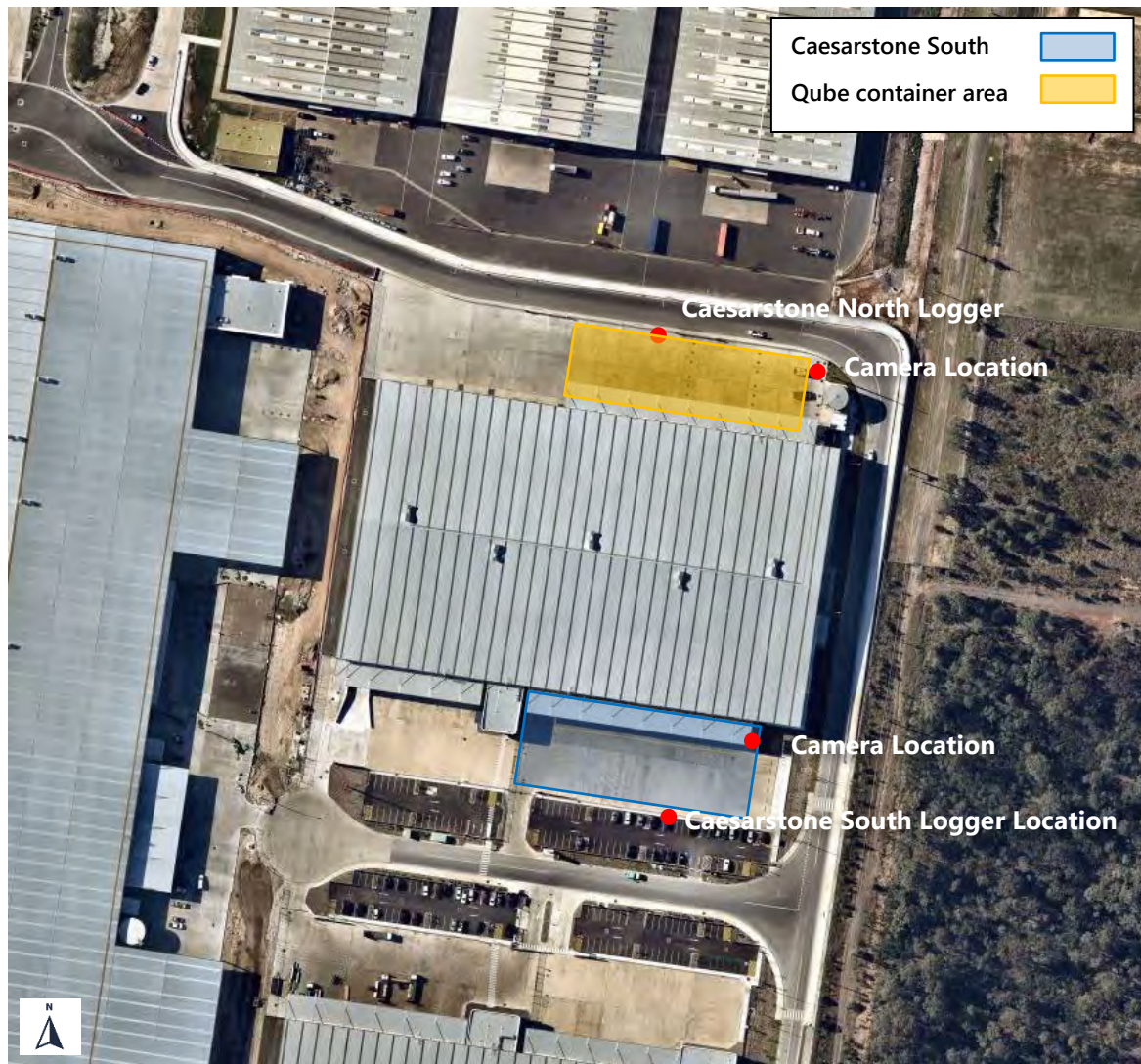
The location of the unattended noise loggers is shown in Figure 3. These were selected so that they would capture noise from the main noise-generating areas as part of the typical warehouse operations. Camera units were setup at west side boundary fence at Caesarstone north and south to assist the engineers in gaining a comprehensive understanding of the site operations and vehicle movements.

The purpose of the noise logging at the selected locations was for the following:

- Determine the noise emissions from the facility at a fixed location close enough to quantify on-site sources.
- Determine the long-term background noise levels when operations were not taking place at the site.
- A source for analysis to determine the duration and nature of the different on-site activities through correlation with the Facility activity data.
- Source of validation for the noise model calibration process.

Detailed unattended noise monitoring results are provided in APPENDIX B for Caesarstone North and APPENDIX C for Caesarstone South. The noise model was validated using the unattended noise logger results, refer to Section 3.7.3 for noise model calibration.

**Figure 3 Unattended noise logger locations and main noise generation areas** (imagery: Nearmap, 2020)



### 3.6 Modelled operational scenarios

#### 3.6.1 Observed operations for modelling

Based upon the on-site attended measurements presented in Section 3.4, the video recording for the facility over the unattended monitoring period presented in Section 3.5, and discussions with Caesarstone personnel, 'reasonable' worst-case operational scenarios were established and modelled to satisfy the assessment periods under SSD 7628.

The following section details the key observations of each of the noise-generating activities that take place across the warehouse operations.

### 3.6.1.1 Ute and despatching operations (Caesarstone south)

The following data on truck operations was obtained from the site observations during the attended measurements on 10 September 2020, and unattended noise measurements / concurrent video recordings between 2 September and 15 September.

- It was observed and confirmed by video movement data, that truck operations were typically commercial customer vehicles, and that a typical 'in-and-out' cycle time in the facility was on median 20 minutes, with each loading cycle taking approximately 10-15 minutes.
- Based upon the attended noise measurement and video data analysis, utes or small trucks operating in the Caesarstone south despatching area travel at a relative low speed of approximately 20 km/h.
- Based upon the attended noise measurement and video data analysis, no loading and unloading of containers or trucks occurred outside of the warehouse on the southside of Caesarstone.
- Loading of products onto commercial customer vehicles operations occurred within the warehouse with the doors open.
- Up to three utes could be loaded simultaneously within the warehouse via the use of overhead gantry cranes.
- The peak periods of commercial customer vehicles entering and exiting the facility from the southern side of the warehouse was between 9:00am to 9:30am, where up to five vehicles movements would occur within a 15 minute period. Commercial customer vehicles continued to enter and exit the facilities during the hours of 9:30am to 8:00pm.

### 3.6.1.2 Qube container handling operational area

- It was observed that one combi-lift is would be used to move containers in and out of the Caesarstone terminal at the Qube container handling operational area. During on-site measurements, it was observed that the combi-lift operate could operate continuously throughout a 15-minute period when handling containers.
- The use of the reversing beepers at the Qube container handling operational area has been considered within the CadnaA modelling process.
- Impact noise events associated with grabbing and dropping would occur when the combi-lift gripper contact individual containers as part of handling operations.
- Tonal reversing beepers are used when a combi-lift is undertaking container handling activities.
- Movements of containers within the Qube area can occur throughout the day time period. However, it was observed movements typically started from approximately 7:00am. Three

containers movements per week were observed from the video data as container movements happens once during the same day.

### 3.6.2 Assessment noise source levels

Source levels for the key noise-generating activities on-site have been established based upon the attended noise measurements (Section 3.4) and unattended noise measurements (Section 3.5) during periods of typical operation. The sound power level inputs presented in Table 8 were used in the operational noise compliance modelling, and adjusted for the duration and frequency of operations (Section 3.6.3).

**Table 8 Assessment noise source levels**

Site items / operation	Individual activity sound power level (SWL) (L <sub>Aeq</sub> , dB(A))
<b>Caesarstone North</b>	
Container combi-lift (moving container activity)	103
Container Trucks	105
Container movement noise events (L <sub>AFmax</sub> )	107
<b>Caesarstone South</b>	
Utes/small trucks idling on site/no engine load movement	69
Commercial customer vehicle (ute/small truck) moving onsite (Ute/small truck) (typical speed onsite approximately 20km/h)	98
<b>Internal noise breakout</b>	
Internal activities noise <sup>1</sup>	66 L <sub>Aeq</sub> internal sound pressure level
<b>Mechanical Plant</b>	
Warehouse air smoke exhaust fan <sup>2</sup>	90
Air condenser unit <sup>3</sup>	69
<b>Other noise sources</b>	
Utes/small trucks moving on internal roads within MLP, outside of the Caesarstone site (typical speed on internal roads of 40km/h)	98

Notes:

1. Attended measurement shows breakout via Caesarstone South & North loading dock door during despatching operations Internal noise levels included internal noise intensive periods when gantry cranes, forklifts and vehicles were in use.
2. Based upon internal measurement based upon internal noise measurement undertaken at ATS Building Products warehouse, 16 September 2020, as similar model fans are installed within that warehouse.
3. Located on both the east and south façades of the warehouse.

### 3.6.3 Reasonable worst-case intrusiveness scenarios (15-minute period)

As the noise limits in CoC B80 are set at 35 dB(A) L<sub>Aeq 15 minute</sub> for the day, evening and night periods, specific separation of noise intensive periods for each of these time periods has not been undertaken. Instead, it is noted that there are two main areas of noise generation as part of typical warehouse operations, as presented in Figure 3.

In order to assess the operational noise emissions from the warehouse, the 'reasonable' worst-case operations for each of the two main areas of noise generation have been developed, along with the corresponding activities in the other noise-generating areas, in order to review a representative snapshot of activities from the warehouse operations. Each of the assessment scenarios have been developed from an analysis of the video movement data over during the two-week period, in addition to the information detailed in Section 3.6.1.

A representative scenario has been established to assess a 'reasonable' worst-case scenario for the northern side of the warehouse, which is the Qube container operation area. A total of three container movements per week were recorded from the video data which recorded for a period of two weeks. The duration of each container operation was approximately 25 minutes or less. During the periods when containers were being moved within the Qube container operation area, internal loading activities were observed within the Caesarstone warehouse.

The Caesarstone south activities were observed to commence from 9:00am, with a peak period of noise intensive activities around the 10:30am to 11:00am.

Two periods representing the 'reasonable' worst-case operations based upon these peak periods of noise intensive activities have been used to assess operational noise emissions. Table 9 details the two 'reasonable' worst-case scenarios (15-minute period), covering the noise intensive periods for the two main areas of noise generation across the site.

All significant noise-generating equipment has been included in the assessment modelling, in addition to the key noise-generating mechanical plant as required by CoC B85. It is noted that the noise contribution from the mechanical plant items serving the warehouse and office area are included in the modelling, however, they generate minimal contribution to the overall noise levels from site operations, which are controlled by other on-site activities such as commercial vehicle departures, arrivals and warehouse internal loading activities.

No onsite noise generating activities were observed during the night period (10:00pm to 7:00am). As such, sources of potential sleep disturbance have not been modelled.

**Table 9 Representative 'reasonable' worst-case 15-minute intrusive assessment scenarios**

Activity	Caesarstone North 15-minute assessment period (Qube container area)	Caesarstone South 15-minute assessment period
<b>Caesarstone North 15-minute noise intensive period (with container handling taking place)</b>		
Departure	One container truck departure from Qube area with 2 containers.	No activity
Arrival	One Combi-lift and one container truck arrival at Qube container operational area	No activity
On-site operations	<p>Container operations:</p> <ul style="list-style-type: none"> <li>a) Removing two empty containers from dock 4 and 5 on to the container truck.</li> <li>b) Moving two new containers from the side into dock 4 and 5.</li> </ul> <p><i>Noise breakout via open warehouse doors.</i> All loading activity are occurring inside the warehouse with warehouse doors open, three noise generating activities occurring concurrently.</p> <ul style="list-style-type: none"> <li>a) Crane operations</li> <li>b) Forklift movements</li> <li>c) Ute idling</li> </ul>	<p><i>Noise breakout via open warehouse doors.</i> All loading activity are occurring inside the warehouse with warehouse doors open, three noise generating activities occurring concurrently.</p> <ul style="list-style-type: none"> <li>a) Crane operations</li> <li>b) Forklift movements</li> <li>c) Ute idling</li> </ul>
<b>Caesarstone South 15-minute noise intensive period</b>		
Departure	No activity	One Ute departure from dock 2
Arrival	No activity	Four Utes arrive at loading dock: <ul style="list-style-type: none"> <li>a) Dock 2</li> <li>b) Dock 3</li> <li>c) Dock 4</li> <li>d) Dock 5</li> </ul>
On-site operations	<p><i>Noise breakout via open warehouse doors.</i> All loading activity is occurring inside the warehouse with warehouse doors open, three noise generating activities occurring concurrently.</p> <ul style="list-style-type: none"> <li>a) Crane operations</li> <li>b) Forklift movements</li> <li>c) Utes idling</li> </ul>	<p><i>Noise breakout via open warehouse doors.</i> All loading activity is occurring inside the warehouse with warehouse doors open, three noise generating activities occurring concurrently.</p> <ul style="list-style-type: none"> <li>a) Crane operations</li> <li>b) Forklift movements</li> <li>c) Utes idling</li> </ul>
<b>Mechanical plant (All scenarios)</b>		
	<ul style="list-style-type: none"> <li>a) Roof top exhaust fan (3 fans)</li> <li>b) Office condenser (9 units) (2 in operation)</li> <li>c) Warehouse air condenser (12 units)</li> </ul>	

## 3.7 Modelling methodology

### 3.7.1 Overview of noise modelling

Since ambient noise levels were well above the project noise limit at the nearest residential receivers, and it was not possible to directly measure or estimate the warehouse noise contribution directly, computer noise modelling was used to calculate the operational noise levels from warehouse operations at the nearby noise sensitive receivers.

### 3.7.2 General modelling assumptions

Modelling and assessment of warehouse noise emissions were determined by modelling the noise sources, receiver locations, existing built structures and topographical features, using CadnaA (version 2020).

The modelling incorporated the worst-case prevailing meteorological conditions, as required by CoC B80, which are wind speeds of up to 3 m/s at 10 metres above ground level for the assessed activities.

The noise predictions are based on the CONCAWE noise prediction algorithms, noting that the nearby noise sensitive receivers are greater 100 metres from the site (except for MPW). The CONCAWE environmental noise prediction method is an appropriate method for predicting noise propagation in these circumstances.

The noise prediction model considers:

- Location of noise sources on-site sensitive receiver locations
- Height of sources and receivers referenced to digital ground contours within the site and outside the site area
- Noise source levels of individual plant, equipment and internal building noise levels, modelled as either point, line or area noise sources. All noise sources associated with the Caesarstone operations within the MPE boundary have been included in the noise modelling, including the truck movements outside of the WH3A Caesarstone warehouse footprint, along internal MPE roads.
- Separation distances between sources and receivers
- Ground type between sources and receivers (mixed soft/ hard)
- Attenuation from buildings and built structures and topography (natural and purpose built)
- Atmospheric losses and assessment meteorological conditions.

The modelled activities and assumptions for the to the equipment operating and the duration and frequency of operation as part of the 'reasonable' worst-case operational scenarios are described in Section 3.6.3.

### 3.7.3 Model validation

Following the development of each of the representative modelling scenarios, the noise model outputs were compared against the unattended noise measurement results for the period with similar activities to the reasonable' worst-case operational scenario. Validation of the reasonable worst-case on-site activities was undertaken to check the final representative modelling inputs against a period of measured activities. The results of this process are presented in Table 10.

**Table 10 Comparison between measured and modelled noise levels**

Time period	Logger	Measured noise levels LAeq,15minute (dBA)	Predicted noise levels LAeq,15minute (dBA)	Difference, dB
2:00pm to 2:15pm 2 September 2020 <sup>1</sup>	Caesarstone North	73	71	2
10:40am to 10:55am 3 September 2020 <sup>2</sup>	Caesarstone South	57	58	1

Notes: 1. Noise generating activities within the facility were as per Table 9 "Caesarstone North 15-minute noise intensive period (With container handling taking place)"  
2. Noise generating activities within the facility were as per Table 9 "Caesarstone South 15-minute noise intensive period"

The differences between the modelled and the measured noise levels are the result of the following:

- Noise levels at the logger location are dependent upon the specific location of loading activities and which internal loading dock is being used by a ute at Caesarstone South.
- Differences in modelled levels compared with measured noise levels from the noise breakout from internal warehouse activities will depend upon the specific duration and operating times of noise intensive plant/equipment associated with internal loading activities.
- Modelled levels for ute passbys were based upon a worst-case average sound power level for a range of measured ute passbys. In addition at Caesarstone south, noise contribution from vehicle movements, which varied in duration, speed and location compared to the logger location throughout the activity, which would result in minor differences in measured noise levels.

The results from the validation of the model demonstrate that it is suitable for determining the compliance noise levels for this assessment.

## 3.8 Noise compliance assessment

Predicted operational compliance noise levels are presented in Table 11 for each of the two compliance assessment scenarios. The noise levels have been predicted to each of the surrounding residential

receiver noise catchments, and the highest residential receiver noise level in each catchment area is the reported level in Table 11. It should be noted that this is not necessarily the same receiver location for each assessment scenario.

These noise levels represent the reasonable worst-case intrusiveness operational scenarios (15-minute period) from typical operations of the warehouse. The results in Table 11 show that the predicted noise levels for the  $L_{Aeq}$  (15-minute) assessments comply with the overall operational noise limits presented in Table 2.

As no activities typically take place during the night period (10:00pm to 7:00am), when the  $L_{A1}$  (1-minute) noise limits presented in Table 2 are applicable. As such, warehouse operations also satisfy this noise limit.

**Table 11 Predicted noise levels - Reasonable worst-case scenarios for warehouse (Caesarstone)**

Noise catchment area/ receiver location	$L_{Aeq}$ (15-minute)		Compliance
	Noise limits	Predicted noise levels	
<b>Caesarstone North 15-minute noise intensive period (With container handling taking place)</b>			
Wattle Grove (NCA 1)	35	32	Yes
Wattle Grove North (NCA 2)	35	22	Yes
Casula (NCA 3)	35	23	Yes
Glenfield (NCA 4)	35	<20	Yes
All Saints Senior College (S1)	45 <sup>1</sup>	<20	Yes
Casula Powerhouse (S2)	45 <sup>1</sup>	22	Yes
Defence Joint Logistics Unit (DJLU) (I2)	70 <sup>1</sup>	38	Yes
ABB (I3)	70 <sup>1</sup>	22	Yes
<b>Caesarstone South 15-minute noise intensive period</b>			
Wattle Grove (NCA 1)	35	27	Yes
Wattle Grove North (NCA 2)	35	20	Yes
Casula (NCA 3)	35	20	Yes
Glenfield (NCA 4)	35	<20	Yes
All Saints Senior College (S1)	45 <sup>1</sup>	<20	Yes
Casula Powerhouse (S2)	45 <sup>1</sup>	20	Yes
Defence Joint Logistics Unit (DJLU) (I2)	70 <sup>1</sup>	<20	Yes
ABB (I3)	70 <sup>1</sup>	35	Yes

Notes: 1. Noise limits for these receivers are only applicable when the receiver is in use

The highest modelled noise levels are generated by the container unloading activities on the northern side of the Caesarstone warehouse. The highest modelled noise level was 32 dB(A)  $L_{Aeq,15minute}$  at Wattle Grove (NCA 1).

However, video data has shown that these container movement operations only occurred three times per week, over the two weeks, each of 15 minutes or less. As such, this would not be considered a

typical operation. As such, the modelled noise levels for the 'reasonable' worst case Caesarstone North 15-minute noise assessment period will only occur occasionally.

The noise emissions for the Caesarstone South 15-minute noise intensive period, which are predicted to be 27 dB(A)  $L_{Aeq,15\text{minute}}$  at Wattle Grove, would be more representative of the overall typical noise emissions from the site operations.

## 4 Conclusion

The noise assessment has been undertaken to address the operational noise requirements for the Caesarstone warehouse (WH3A) within the Moorebank Precinct East in accordance with the *Operational Noise and Vibration Management Plan, Moorebank Logistics Park – East Precinct* (dated 27 March 2019, Revision 12) (MPE ONVMP), more specifically to address the requirements of Condition of Consent (CoC) B85 in State Significant Development (SSD) 7628.

As part of the compliance noise assessment, a series of noise measurements were undertaken over a two week period. Unattended noise monitoring was undertaken at two locations within the Caesarstone warehouse over a period of two weeks between 2 September and 15 September 2020. In addition, attended noise measurements were undertaken on 10 September within the Caesarstone warehouse site. The aim of the measurements was to quantify operational noise levels on-site.

In order to quantify the operational noise levels at nearby residential receivers, firstly noise monitoring data from four permanent noise monitoring stations at nearby residential locations was reviewed. This noise monitoring data was reviewed during periods when on-site attended noise measurements were taking place on 10 September 2020. This review confirmed that direct quantification or estimation of operational noise emissions from the warehouse operations at the sensitive receiver locations was not possible because of the existing high ambient noise levels at the nearby receivers.

As such, guidance in Section 7.1.1 of the NSW EPA Noise Policy for Industry (NPfI) has been used to assist in monitoring the performance of Caesarstone operations. Using this approach, noise emissions from the warehouse facility operations have been evaluated using a combination of on-site attended and unattended noise monitoring, combined with noise modelling.

Two 'reasonable' worst-case assessment scenarios were established based upon on site unattended noise monitoring and video recordings over an approximate two-week period, in addition to discussions with Caesarstone personnel and observations made during on-site attended noise measurements. These were developed to capture the 'reasonable' worst case noise intensive periods on the northern and southern sides of the warehouse.

All significant noise-generating equipment was included the assessment modelling, in addition to the key noise-generating mechanical plant as required by CoC B85. The noise contribution from the mechanical plant items serving the warehouse and office area generate minimal contribution to the overall noise levels from site operations, which are generally controlled by other on-site activities such as ute departures, arrivals and internal warehouse loading activities.

Using the calibrated noise model, noise levels were predicted to all nearby noise sensitive receiver locations, including the residential receivers in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North. Noise levels were assessed assuming the worst-case prevailing meteorological conditions were present, as required by CoC B80.

The outcome of the compliance noise monitoring and modelling demonstrated that the mechanical plant and other noisy equipment that operate as part of the Caesarstone warehouse operations achieve the noise limits presented SSD 7628 CoC B80.

## APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).																																														
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.																																														
Assessment period	The period in a day over which assessments are made.																																														
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.																																														
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).																																														
Decibel [dB]	<p>The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:</p> <table border="0"> <tr> <td>threshold of hearing</td> <td>0 dB</td> <td>The faintest sound we can hear</td> </tr> <tr> <td></td> <td>10 dB</td> <td>Human breathing</td> </tr> <tr> <td></td> <td>20 dB</td> <td></td> </tr> <tr> <td>almost silent</td> <td>30 dB</td> <td>Quiet bedroom or in a quiet national park location</td> </tr> <tr> <td></td> <td>40 dB</td> <td>Library</td> </tr> <tr> <td>generally quiet</td> <td>50 dB</td> <td>Typical office space or ambience in the city at night</td> </tr> <tr> <td></td> <td>60 dB</td> <td>CBD mall at lunch time</td> </tr> <tr> <td>moderately loud</td> <td>70 dB</td> <td>The sound of a car passing on the street</td> </tr> <tr> <td></td> <td>80 dB</td> <td>Loud music played at home</td> </tr> <tr> <td>loud</td> <td>90 dB</td> <td>The sound of a truck passing on the street</td> </tr> <tr> <td></td> <td>100 dB</td> <td>Indoor rock band concert</td> </tr> <tr> <td>very loud</td> <td>110 dB</td> <td>Operating a chainsaw or jackhammer</td> </tr> <tr> <td></td> <td>120 dB</td> <td>Jet plane take-off at 100m away</td> </tr> <tr> <td>extremely loud</td> <td>130 dB</td> <td></td> </tr> <tr> <td></td> <td>140 dB</td> <td>Military jet take-off at 25m away</td> </tr> </table>		threshold of hearing	0 dB	The faintest sound we can hear		10 dB	Human breathing		20 dB		almost silent	30 dB	Quiet bedroom or in a quiet national park location		40 dB	Library	generally quiet	50 dB	Typical office space or ambience in the city at night		60 dB	CBD mall at lunch time	moderately loud	70 dB	The sound of a car passing on the street		80 dB	Loud music played at home	loud	90 dB	The sound of a truck passing on the street		100 dB	Indoor rock band concert	very loud	110 dB	Operating a chainsaw or jackhammer		120 dB	Jet plane take-off at 100m away	extremely loud	130 dB			140 dB	Military jet take-off at 25m away
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dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.																																														
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.																																														

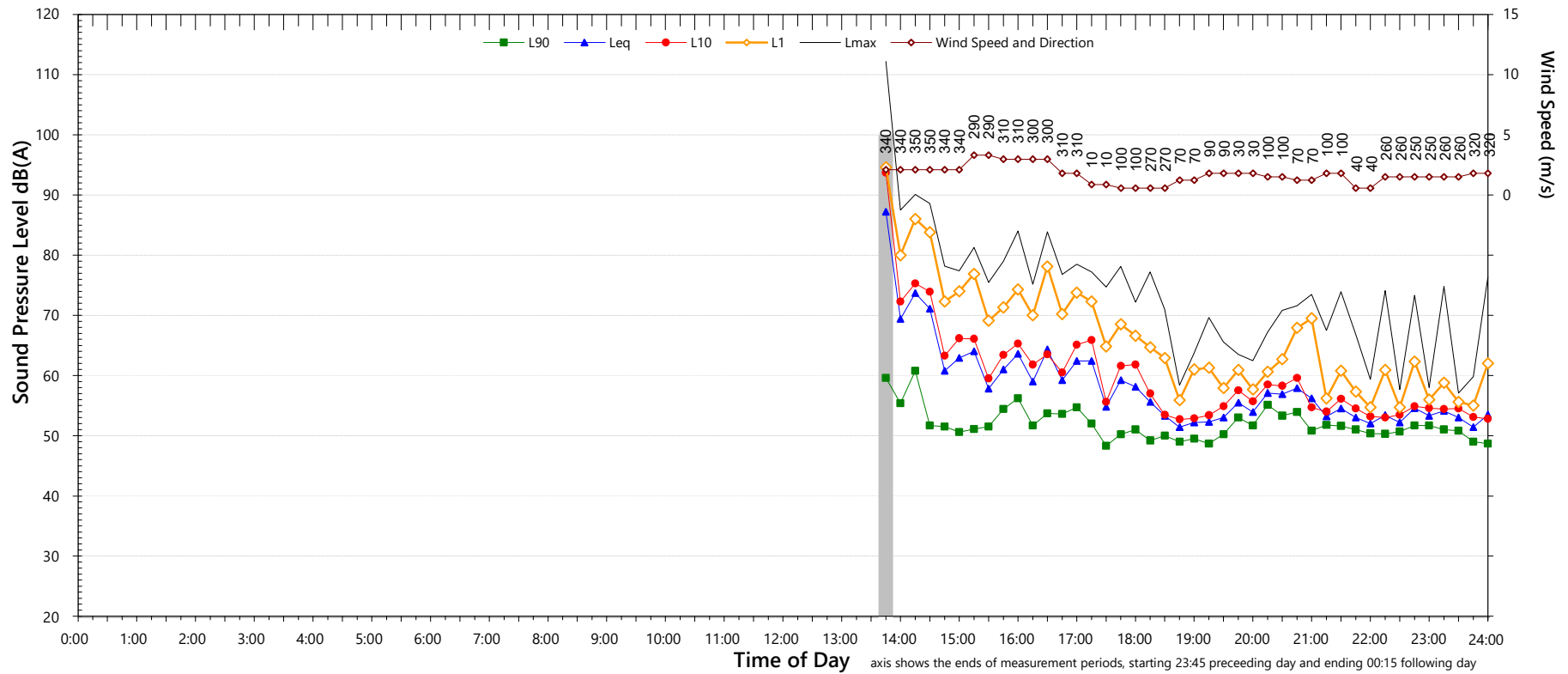
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L <sub>Max</sub>	The maximum sound pressure level measured over a given period.
L <sub>Min</sub>	The minimum sound pressure level measured over a given period.
L <sub>1</sub>	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L <sub>10</sub>	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L <sub>90</sub>	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L <sub>eq</sub>	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

## **APPENDIX B**      **Logger location 1 – Caesarstone - North side**

# Unattended Noise Monitoring Results

## Caesarstone North

Wednesday, 2 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	49	46
L <sub>Aeq</sub>	-	55	59

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	74	to	90
L <sub>Max</sub> - L <sub>eq</sub> (Range)	20	to	26

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	66	62
L <sub>eq</sub> 1hr upper 10 percentile	72	67
L <sub>eq</sub> 1hr lower 10 percentile	56	54

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

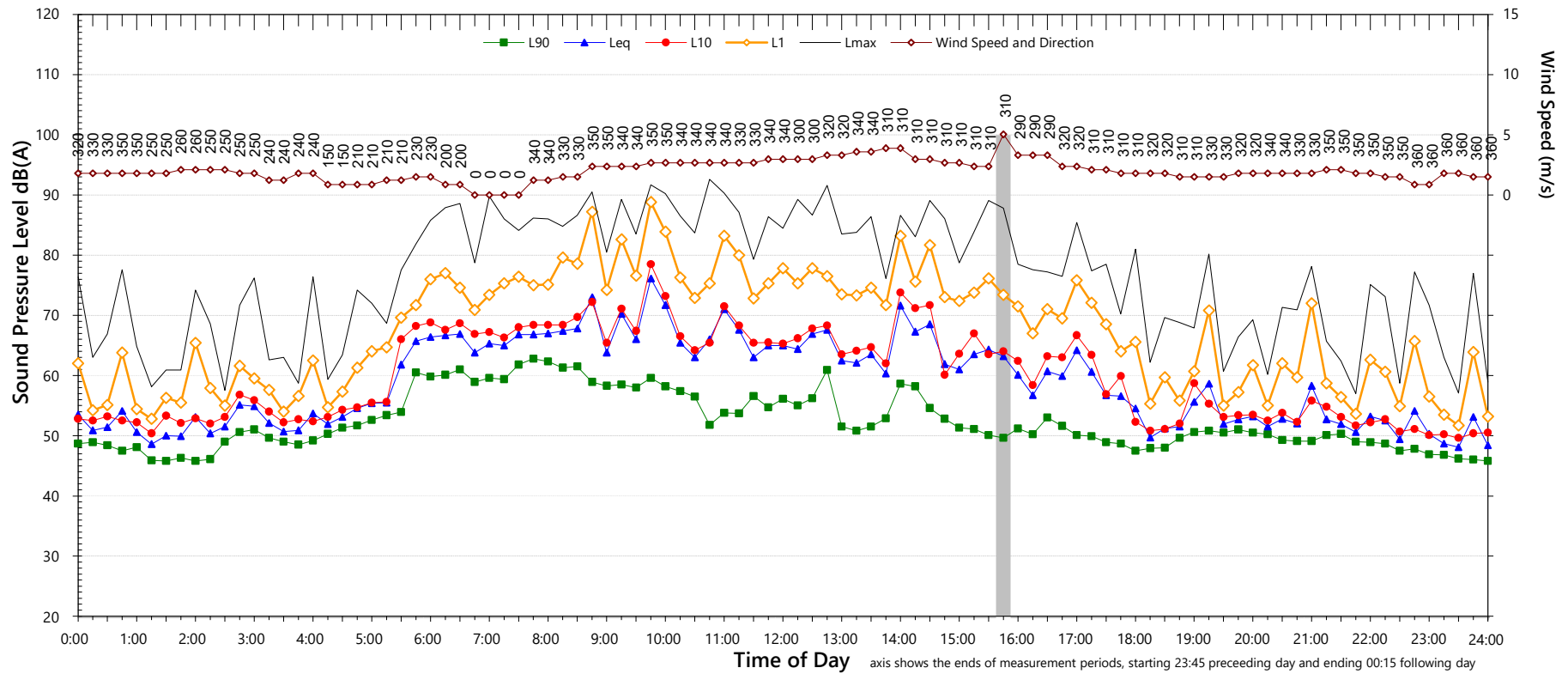
Logger Graphs Caeserstone North

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Thursday, 3 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	50	48	46
L <sub>Aeq</sub>	67	54	58

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	74	to	87
L <sub>Max</sub> - L <sub>eq</sub> (Range)	19	to	30

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	68	61
L <sub>eq</sub> 1hr upper 10 percentile	71	65
L <sub>eq</sub> 1hr lower 10 percentile	56	54

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

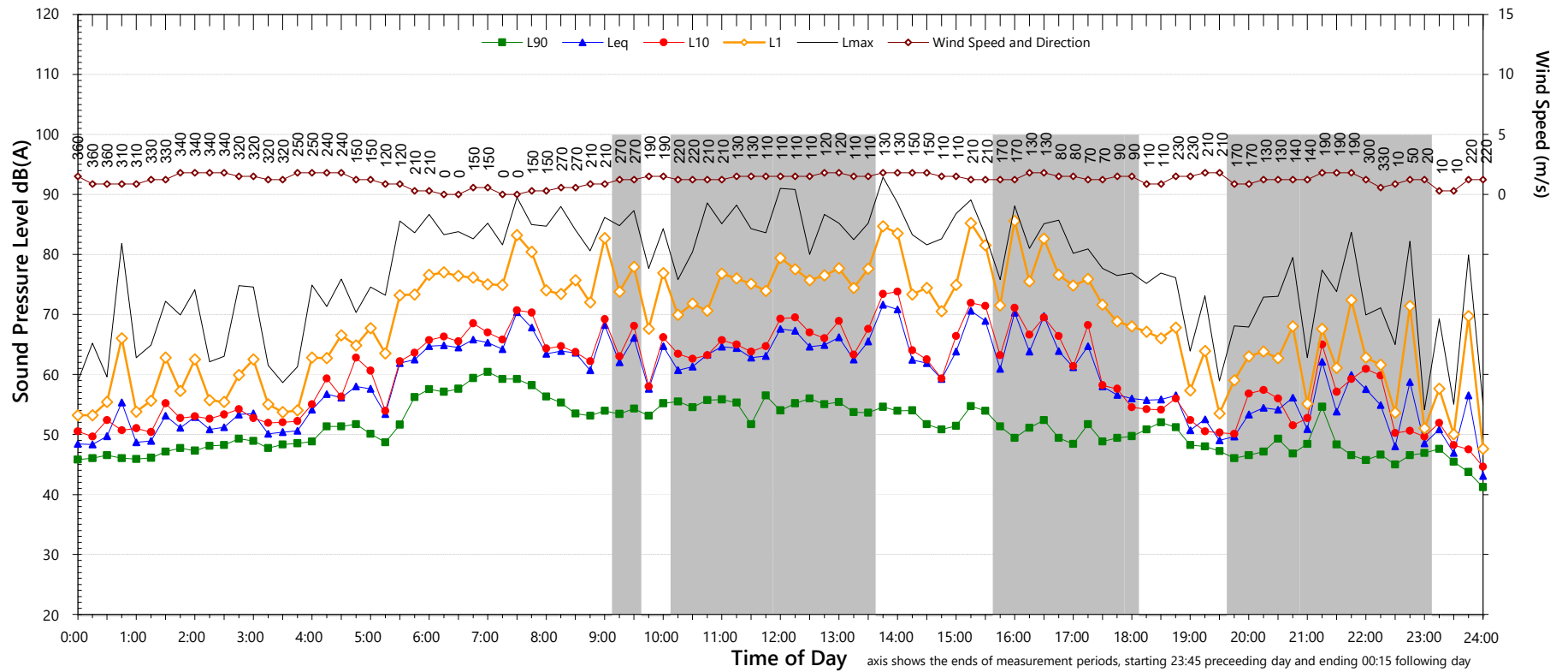
Logger Graphs Caesarstone North

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Friday, 4 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	-
L <sub>Aeq</sub>	-	-	-

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	74	to	94
L <sub>Max</sub> - L <sub>eq</sub> (Range)	26	to	31

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	68	58
L <sub>eq</sub> 1hr upper 10 percentile	73	58
L <sub>eq</sub> 1hr lower 10 percentile	56	51

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

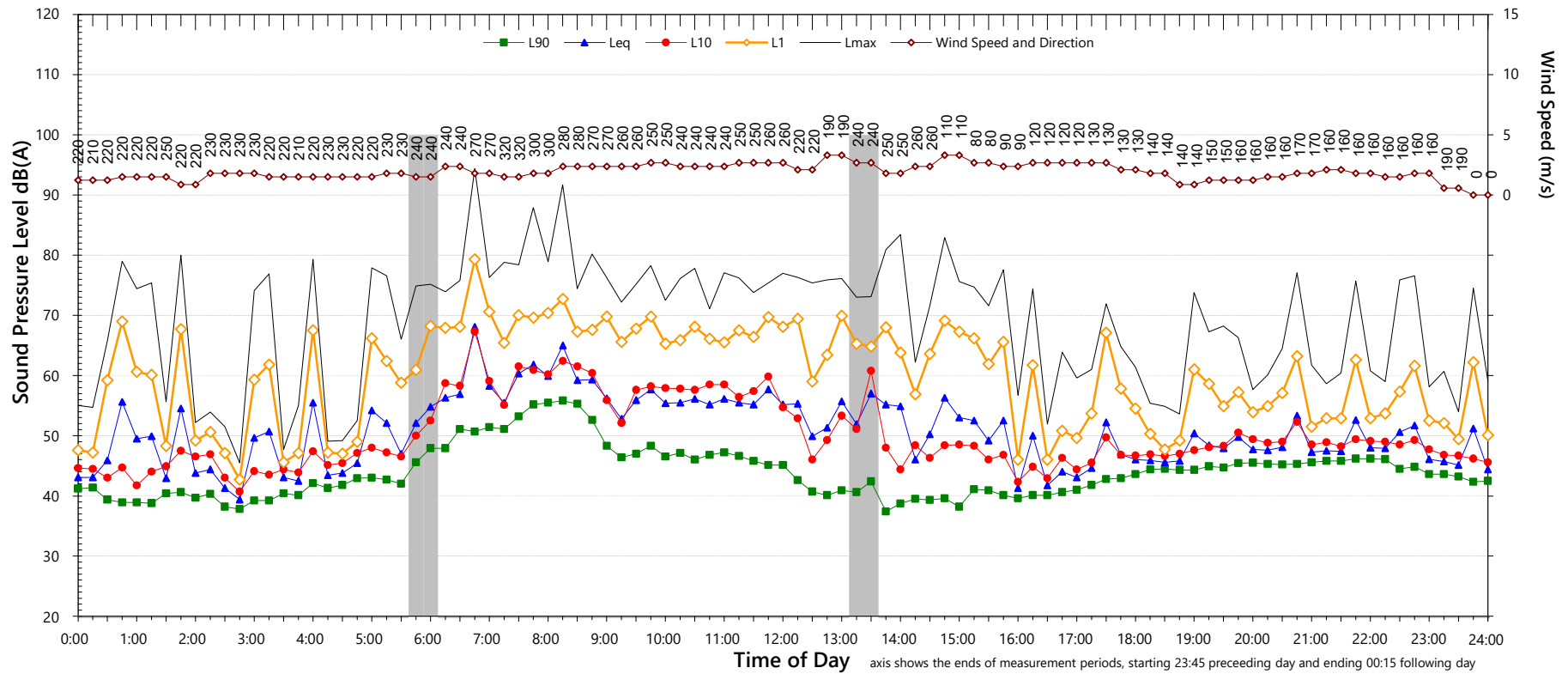
Logger Graphs Caeserstone North

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Saturday, 5 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	40	44	41
L <sub>Aeq</sub>	56	49	49

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	70	to	82
L <sub>Max</sub> - L <sub>eq</sub> (Range)	25	to	29

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	57	52
L <sub>eq</sub> 1hr upper 10 percentile	61	53
L <sub>eq</sub> 1hr lower 10 percentile	50	49

Notes:

- 1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- 2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- 3. "Evening" is the period from 6pm till 10pm
- 4. "Night" relates to the remaining periods
- 5. "Night" relates to period from 10pm on this graph to morning on the following graph.
- 6. Graphed data measured in free-field; tabulated results facade corrected
- 7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- 8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

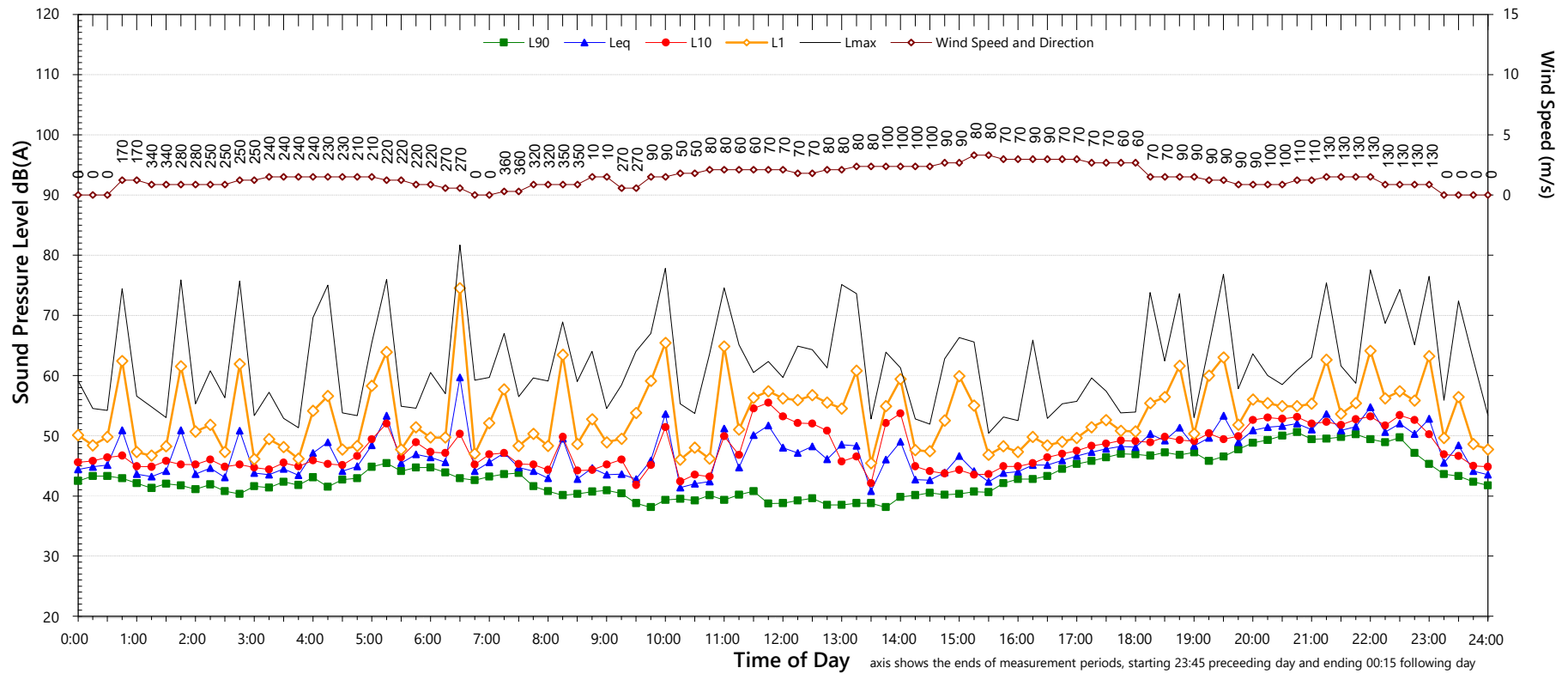
Logger Graphs Caesarstone North

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Sunday, 6 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	39	47	41
L <sub>Aeq</sub>	47	51	56

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	72	to	86
L <sub>Max</sub> - L <sub>eq</sub> (Range)	22	to	27

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Logger Graphs Caeserstone North

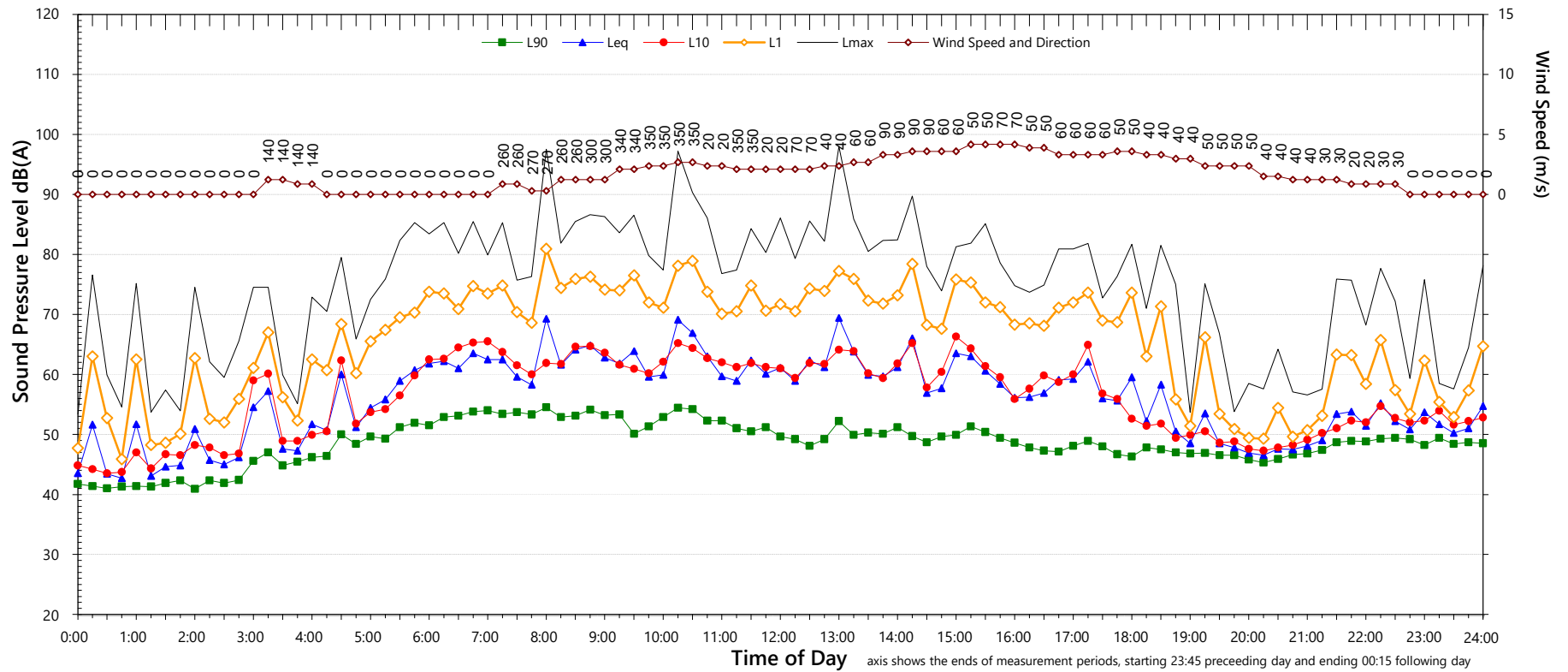
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	51	59
L <sub>eq</sub> 1hr upper 10 percentile	54	63
L <sub>eq</sub> 1hr lower 10 percentile	47	49

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Monday, 7 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	48	46	-
L <sub>Aeq</sub>	63	52	-

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	74	to	78
L <sub>Max</sub> - L <sub>eq</sub> (Range)	22	to	26

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	64	56
L <sub>eq</sub> 1hr upper 10 percentile	67	57
L <sub>eq</sub> 1hr lower 10 percentile	53	54

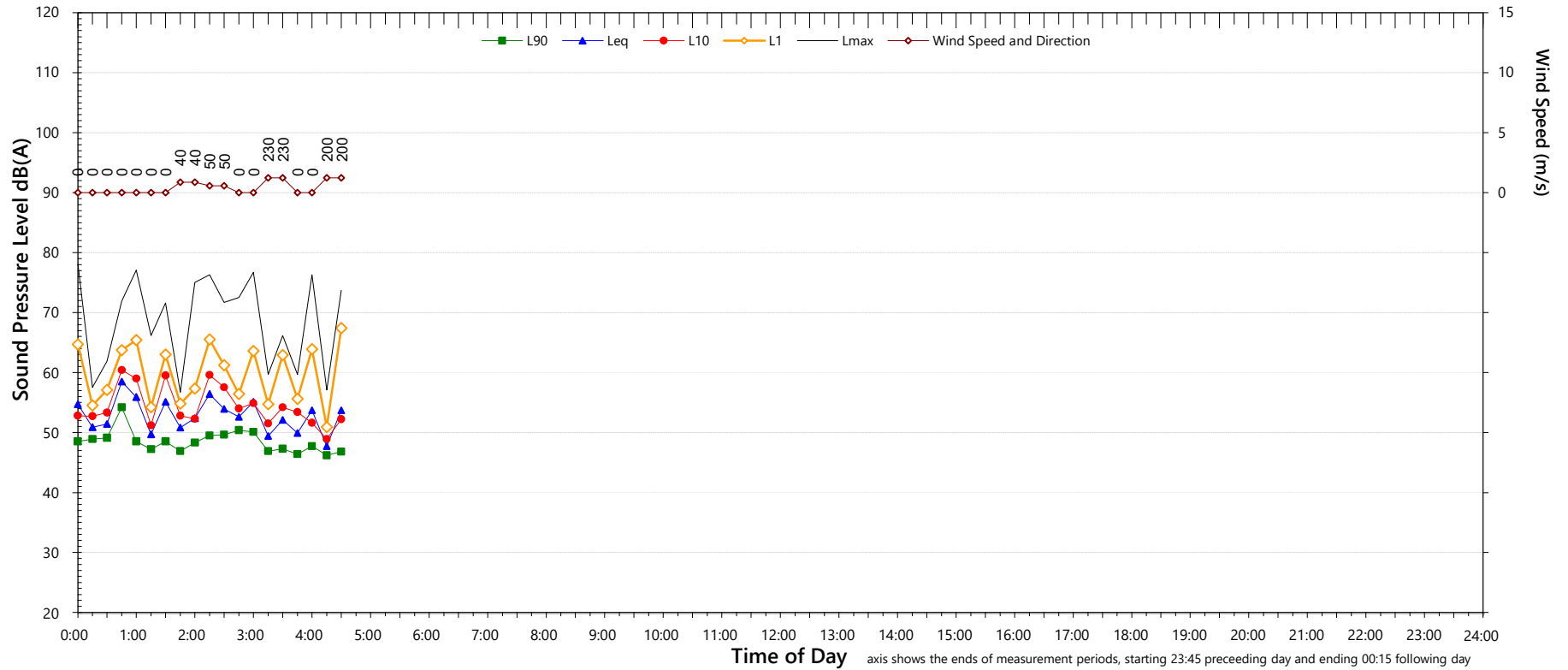
Notes:

- 1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- 2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- 3. "Evening" is the period from 6pm till 10pm
- 4. "Night" relates to the remaining periods
- 5. "Night" relates to period from 10pm on this graph to morning on the following graph.
- 6. Graphed data measured in free-field; tabulated results facade corrected
- 7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- 8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

Caesarstone North

Tuesday, 8 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	-
L <sub>Aeq</sub>	-	-	-
Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	-	to	-
L <sub>Max</sub> - L <sub>eq</sub> (Range)	-	to	-

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	-	-
L <sub>eq</sub> 1hr upper 10 percentile	-	-
L <sub>eq</sub> 1hr lower 10 percentile	-	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

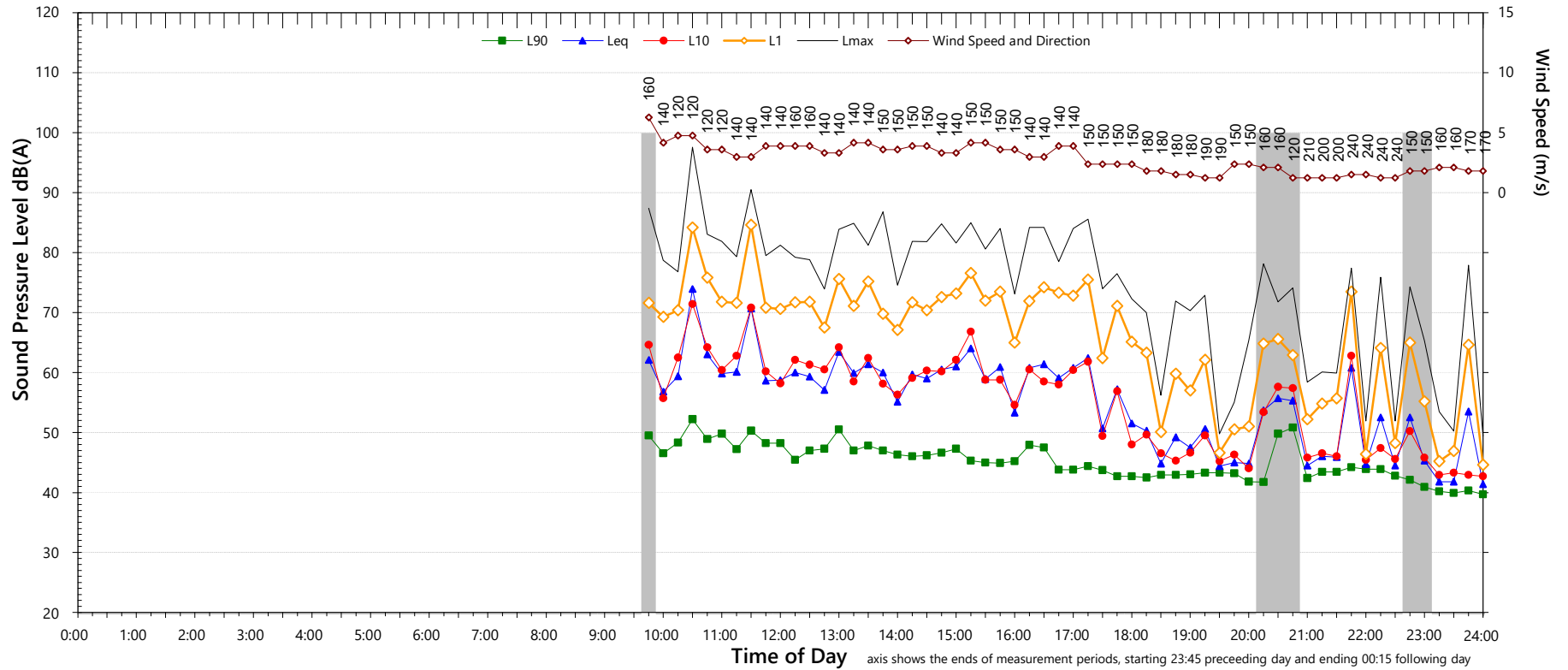
Logger Graphs Caesarstone North

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Wednesday, 9 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	40
L <sub>Aeq</sub>	-	-	61

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	75	to	96
L <sub>Max</sub> - L <sub>eq</sub> (Range)	24	to	31

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	64	64
L <sub>eq</sub> 1hr upper 10 percentile	67	62
L <sub>eq</sub> 1hr lower 10 percentile	50	50

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

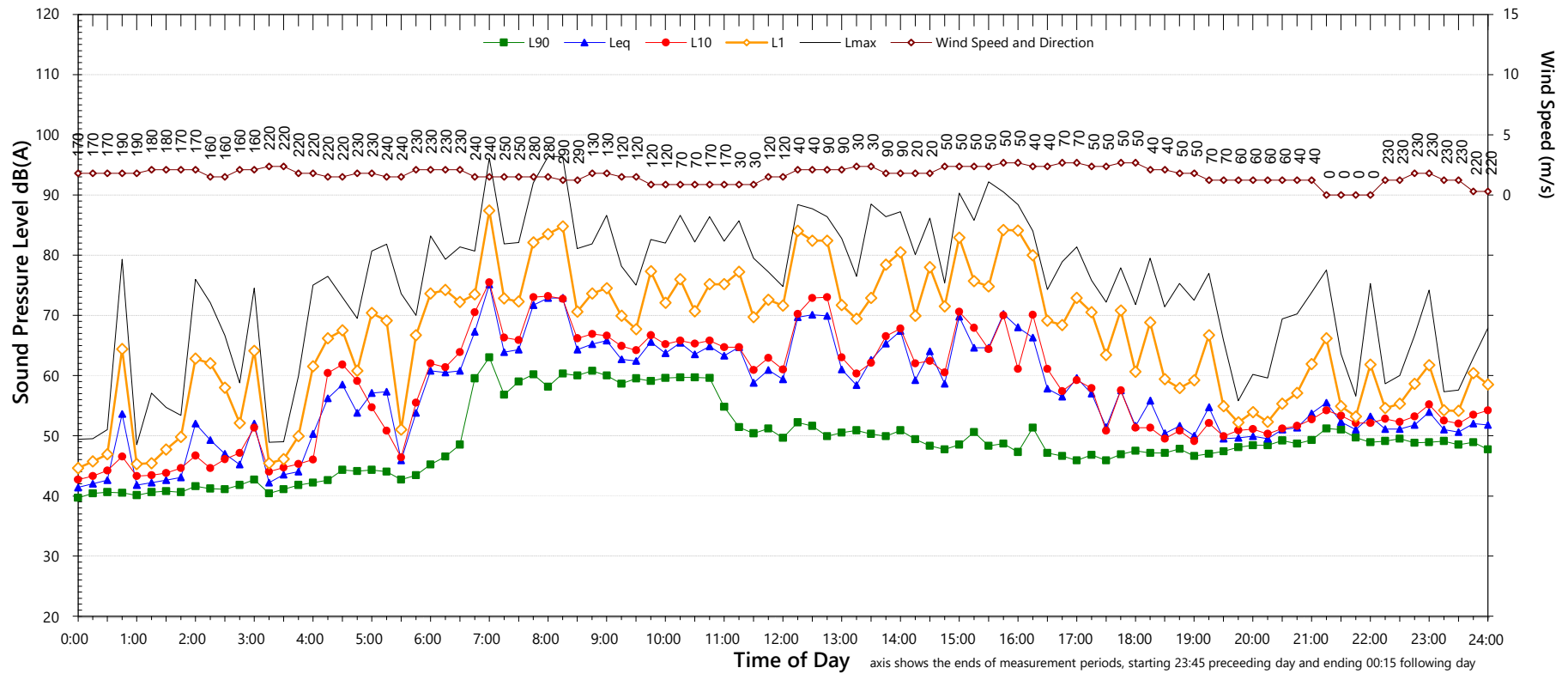
Logger Graphs Caeserstone North

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Thursday, 10 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	47	47	46
L <sub>Aeq</sub>	66	52	54

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	68	to	81
L <sub>Max</sub> - L <sub>eq</sub> (Range)	17	to	27

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Logger Graphs Caesarstone North

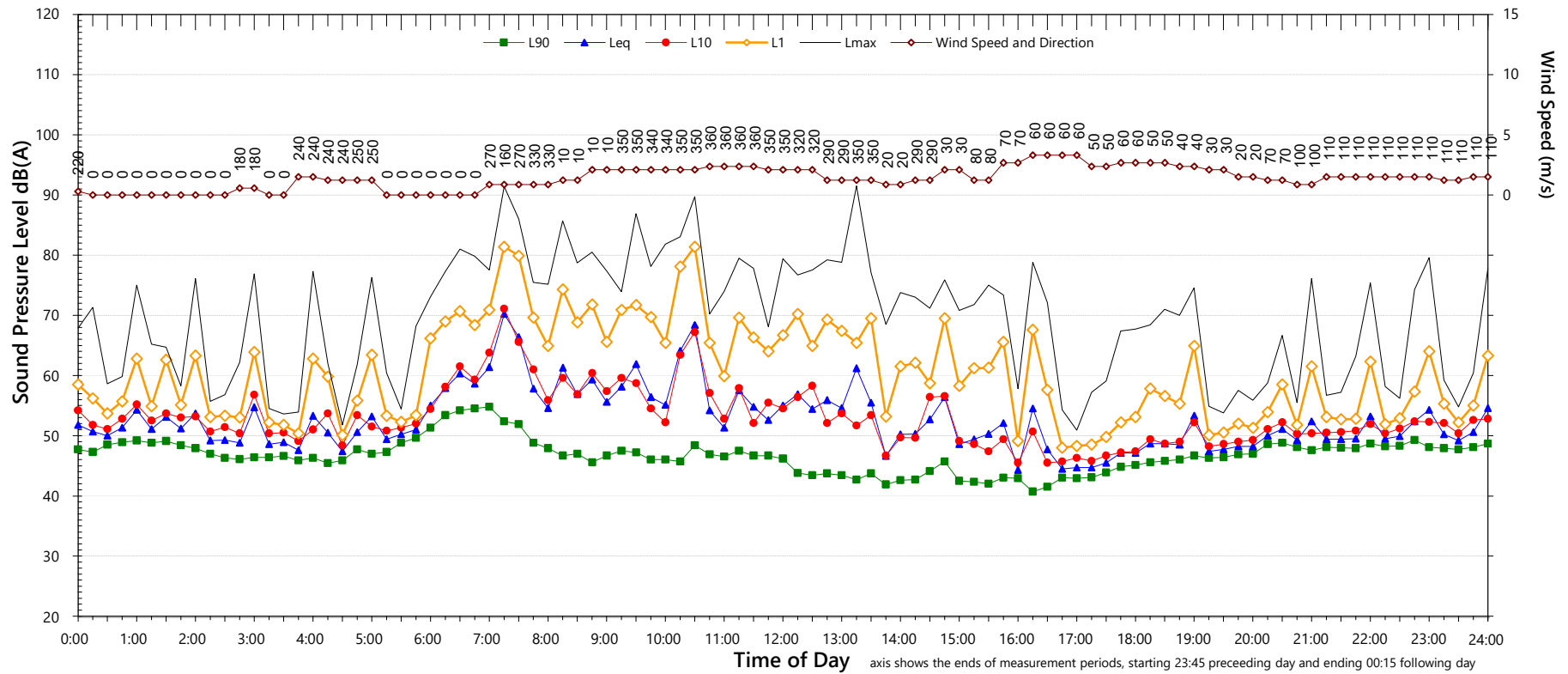
QTE-26 Logger Graphs Program (r34)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	67	56
L <sub>eq</sub> 1hr upper 10 percentile	71	56
L <sub>eq</sub> 1hr lower 10 percentile	55	53

# Unattended Noise Monitoring Results

Caesarstone North

Friday, 11 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	42	46	40
L <sub>Aeq</sub>	59	50	51

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	71	to	82
L <sub>Max</sub> - L <sub>eq</sub> (Range)	18	to	29

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Logger Graphs Caeserstone North

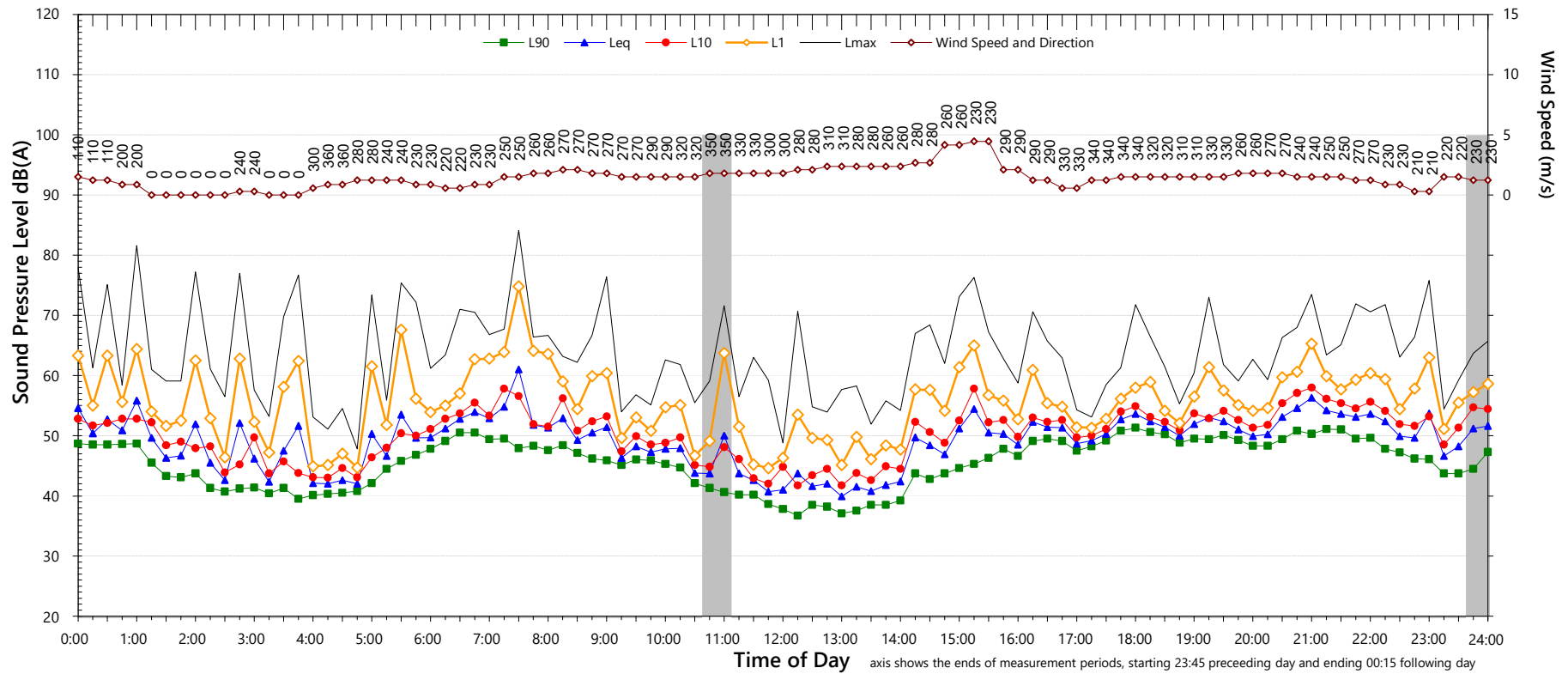
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	61	53
L <sub>eq</sub> 1hr upper 10 percentile	64	55
L <sub>eq</sub> 1hr lower 10 percentile	51	50

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Saturday, 12 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	38	49	45
L <sub>Aeq</sub>	51	53	62

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	73	to	94
L <sub>Max</sub> - L <sub>eq</sub> (Range)	19	to	28

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	54	63
L <sub>eq</sub> 1hr upper 10 percentile	56	64
L <sub>eq</sub> 1hr lower 10 percentile	45	53

Notes:

- 1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- 2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- 3. "Evening" is the period from 6pm till 10pm
- 4. "Night" relates to the remaining periods
- 5. "Night" relates to period from 10pm on this graph to morning on the following graph.
- 6. Graphed data measured in free-field; tabulated results facade corrected
- 7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- 8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

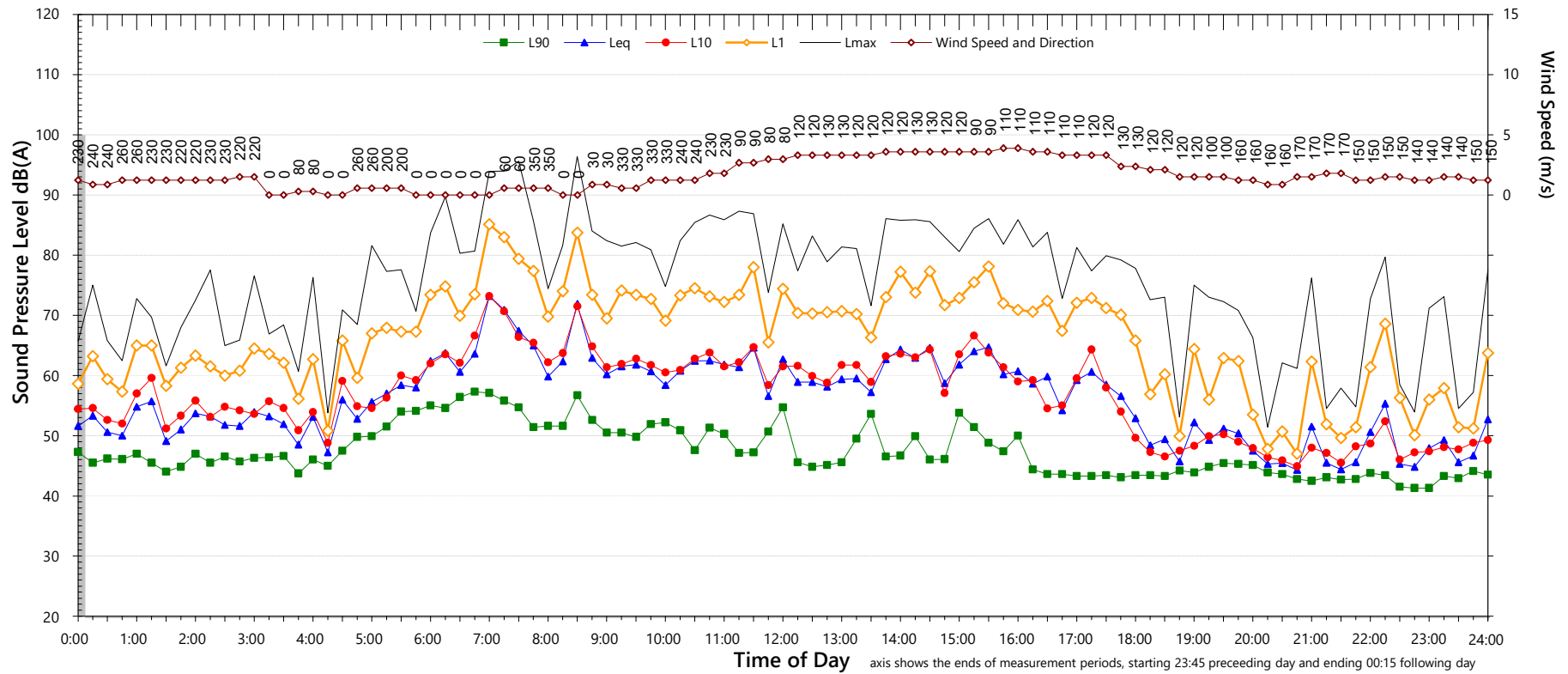
Logger Graphs Caeserstone North

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Sunday, 13 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	43	43	38
L <sub>Aeq</sub>	62	49	56

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	75	to	87
L <sub>Max</sub> - L <sub>eq</sub> (Range)	24	to	32

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	64	59
L <sub>eq</sub> 1hr upper 10 percentile	68	63
L <sub>eq</sub> 1hr lower 10 percentile	51	50

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

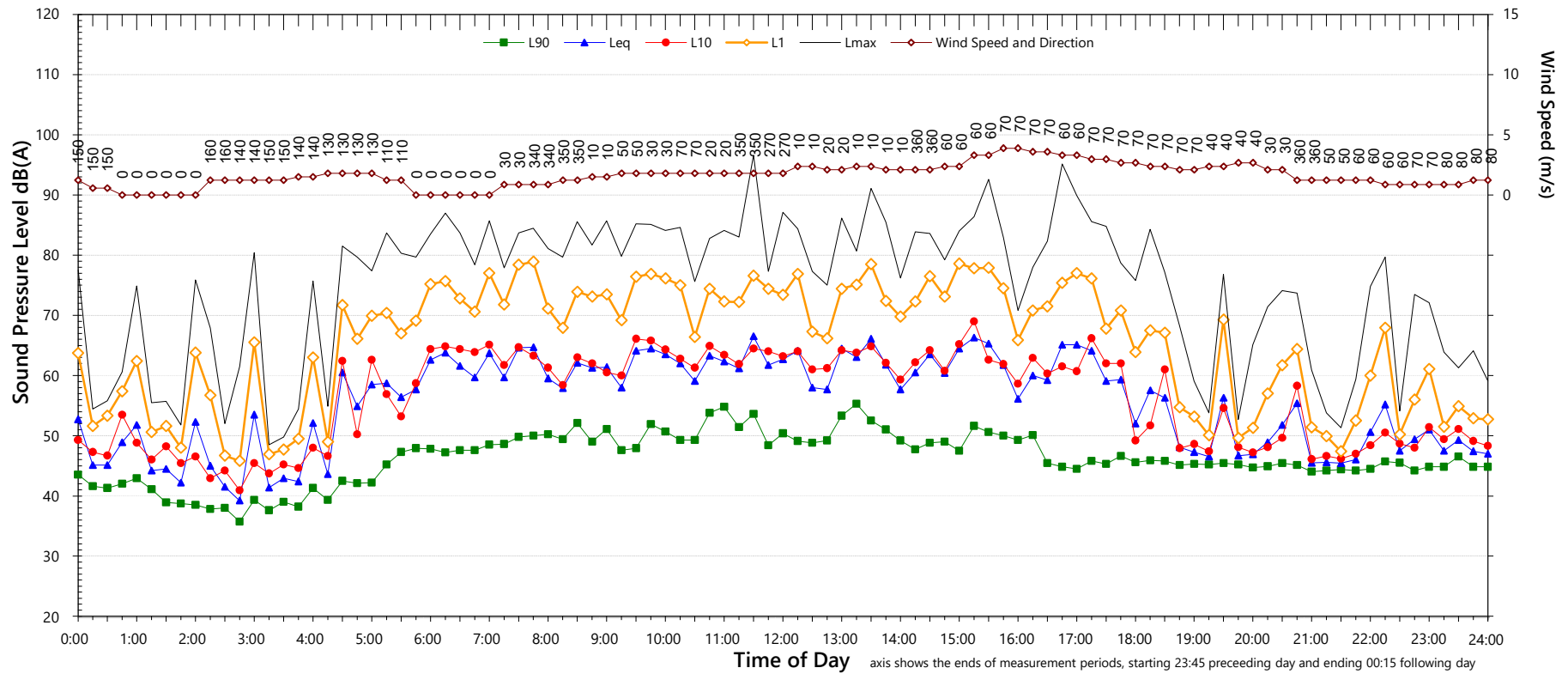
Logger Graphs Caesarstone North

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

Caesarstone North

Monday, 14 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	46	44	45
L <sub>Aeq</sub>	63	52	56

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	71	to	86
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	28

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Logger Graphs Caeserstone North

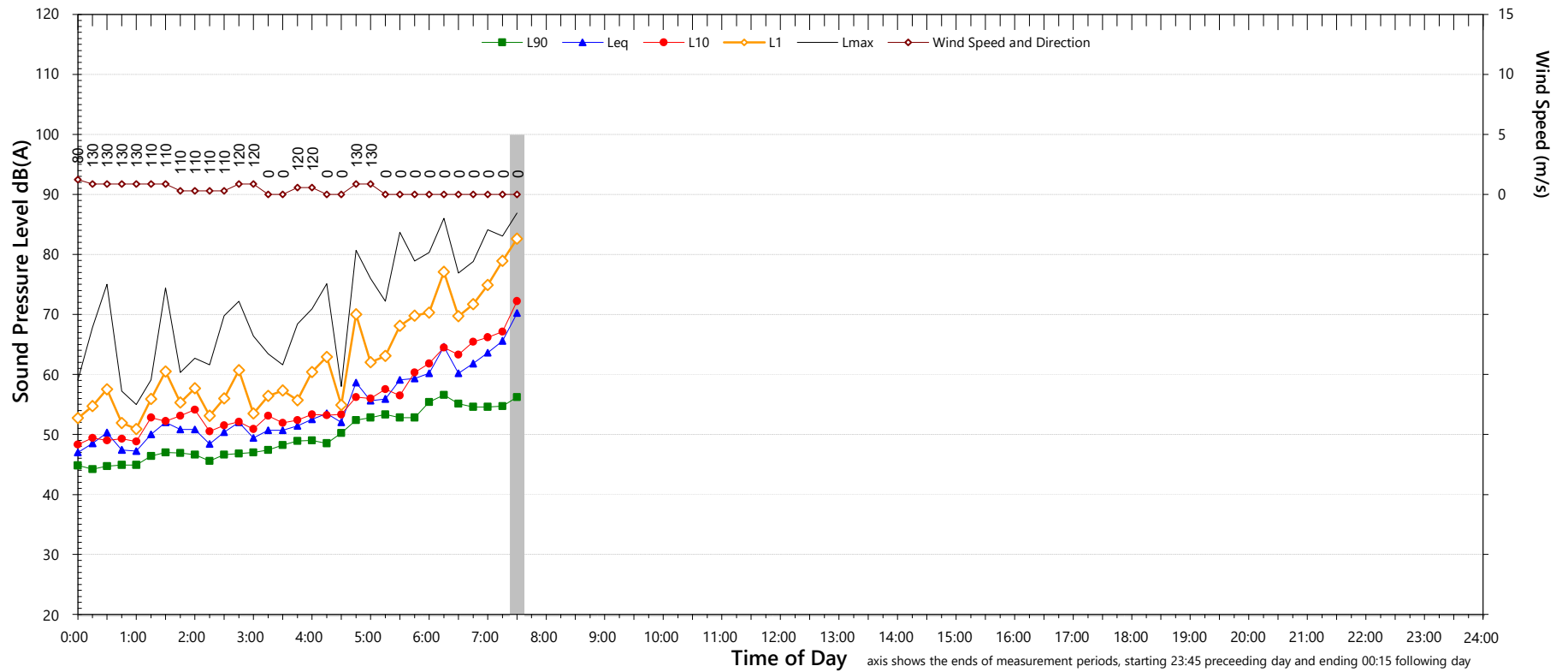
QTE-26 Logger Graphs Program (r34)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	64	59
L <sub>eq</sub> 1hr upper 10 percentile	66	62
L <sub>eq</sub> 1hr lower 10 percentile	54	51

# Unattended Noise Monitoring Results

Caesarstone North

Tuesday, 15 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	-
L <sub>Aeq</sub>	-	-	-

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	-	to	-
L <sub>Max</sub> - L <sub>eq</sub> (Range)	-	to	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Logger Graphs Caesarstone North

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	68	-
L <sub>eq</sub> 1hr upper 10 percentile	68	-
L <sub>eq</sub> 1hr lower 10 percentile	68	-

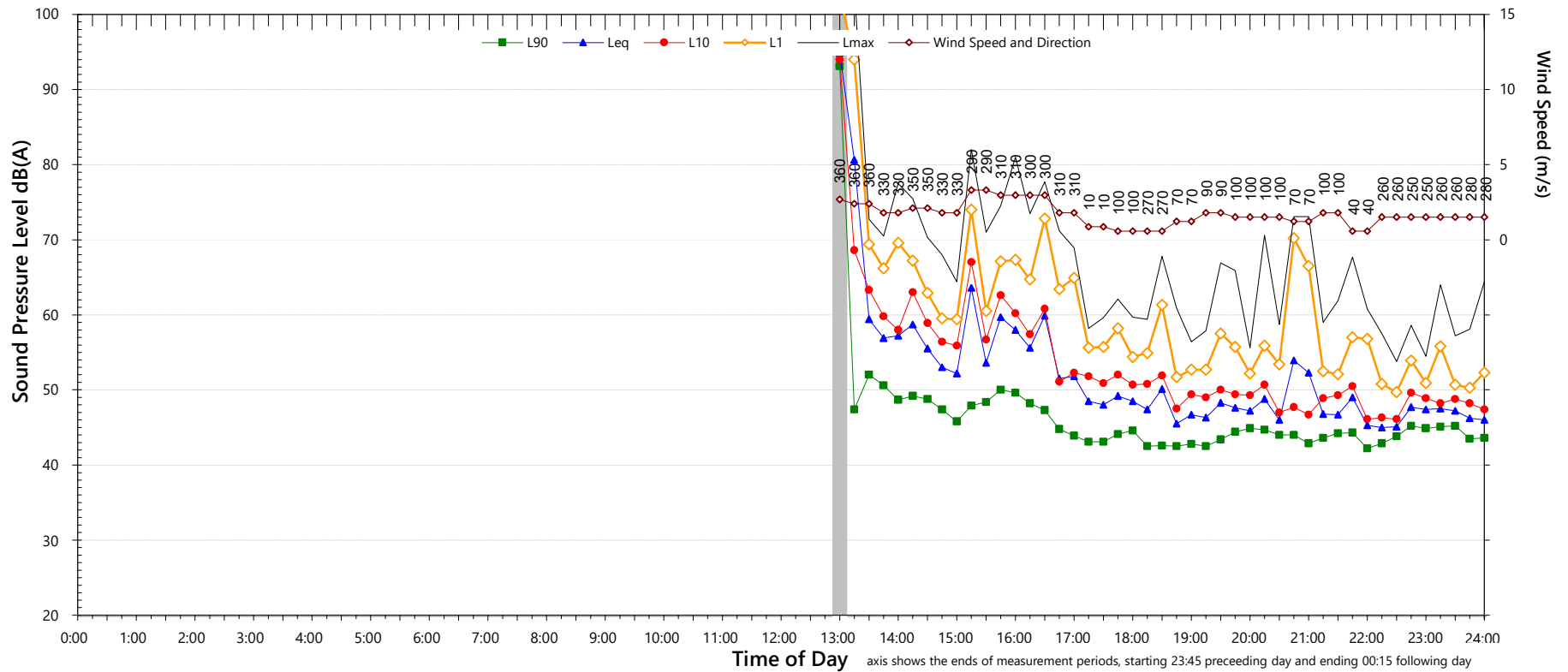
QTE-26 Logger Graphs Program (r34)

## APPENDIX C    **Logger location 2 – Caesarstone – South side**

# Unattended Noise Monitoring Results

Caesarstone South

Wednesday, 2 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	43	41
L <sub>Aeq</sub>	-	49	53

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	65	to	89
L <sub>Max</sub> - L <sub>eq</sub> (Range)	17	to	29

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	68	55
L <sub>eq</sub> 1hr upper 10 percentile	66	57
L <sub>eq</sub> 1hr lower 10 percentile	50	47

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

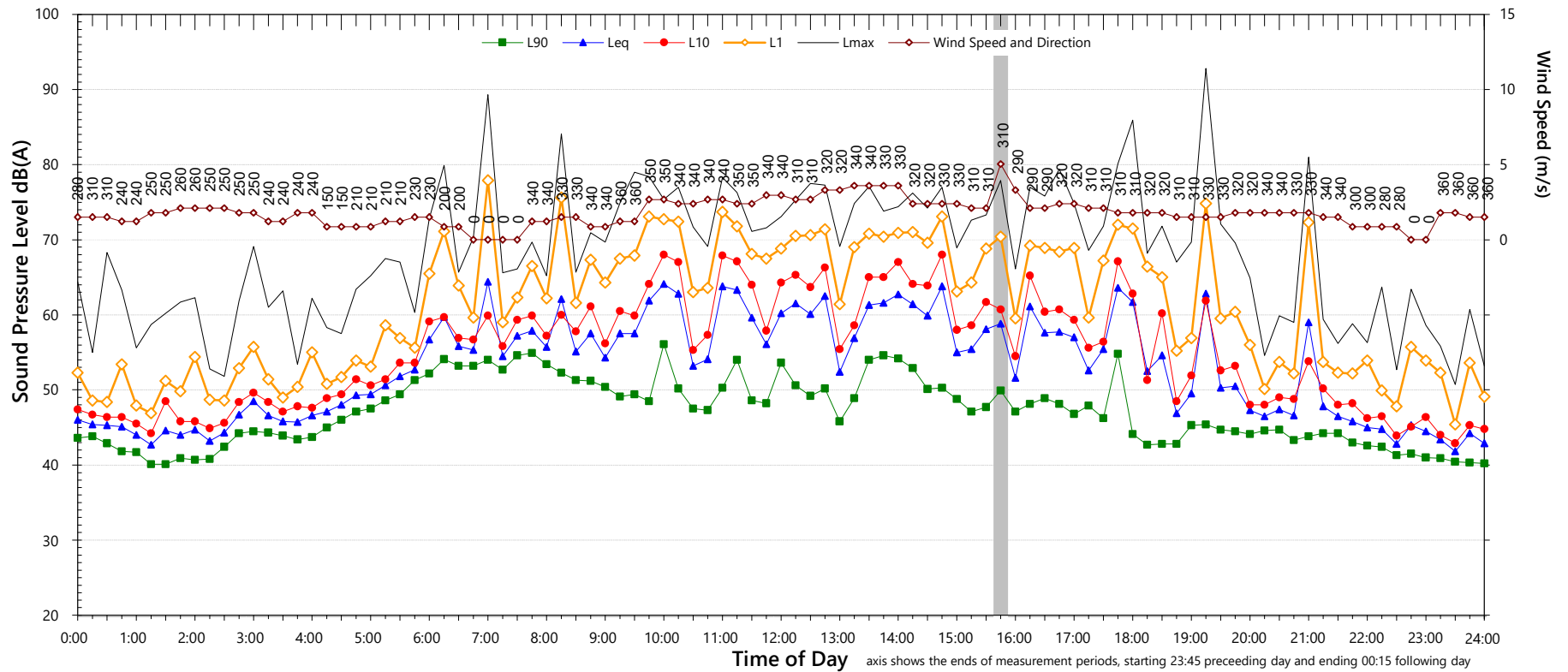
Caesarstone South Logger Graphs(r0)

QTE-26 Logger Graphs Program (r33)

# Unattended Noise Monitoring Results

Caesarstone South

Thursday, 3 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	47	43	40
L <sub>Aeq</sub>	60	54	50

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	66	to	76
L <sub>Max</sub> - L <sub>eq</sub> (Range)	17	to	23

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Caesarstone South Logger Graphs(r0)

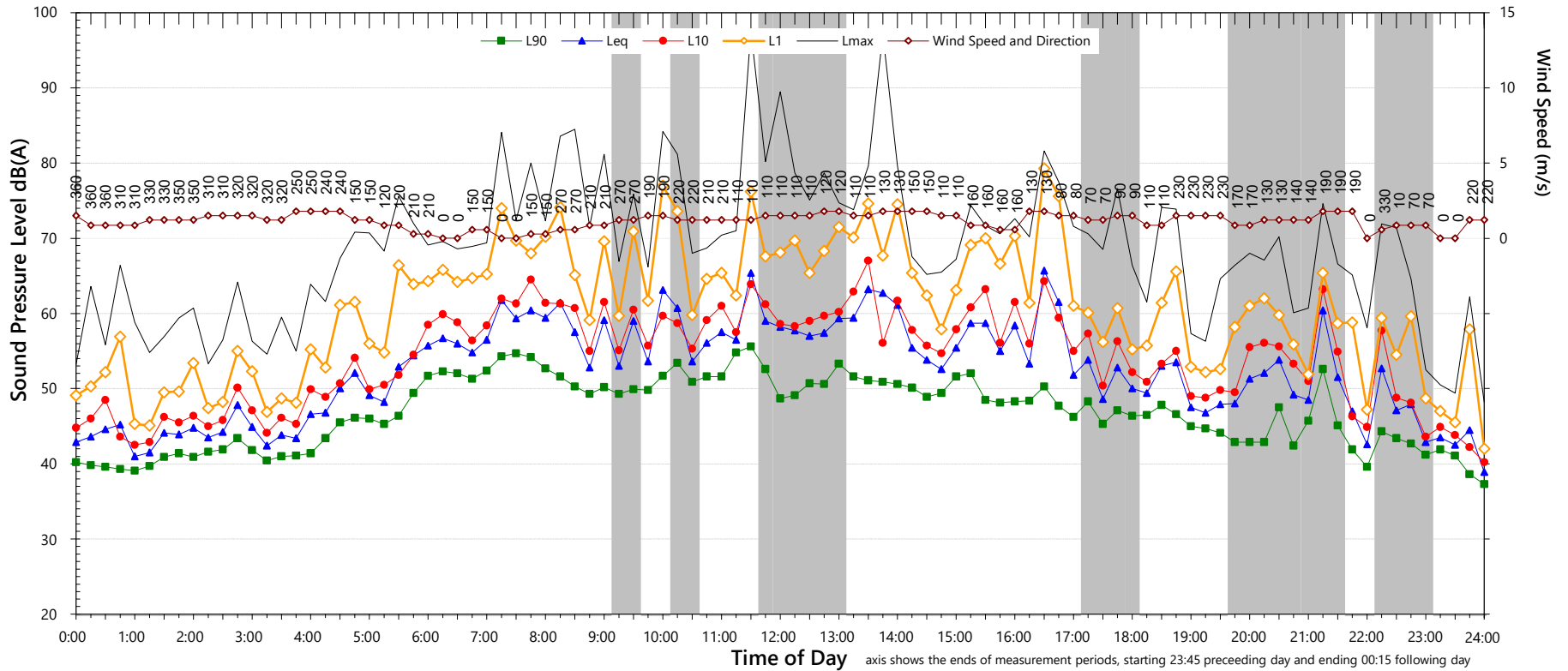
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	61	52
L <sub>eq</sub> 1hr upper 10 percentile	64	57
L <sub>eq</sub> 1hr lower 10 percentile	55	46

QTE-26 Logger Graphs Program (r33)

# Unattended Noise Monitoring Results

Caesarstone South

Friday, 4 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	35
L <sub>Aeq</sub>	-	-	45

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	70	to	70
L <sub>Max</sub> - L <sub>eq</sub> (Range)	17	to	23

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Caesarstone South Logger Graphs(r0)

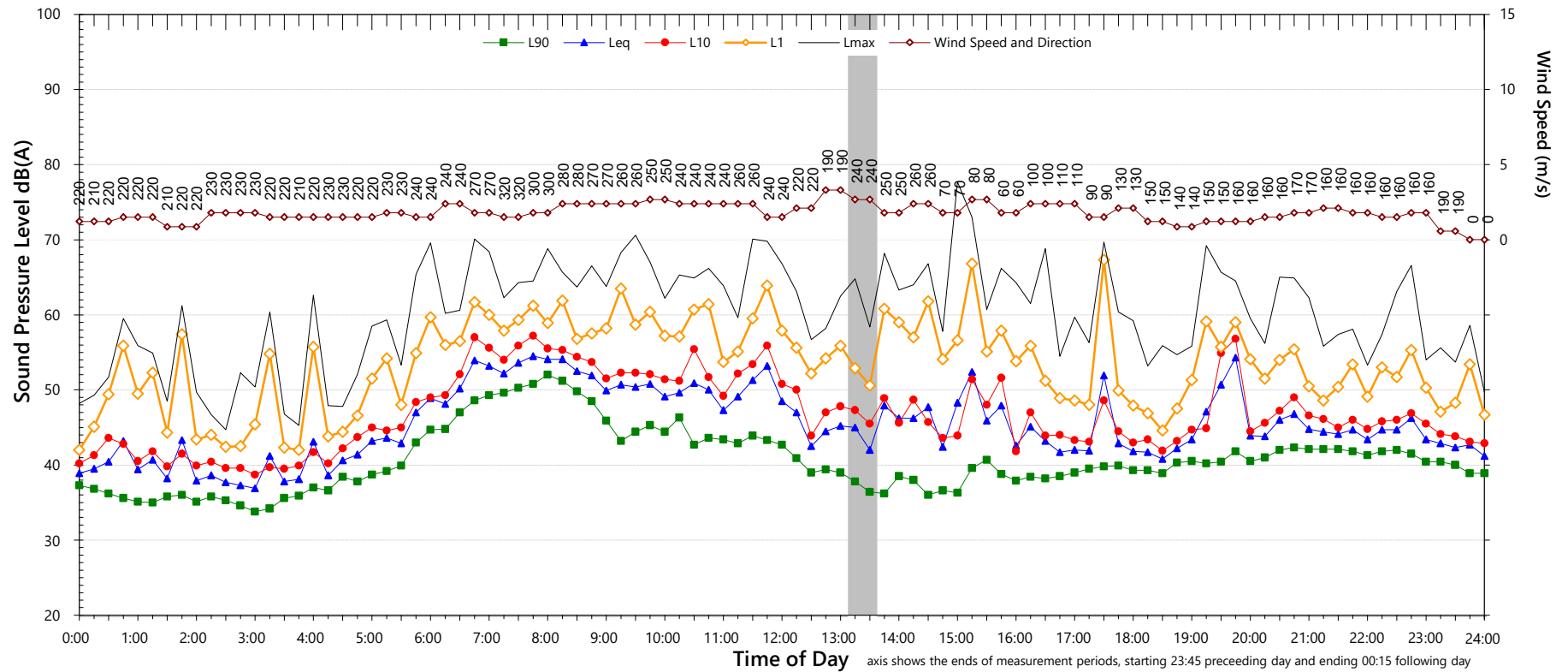
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	62	48
L <sub>eq</sub> 1hr upper 10 percentile	64	50
L <sub>eq</sub> 1hr lower 10 percentile	50	42

QTE-26 Logger Graphs Program (r33)

# Unattended Noise Monitoring Results

Caesarstone South

Saturday, 5 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	38	40	36
L <sub>Aeq</sub>	50	47	45

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	67	to	75
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	30

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	52	45
L <sub>eq</sub> 1hr upper 10 percentile	54	47
L <sub>eq</sub> 1hr lower 10 percentile	46	41

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

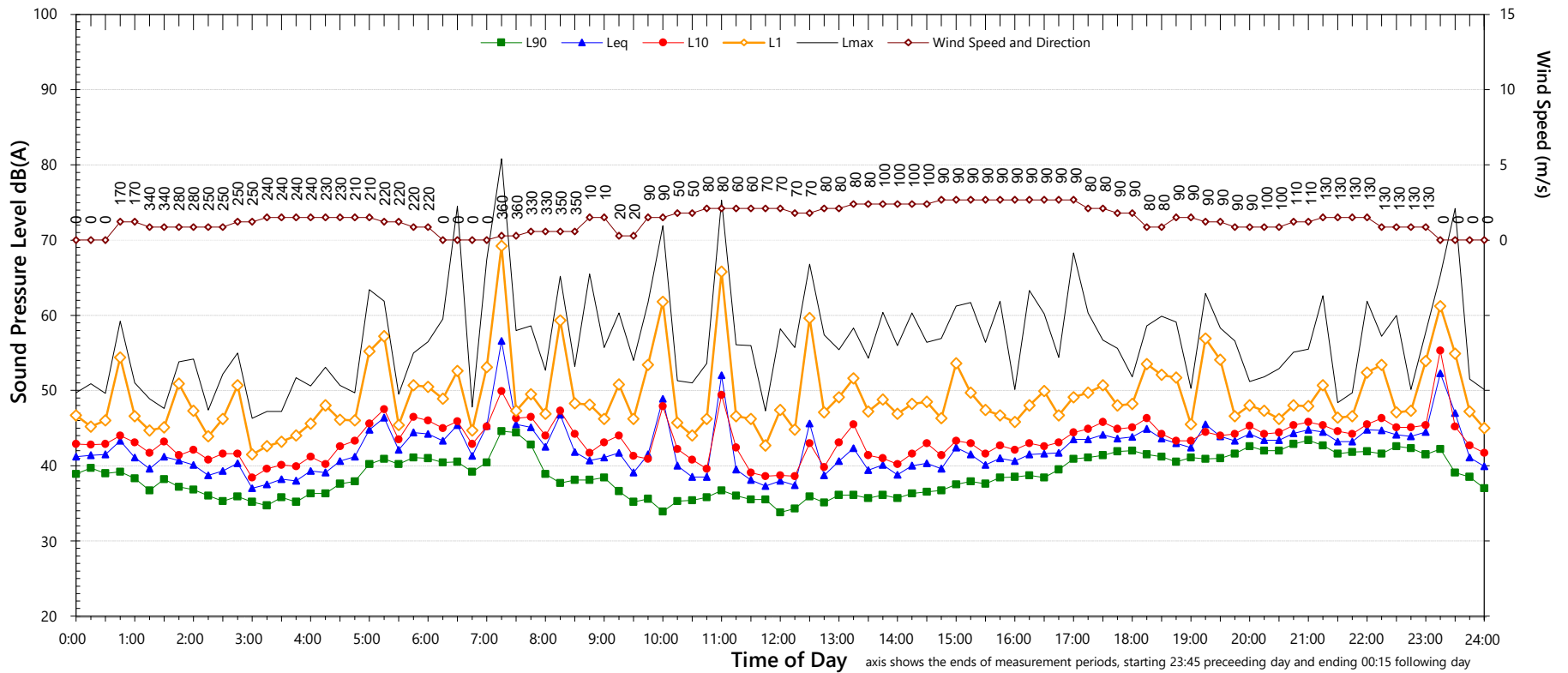
Caesarstone South Logger Graphs(r0)

QTE-26 Logger Graphs Program (r33)

# Unattended Noise Monitoring Results

Caesarstone South

Sunday, 6 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	35	41	36
L <sub>Aeq</sub>	43	44	52

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	66	to	87
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	29

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Caesarstone South Logger Graphs(r0)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	47	54
L <sub>eq</sub> 1hr upper 10 percentile	48	60
L <sub>eq</sub> 1hr lower 10 percentile	43	42

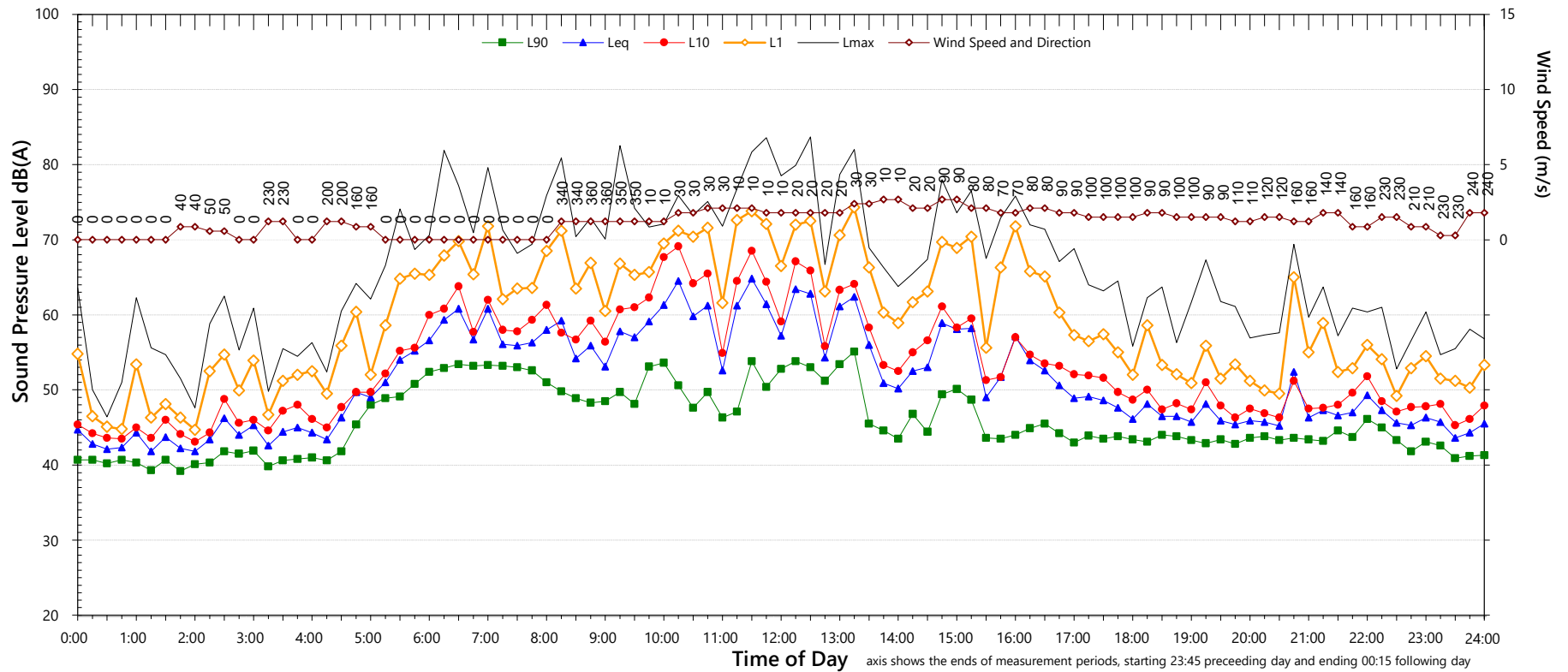
QTE-26 Logger Graphs Program (r33)



# Unattended Noise Monitoring Results

Caesarstone South

Tuesday, 8 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	44	43	37
L <sub>Aeq</sub>	58	47	48

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	67	to	73
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	21

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Caesarstone South Logger Graphs(r0)

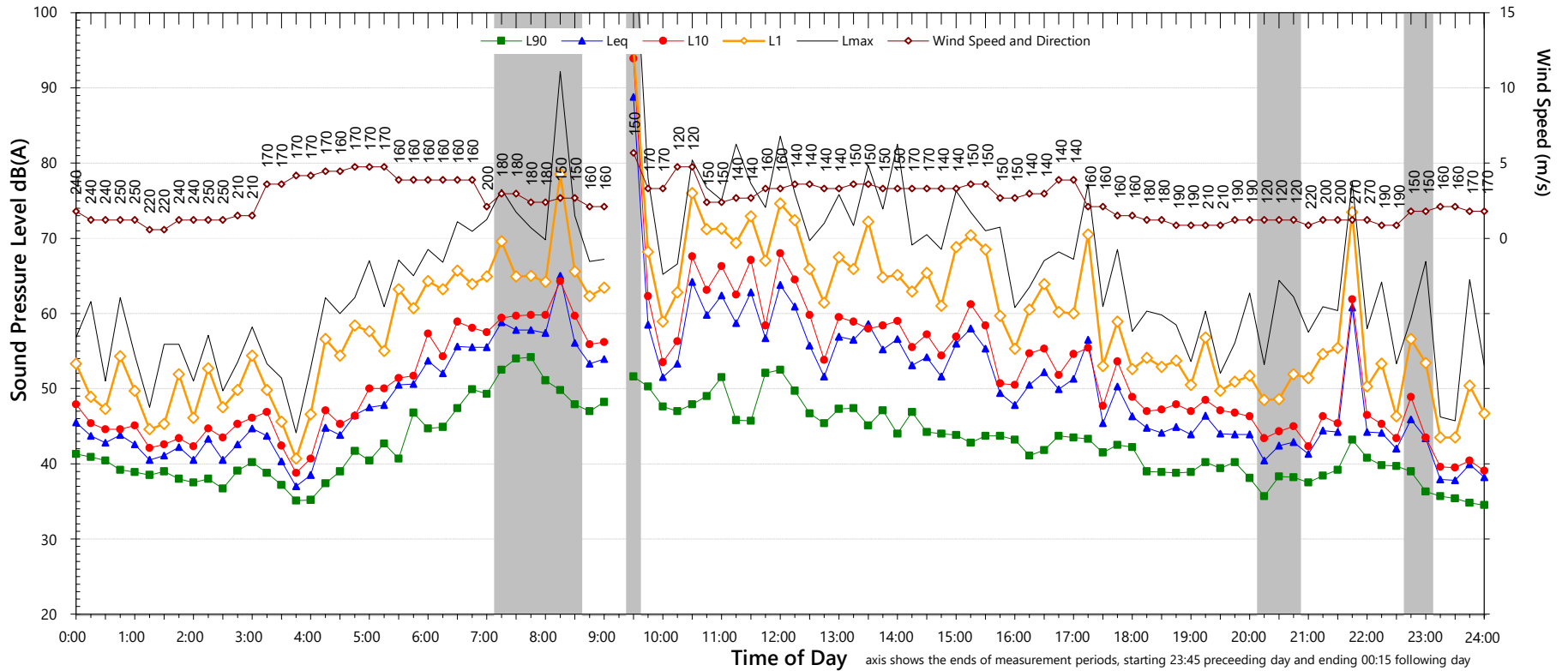
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	60	51
L <sub>eq</sub> 1hr upper 10 percentile	64	54
L <sub>eq</sub> 1hr lower 10 percentile	50	44

QTE-26 Logger Graphs Program (r33)

# Unattended Noise Monitoring Results

Caesarstone South

Wednesday, 9 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	42	-	34
L <sub>Aeq</sub>	57	-	56

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	72	to	74
L <sub>Max</sub> - L <sub>eq</sub> (Range)	18	to	26

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day 7am-10pm	Night <sup>5</sup> 10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	59	59
L <sub>eq</sub> 1hr upper 10 percentile	63	58
L <sub>eq</sub> 1hr lower 10 percentile	47	41

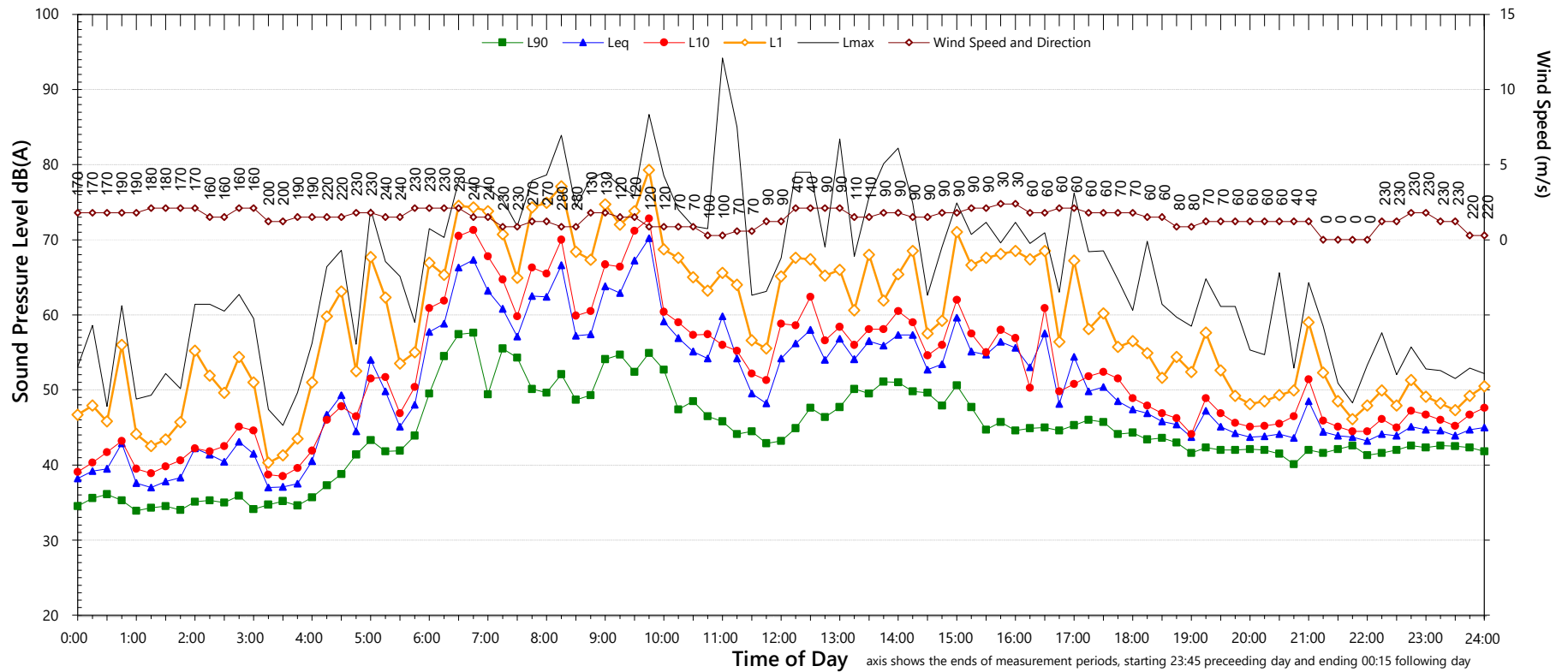
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

Caesarstone South

Thursday, 10 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	44	41	39
L <sub>Aeq</sub>	60	45	46

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	65	to	76
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	25

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	61	48
L <sub>eq</sub> 1hr upper 10 percentile	65	50
L <sub>eq</sub> 1hr lower 10 percentile	48	45

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

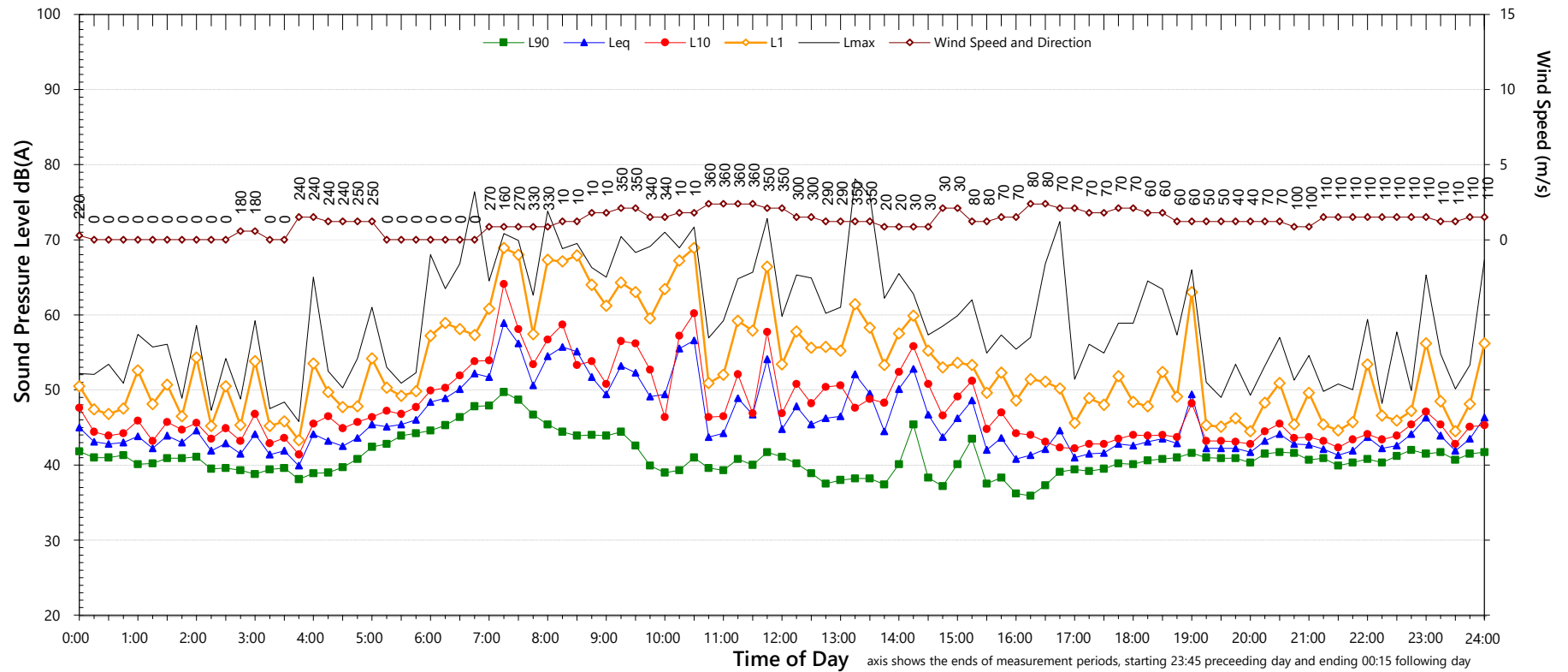
Caesarstone South Logger Graphs(r0)

QTE-26 Logger Graphs Program (r33)

# Unattended Noise Monitoring Results

Caesarstone South

Friday, 11 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	37	40	34
L <sub>Aeq</sub>	51	44	44

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	65	to	76
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	28

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	52	46
L <sub>eq</sub> 1hr upper 10 percentile	56	48
L <sub>eq</sub> 1hr lower 10 percentile	45	42

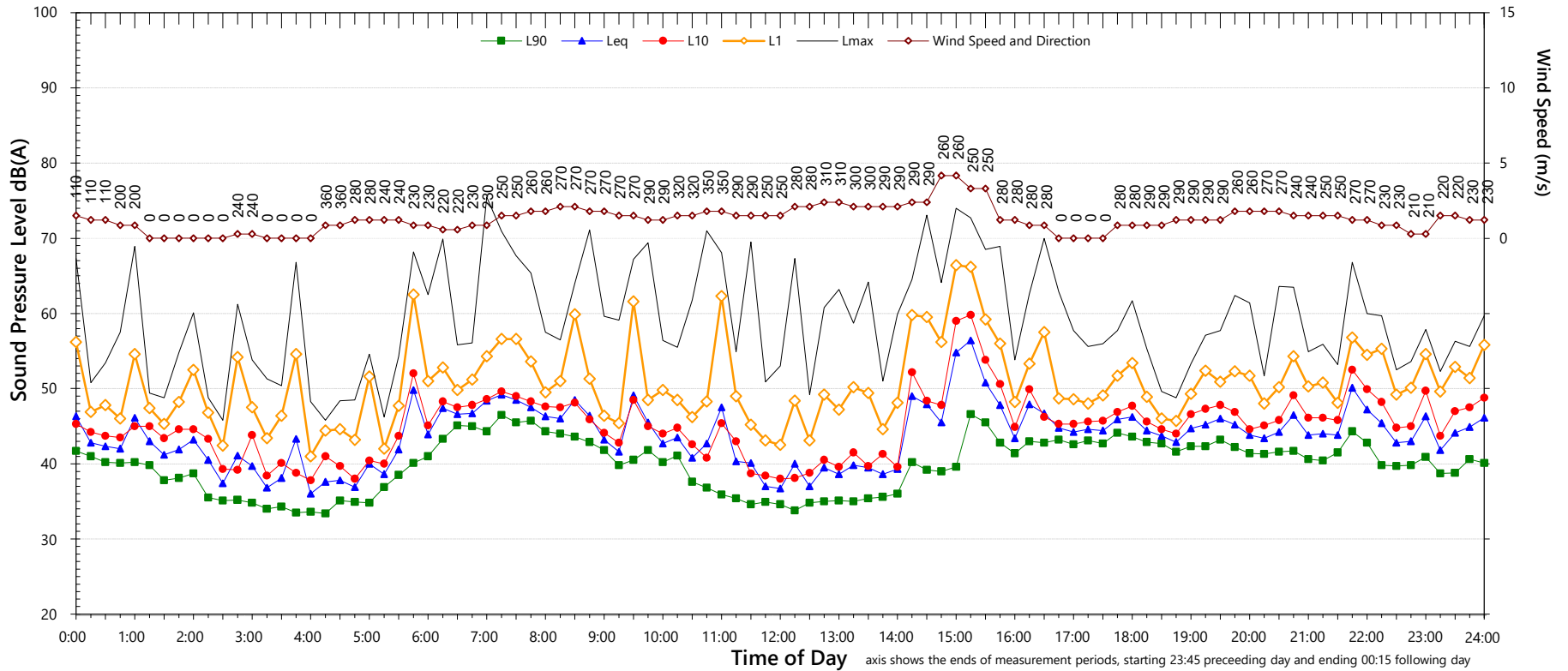
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

Caesarstone South

Saturday, 12 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	35	41	39
L <sub>Aeq</sub>	47	45	57

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	70	to	89
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	31

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Caesarstone South Logger Graphs(r0)

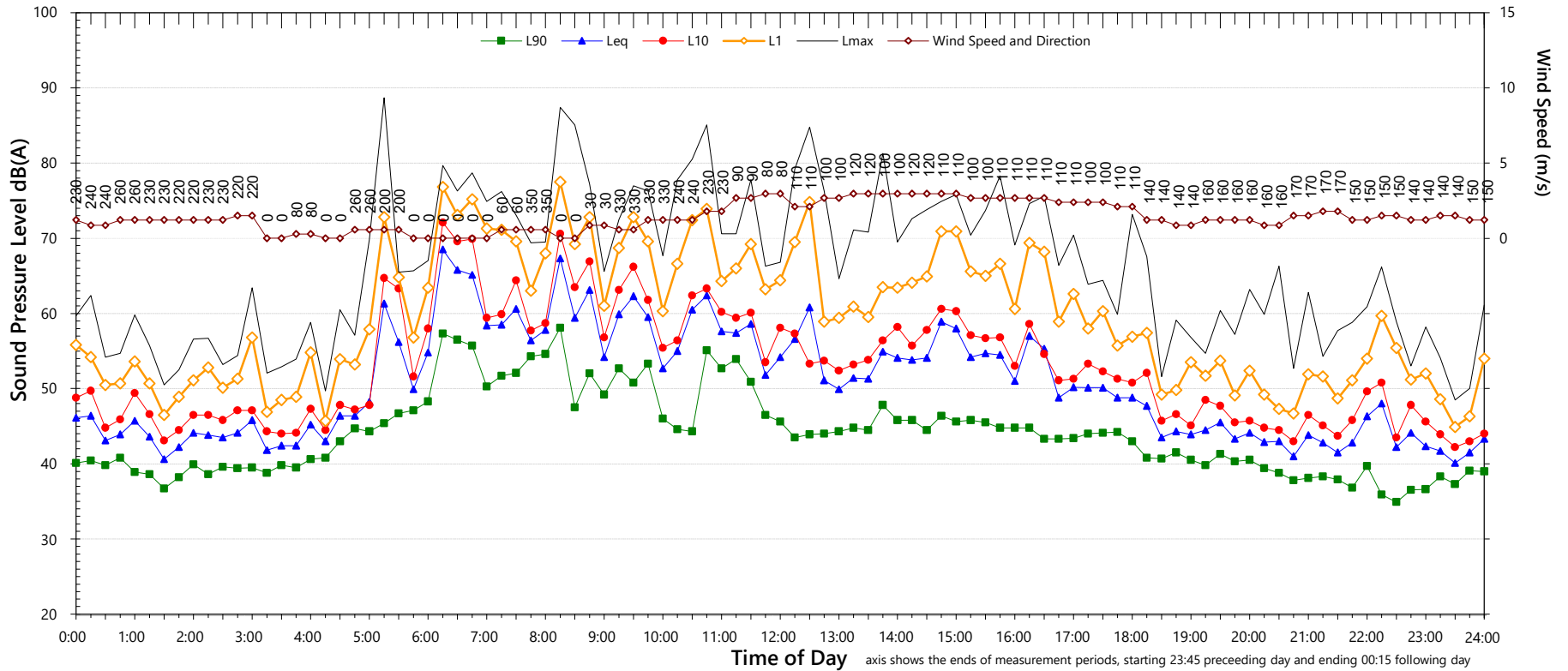
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	49	59
L <sub>eq</sub> 1hr upper 10 percentile	52	62
L <sub>eq</sub> 1hr lower 10 percentile	42	46

QTE-26 Logger Graphs Program (r33)

# Unattended Noise Monitoring Results

Caesarstone South

Sunday, 13 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	43	38	34
L <sub>Aeq</sub>	58	44	48

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	66	to	74
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	28

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Caesarstone South Logger Graphs(r0)

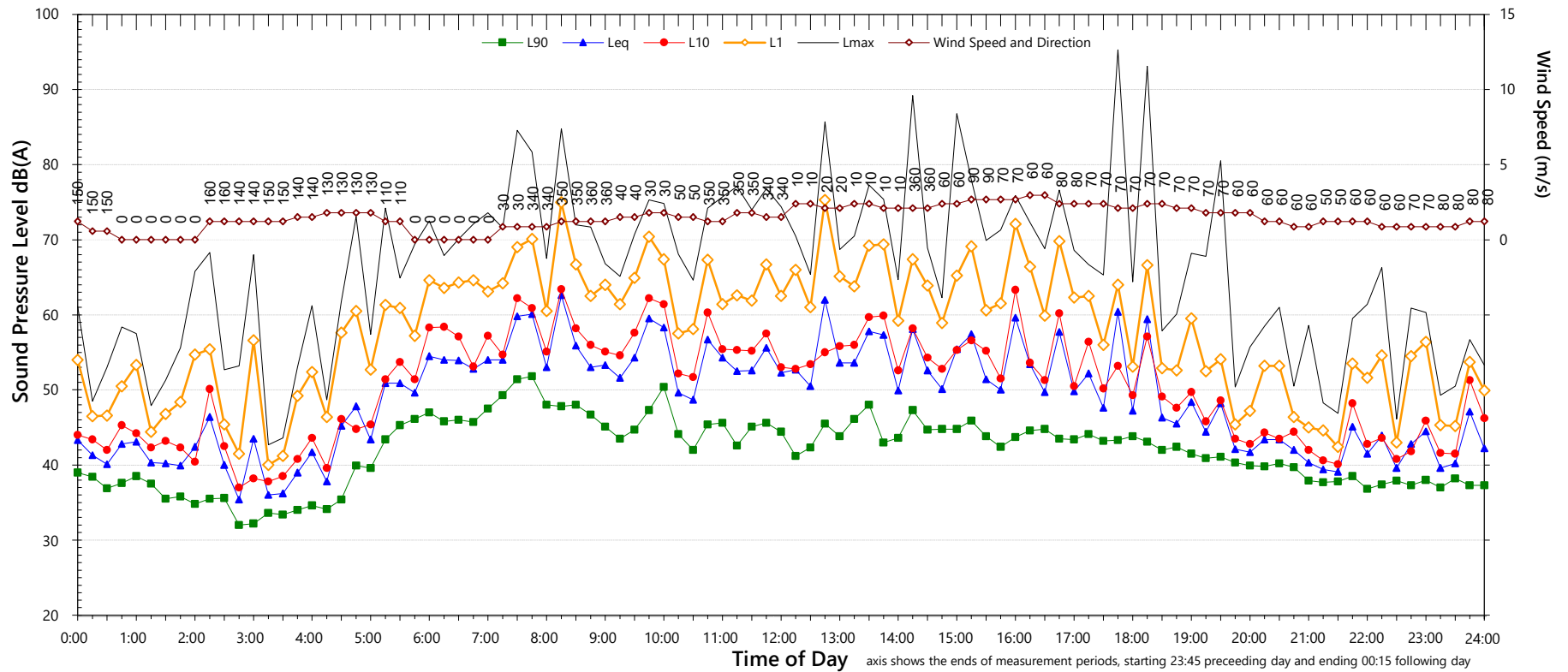
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	59	50
L <sub>eq</sub> 1hr upper 10 percentile	62	55
L <sub>eq</sub> 1hr lower 10 percentile	47	43

QTE-26 Logger Graphs Program (r33)

# Unattended Noise Monitoring Results

Caesarstone South

Monday, 14 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	43	38	37
L <sub>Aeq</sub>	56	49	49

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	66	to	77
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	25

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Caesarstone South Logger Graphs(r0)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	58	51
L <sub>eq</sub> 1hr upper 10 percentile	60	55
L <sub>eq</sub> 1hr lower 10 percentile	46	45

QTE-26 Logger Graphs Program (r33)



# MOOREBANK LOGISTIC PARK - PRECINCT EAST

## ATS Building Products Warehouse Operational Compliance Measurements

1 December 2020

Qube Property Management Services Pty Ltd c/- Tactical Group

TL116-05.4F09 ATS Warehouse Operational Compliance (r2).docx

## Document details

Detail	Reference
Doc reference:	TL116-05.4F09 ATS Warehouse Operational Compliance (r2).docx
Prepared for:	Qube Property Management Services Pty Ltd c/- Tactical Group
Attention:	Cathal McGann

## Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
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## Contents

1	Introduction	5
1.1	Warehouse operations description – ATS	6
1.1.1	Location	6
1.1.2	Operational activities and facilities and hours of operation	6
1.2	Nearby sensitive receivers	6
2	Summary of noise objectives	9
2.1	Compliance assessment noise requirements	9
2.2	Operational noise limits	10
2.3	Discussion of assessment noise limits	10
3	Measurement methodology and results	12
3.1	Compliance measurement methodology	12
3.2	Instrumentation	13
3.3	Receiver attended noise measurement results	13
3.3.1	Meteorological conditions	14
3.4	On-site attended operational activity noise measurement results	17
3.5	Unattended noise measurements	18
3.6	Modelled operational scenarios	20
3.6.1	Observed operations for modelling	20
3.6.1.1	Truck and despatching operations (ATS north)	21
3.6.1.2	Qube container handling operational area	21
3.6.2	Assessment noise source levels	22
3.6.3	Reasonable worst-case intrusiveness scenarios (15-minute period)	22
3.7	Modelling methodology	23
3.7.1	Overview of noise modelling	23
3.7.2	General modelling assumptions	24
3.7.3	Model validation	24
3.8	Noise compliance assessment	25
4	Conclusion	27
APPENDIX A	Glossary of terminology	29
APPENDIX B	Logger location 1 – ATS - North side	31
APPENDIX C	Logger location 2 – ATS – South side	32

## List of tables

Table 1	Noise sensitive receivers and approximate distance from MPE warehouse (ATS)	7
Table 2	SSD 7628 CoC B80 noise limits, dB(A)	10
Table 3	Noise measurement equipment	13

Table 4	Receiver attended noise monitoring locations	14
Table 5	Summary of attended noise measurement results at the nearest sensitive residential receivers	16
Table 6	On-site attended measurement results	17
Table 7	Assessment noise source levels	22
Table 8	Representative 'reasonable' worst-case 15-minute intrusive assessment scenarios	23
Table 9	Comparison between measured and modelled noise levels	25
Table 10	Predicted noise levels - Reasonable worst-case scenarios for warehouse (ATS)	26

### List of figures

Figure 1	Warehouse location (ATS – WH4B), MPE precinct and the nearest residential receivers	8
Figure 2	Attended residential receiver noise monitoring locations	15
Figure 3	ATS South Unattended Noise Measurement Setup	19
Figure 4	ATS North Unattended Noise Measurement Setup	19
Figure 5	Unattended noise logger locations and main noise generation areas (imagery: Nearmap, 2020)	20

# 1 Introduction

Renzo Tonin & Associates was engaged by Tactical on behalf of Qube Property Management Services Pty Ltd (QUBE) to undertake an operational noise compliance assessment of the warehouse operations carried out by ATS Building Products (Warehouse 4B (WH4B)) within the Moorebank Precinct East (MPE), located within the Moorebank Logistics Park (MLP) at Moorebank, NSW.

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stages 1 and 2 of the MPE Project (SSD 6766 and SSD 7628 respectively), which together comprise the two stages of development under the MPE Concept Approval (MP10\_0193). Warehouse operations, including the site that is operated by ATS (WH4B), fall under the area and activities approved as part of SSD 7628.

This report has been prepared to address the operational noise monitoring requirements outlined in the MPE Operational Noise and Vibration Management Plan<sup>1</sup> (MPE ONVMP) required for the warehouse operations carried out by ATS. Specifically, this report has been prepared to address the requirements of Condition of Consent (CoC) B85 in State Significant Development (SSD) 7628, as detailed in Section 3.2.2 of the MPE ONVMP.

Appendix A contains a glossary of acoustic terms used in this report.

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<sup>1</sup> Arcadis & Renzo Tonin & Associates, Operational Noise and Vibration Management Plan for Moorebank Logistics Park – East Precinct, Revision 012, dated 27/3/2020, available [https://simta.com.au/wordpress/wp-content/uploads/2020/04/ONVMP\\_V12\\_redacted.pdf](https://simta.com.au/wordpress/wp-content/uploads/2020/04/ONVMP_V12_redacted.pdf), accessed 8/10/2020

## 1.1 Warehouse operations description – ATS

### 1.1.1 Location

The MLP is located approximately 27 kilometres south-west of the Sydney Central Business District and approximately 26 kilometres west of Port Botany, within the Liverpool Local Government Area. The MLP is divided into an East Precinct and a West Precinct, located east and west of Moorebank Avenue respectively, as shown in Figure 1.

### 1.1.2 Operational activities and facilities and hours of operation

ATS undertakes warehouse and distribution activities from the warehouse designated WH4B within the MPE. The day to day activities include:

- Receipt and despatch of goods from and to the IMEX terminal
- Packing and unpacking of containers
- Storage and distribution of building products
- Despatching and receiving truck movements in and out of the facility
- Forklift operations
- Cutting of timber products to size (Internal warehouse activity)
- De-termite timber treatment line (Internal warehouse activity)
- General office administrative and support functions.

ATS's warehouse and distribution activities can operate 24 hours, 7 days per week.

The despatch and receiving activities mostly occur from the north side of the ATS warehouse, typically between the hours of 5:00am and 10:00pm, with the busiest period around 5:30am to 6:30am. Additionally, there is a designated area on the southern side of the warehouse where containers from the IMEX terminal are transported to and stored for unloading within the warehouse. These two main areas are shown in Figure 5.

## 1.2 Nearby sensitive receivers

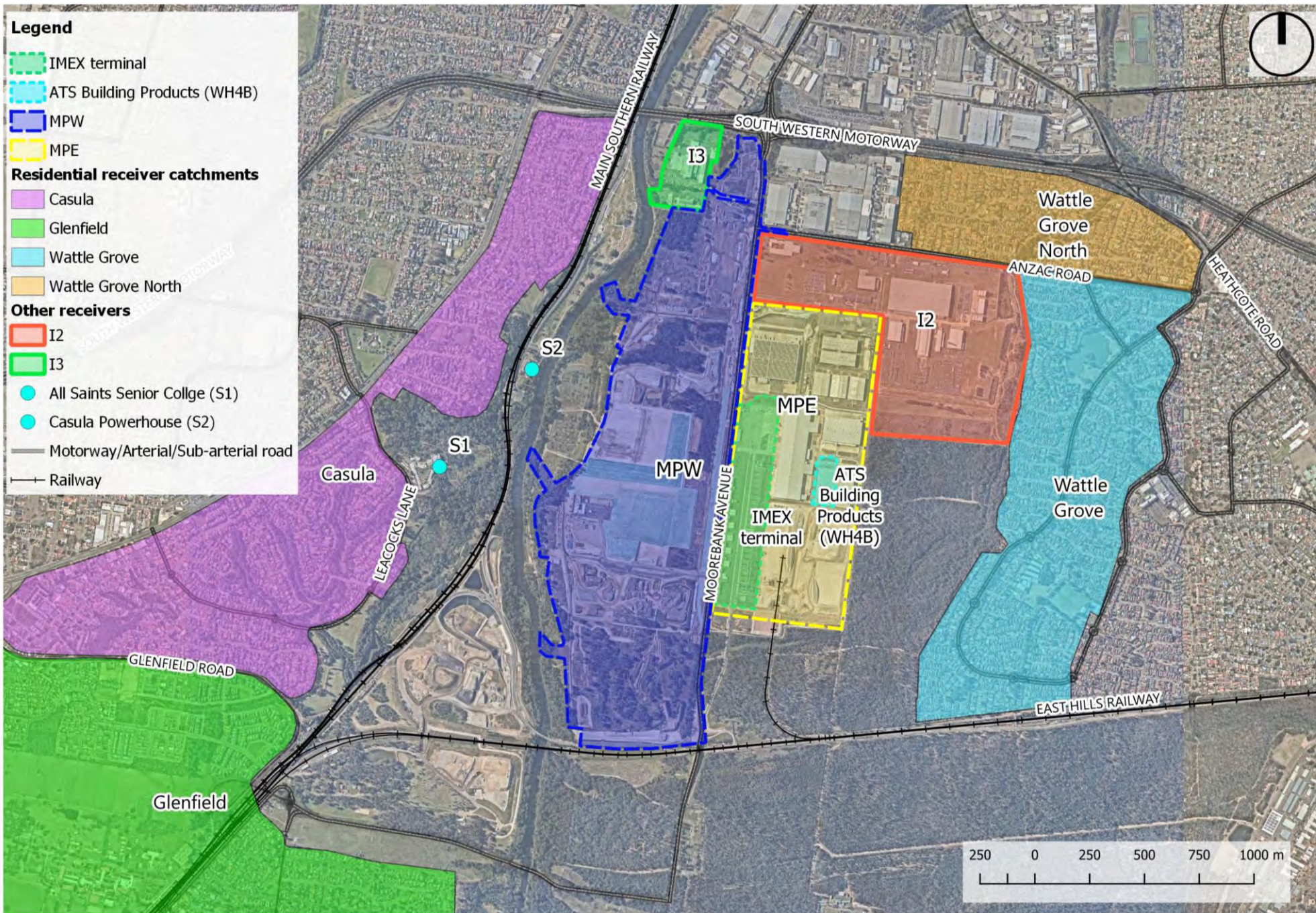
The potentially most affected residential receivers in the vicinity of the MPE (where loading / unloading at ATS north and south occur), are located in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North. A summary of the approximate distance to the nearest residential receiver in the surround noise catchment areas (NCAs) is provided in Table 1. The locations of the NCAs or receivers, are shown in Figure 1.

**Table 1 Noise sensitive receivers and approximate distance from MPE warehouse (ATS)**

Sensitive receiver (Noise Catchment Area (NCA) or Receiver ID)	Receiver type	Approximate distance from MPE precinct warehouse (ATS), metres
Wattle Grove (NCA 1)	Residential	800
Wattle Grove North (NCA 2)		1,060
Casula (NCA 3)		1,530
Glenfield (NCA 4)		2,530
All Saints Senior College (S1)	Educational	1,720
Casula Powerhouse (S2)		1,380
Defence Joint Logistics Unit (DJLU) (I2)	Industrial	600
ABB (I3)		1,260

Notes: 1. Moorebank Precinct West (MPW) has not been assessed as the final receiver locations have not been confirmed or constructed.

Figure 1 Warehouse location (ATS – WH4B), MPE precinct and the nearest residential receivers



## 2 Summary of noise objectives

### 2.1 Compliance assessment noise requirements

The management of operational noise emission from warehouse activities within MPE Stage 2 is outlined in the MPE ONVMP. Specifically, this report has been prepared to address the monitoring requirements of CoC B85 in SSD 7628, as detailed in Section 4.1.1 of the MPE ONVMP.

This report includes noise monitoring performed to address the requirements in CoC B85, as detailed in Table 4-1 in Section 4.1.1 of the MPE ONVMP.

The requirements of CoC B85 state:

*B85 The Applicant must carry out noise monitoring of mechanical plant and other noisy equipment for a minimum period of one week where valid data is collected following occupation of each warehouse. The monitoring program must be carried out by a suitably qualified and experienced person(s) and a Monitoring Report for Mechanical Plant must be submitted to the Secretary within two months of occupation or each tenancy to verify predicted mechanical plant and equipment noise levels.*

CoC B85 requires that the monitored noise levels be compared against the predicted levels reviewed in accordance with CoC B84.

The noise impacts from warehouse operations were assessed as part of the environment impacts statement noise and vibration impact assessments (MPE Stage 2 Noise and Vibration Impact Assessment, Wilkinson Murray, Report No. 12186-S2, Version C, 29 November 2016 (MPE Stage 2 N&V assessment)). Individual warehouse operations were not assessed and further review of site noise emissions subsequently has not been undertaken. As such, there are no specific predicted noise levels for the warehouse activities at the nearby noise sensitive receivers that can then be used for verification under CoC B85.

As per Table 4-1 in Section 4.1.1 of the MPE ONVMP, Table 3-20 and Table 3-21 of the MPE ONVMP detail the predicted  $L_{Aeq\ 15\ minute}$  intrusiveness and  $L_{Amax}$  sleep disturbance noise levels respectively for the overall MPE operations (not for an individual warehouses).

As such, for the purposes of addressing CoC B85, instead of comparing the facility noise emission against the noise level predicted in accordance with condition B84, this report is aims to assess the noise levels from the mechanical plant and other noisy equipment that operate within the facility directly against the noise limits presented in Table 5 of condition B80.

## 2.2 Operational noise limits

The operational noise limits applicable for the warehouse operations within MPE are presented in Table 5 of SSD 7628 CoC B80 and are reproduced in Table 2. These noise limits are as per Table 3-5 of the MPE ONVMP. The noise limits are applicable not only to all operational noise sources approved under SSD 7628, but are inclusive of operations as part of MPE Stage 1, approval SSD 6766.

The  $L_{Aeq(15 \text{ minute})}$  criteria are applicable during the day, evening and night-time periods and the  $L_{A1(1 \text{ minute})}$  sleep disturbance noise limits at residential receivers are applicable during the night-time period.

The noise limits are applicable under prevailing meteorological conditions of wind speeds of up to 3 m/s at 10 metres above ground level or stability category 'F' temperature inversion conditions.

**Table 2 SSD 7628 CoC B80 noise limits, dB(A)**

Sensitive receiver	Day <sup>1</sup>	Evening <sup>1</sup>	Night <sup>1</sup>	Night <sup>1</sup>
	$L_{Aeq, 15 \text{ minute}}$	$L_{Aeq, 15 \text{ minute}}$	$L_{Aeq, 15 \text{ minute}}$	$L_{A1(1 \text{ min})}$
Wattle Grove (NCA 1)	35	35	35	52
Wattle Grove North (NCA 2)	35	35	35	52
Casula (NCA 3)	35	35	35	52
Glenfield (NCA 4)	35	35	35	52

Notes:

1. In accordance with the INP, day is the period from 7:00am to 6:00pm Monday to Saturday; or 8:00am to 6:00pm on Sundays and public holidays; evening is the period from 6:00pm to 10:00pm; and night is the remaining periods.
2. To determine compliance with the  $L_{Aeq,15 \text{ minute}}$  noise limits, noise from the development is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 7 Noise Policy for Industry - NPfI) The modification factors in Section 4 of the INP must also be applied to the measured noise levels where applicable.
3. To determine compliance with the  $L_{A1}$  noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the EPA may accept alternative means of determining compliance (see Chapter 7 of the NPfI).
4. The noise emission limits identified above apply under meteorological conditions of:
  - (i) wind speeds of up to 3 m/s at 10 metres above ground level; or
  - (ii) 'F' atmospheric stability class.

## 2.3 Discussion of assessment noise limits

As noted in Section 2.2, the noise limits detailed in SSD 7628 CoC B80 are applicable not only to all operational noise sources approved under SSD 7628, but are also inclusive of operations as part of the MPE Stage 1 approval for SSD 6766. Importantly, when assessing compliance with the noise limits, the most affected residential receiver for any individual operations will not necessarily be at the same location. Additionally, it is unlikely that the reasonable worst-case noise levels from any individual operations would also occur in the same 15-minute period.

As part of the recent modification application for SSD 7709 Moorebank Precinct West (MPW) – Stage 2, MOD 1 - Building height increase (July 2020), a review of the applicable operational noise requirements across Moorebank Precinct West (MPW) and Moorebank Precinct East (MPE) was undertaken (Renzo Tonin & Associates document reference TJ741-11F05 (r4), dated 30 June 2020). The review identified

that there are number of approval conditions that are applicable across both the MPW and MPE sites for operational noise, and that in the application of these approvals to the site activities it became apparent that the operational noise requirements were not consistent across the MPE and MPW sites.

Additionally, the review identified that the operational noise limits across MPE and MPW were set substantially below both the noise criteria and the predicted noise levels (even with feasible and reasonable mitigation measures) established during the environmental assessment stages and considering the cumulative operational noise levels from all MPE and MPW operations.

The review recommended that an overall approach for cumulative operational noise management of the Moorebank intermodal terminal precinct (for East and West precinct) for a “whole of complex” approach be adopted, and that consistent noise management objectives for the Moorebank intermodal terminal precinct’s operational noise be adopted to cover all operations within MPE and MPW. Appropriate and achievable noise management objectives consistent with EPA’s noise policies were also developed in the review.

Following the modification application for SSD 7709 (MOD 1), the submission received from the NSW Environment Protection Authority (NSW EPA) noted the following:

*However, the current noise limits are set below the predicted noise levels and are not based on the Project Specific Noise Levels (PSNL) derived under the then-applicable Industrial Noise Policy 2000 (now superseded by the Noise Policy for Industry 2017)... The EPA considers that the resulting noise limits are not achievable for MPW, nor are they achievable for the cumulative MPW and MPE sites.*

Also Liverpool City Council included in their submission:

*Council considers that site regulation in regard to noise management may be assisted by adopting a precinct approach consistent with the NSW EPA’s Noise Policy for Industry (2017)... Whilst it is acknowledged that current criteria in the Approval may be impracticable, it will be necessary for the Department to consider applying suitable noise limits that are achievable and capable of protecting the amenity and wellbeing of sensitive receivers.*

As such, this operational compliance assessment does not include further quantification of cumulative noise levels, and demonstrates that the ATS warehouse operations can achieve the noise limits set out in SSD 7628 CoC B80 in isolation during reasonable worst-case operations.

It is recommended that noise levels from this assessment achieve the required noise limits set out in Table 5 of SSD 7628 CoC B80, and that the site specific noise levels should be considered as part of the operational noise management applicable to the overall Moorebank intermodal terminal precinct.

## 3 Measurement methodology and results

### 3.1 Compliance measurement methodology

The Noise Policy for Industry (NPfI) provides guidance in Chapter 7 for monitoring the performance of a noise-generating industrial facility. In Section 7.1.1, the NPfI provides guidance as to how to review noise emissions of a site where the existing ambient noise levels are already high, resulting in the direct quantification of the noise under investigation not being possible via noise measurements at the receiver location. Additionally, it provides guidance about using noise modelling to review the performance of an industrial operation that is co-located with separate but noise-generating industrial sites impacting the same receiver.

Noise measurements undertaken as part of this compliance monitoring established that the existing ambient noise levels at the nearby receiver locations meant that the direct quantification or estimation of operational noise emissions from the warehouse operations was not possible.

As such, because of existing high ambient noise levels at the nearest receivers, in addition to a number of industrial noise-generating facilities being co-located, the noise emissions from the warehouse facility (ATS) have been evaluated using a combination of on-site attended and unattended noise monitoring, combined with noise modelling, in order to quantify the industrial noise emissions from ATS operations. To satisfy the requirements of CoC B85, the following noise monitoring and assessment steps have been undertaken:

1. Attended noise monitoring at nearby residential receivers to review existing noise levels and to determine if operational noise emissions are quantifiable (Section 3.3)
2. On-site attended monitoring of noise-generating activities to quantify noise emission levels of mechanical plant and other noise-generating activities as part of typical warehouse operations (Section 3.4)
3. Unattended noise monitoring within the ATS warehouse facility for a period of approximately two weeks, with concurrent video, to identify the reasonable worst-case operational scenarios for each major noise-generating area (Section 3.5).

Following the noise monitoring, the following steps were undertaken to assess the noise level contributions at the nearby sensitive receivers:

4. Review observations of warehouse operations, in addition to the noise monitoring results and associated video, to then determine the reasonable worst-case operational scenarios
5. Setup and calibrate the noise model for the reasonable worst-case operational scenarios
6. Calculate the operational noise levels from the warehouse operations to all nearby receivers and determine the noise level contribution at the property with the highest noise levels within each NCA.

### 3.2 Instrumentation

A range of noise monitoring equipment was used to undertake the compliance noise monitoring. A summary of measurement equipment and calibration dates is provided in Table 3.

All of the noise monitoring equipment are Class 1 instruments, with calibration certificates current at the time of the measurements. Before and after each series of attended measurements, the calibration of the sound level meters were verified using a reference calibration of 94 dB at 1 kHz. The difference between pre- and post-calibration levels was within 0.5 dB for all measurements.

**Table 3 Noise measurement equipment**

Monitoring location/ purpose	Equipment	Serial No	Last date calibrated
Receiver attended noise measurements	NTi XL2	A2A-13500-E0	17/01/2020
On-site attended noise measurements	NTi XL2	A2A-12698-E0	01/05/2019
Unattended on-site noise measurements (ATS North)	NTi XL2	A2A-08004-E0	01/11/2018
Unattended on-site noise measurements (ATS South)	NTi XL2	A2A-13529-E0	20/12/2019
Field calibration	B&K 4231	2677710	16/03/2020

### 3.3 Receiver attended noise measurement results

As detailed in Section 1.2, the nearest residential receivers to the ATS warehouse site are located in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North.

As the most intensive period of operational activities at WH4B (ATS) was during the morning period from 5:30am to 6:30am, attended noise measurements were performed at the nearest residential receiver locations between 5:30am and 8:00am on 7 September 2020. These measurements were undertaken concurrently with on-site unattended noise measurements to confirm that noise intensive activities were occurring on-site during the receiver noise measurements.

Attended noise measurements were undertaken at six potentially noise affected residential receivers in the surrounding residential noise catchment areas. These included nearby residential receiver locations and the locations of the permanent noise monitoring terminals that are established in the suburbs surrounding MLP.

A summary of the monitoring locations and the approximate distance to the warehouse (ATS) is provided in Table 4. The locations and noise catchment areas (NCAs) are presented in Figure 2.

The results of the attended measurements conducted on 7 September 2020 are presented in Table 5.

**Table 4 Receiver attended noise monitoring locations**

Monitoring location ID	Monitoring location (applicable NCA) (see Figure 2)	Approximate distance (metres) from warehouse (ATS)
M1	25 Yallum Court, Wattle Grove (Wattle Grove – NCA1)	1,100
M2	23 Gracemere Court, Wattle Grove (Wattle Grove – NCA1)	800
M3	31 Martindale Court, Wattle Grove (Wattle Grove – NCA1)	830
M4	39 Glenelg Court, Wattle Grove (Wattle Grove North – NCA2)	850
M5	St Andrews Park, Casula (Casula – NCA3)	1,420
M6	14 Dunmore Crescent, Casula (Casula – NCA3)	1,500
M7	26 Goodenough St, Glenfield (Glenfield – NCA4)	2,650

In all cases, the measured  $L_{Aeq(15\text{minute})}$  noise levels at the residential receivers, noise from the direction of the ATS warehouse on-site activities was not audible and/or distinguishable. The noise measurements at each residential receiver location was dominated by noise from sources outside of the MPE operations, mainly dominated by traffic noise levels from nearby arterial roads.

Since the ATS noise emissions were not audible, it was not possible to estimate the industrial noise contribution from the facility at the nearest residential receivers from these measurements.

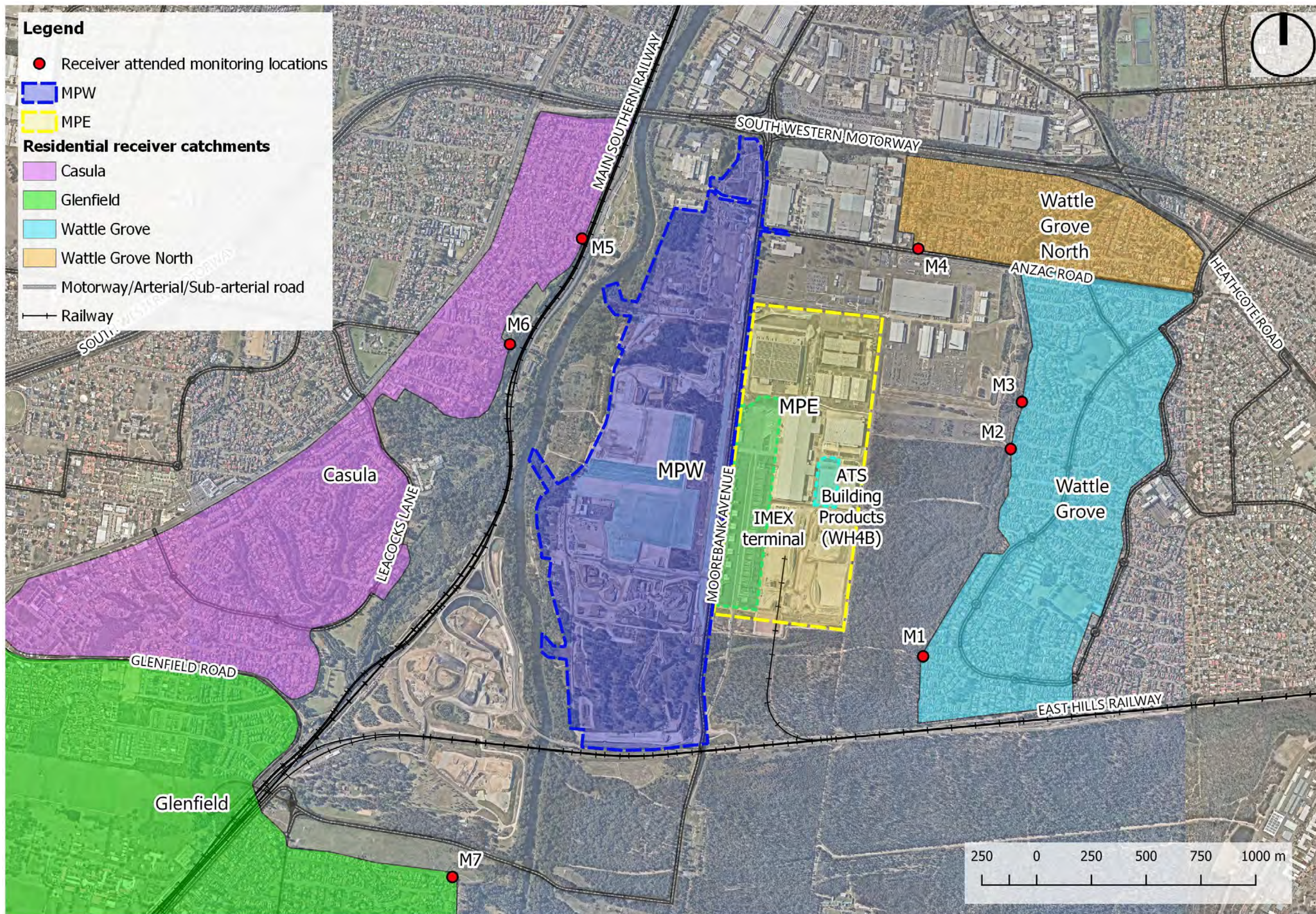
### 3.3.1 Meteorological conditions

Meteorological conditions during the period of the receiver attended noise measurements have been reviewed to determine the prevailing wind and temperature inversion conditions. Data from the meteorological data monitoring station adjacent to Moorebank Avenue, within the MPE site, established in accordance with CoC A54 SSD 7709 has been reviewed. It was determined from the review that the attended noise measurements were undertaken under periods with worst-case prevailing meteorological conditions in accordance with SSD 7628 B80.

The meteorological conditions experienced during receiver attended noise measurement on 7 September 2020 are summarised below:

- During the measurement period on 7 September, the temperature inversion conditions between 5:30am and 7:30am were generally Class F temperature inversion (> 95% of the measurement period), based upon calculations using the sigma-theta method referred to in Fact Sheet D of the NPfI;
- During the measurement period at the facility, the equivalent average wind speed was 0.5-1 m/s and generally from the SSW, varying from SE to W. The measurements were not impacted by excessive wind during any of the measurement periods;
- No rain occurred during any of the measurement periods; and
- The temperature during the measurement period ranged between 12°C and 16°C, and the cloud conditions were generally clear skies with a few scattered clouds.

Figure 2 Attended residential receiver noise monitoring locations



**Table 5 Summary of attended noise measurement results at the nearest sensitive residential receivers**

ID	Address	Noise limit, dB(A)		Measurement period	Measured noise level (15 minute), dB(A)				Estimated MPE operational noise contribution, dB(A)		Comments and measured noise levels from typical events	ATS noise audible?
		L <sub>A1</sub> , 1 minute	L <sub>Aeq</sub> , 15minute		L <sub>Amax</sub>	L <sub>A1</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>	L <sub>A1</sub> , 1 minute	L <sub>Aeq</sub> , 15minute		
<b>Wattle Grove</b>												
M1	25 Yallum Ct, Wattle Grove	52	35	7/09/2020 7:23am to 7:38am	78	62	54	48	Note 1	Note 1	Ambient noise environment dominated by noise from road traffic at north west: Construction 54-57dB(A), bird 65-69dB(A), dog 50-56dB(A), rail traffic 49-52 dB(A).	No
M2	23 Gracemere Court, Wattle Grove	52	35	16/09/2020 6:08am to 6:23am	60	56	53	51	Note 1	Note 1	Ambient noise levels controlled by M5 traffic (54/55 dB(A)) from NW to NNE. Trucks were clearly distinguishable at times on the M5 (up to 60 dB(A)), also peaks are from motorbikes, but generally it is controlled by constant traffic noise. Occasional train movement faintly audible. Other noise sources contributed such as birds and frogs, and distant dogs to the south, and some activities in nearby residence. No noise audible from direction of warehouses.	No
M3	31 Martindale Court, Wattle Grove	52	35	7/09/2020 7:17am to 7:31am	69	61	54	52	Note 1	Note 1	Ambient noise environment dominated by noise from Road traffic from north west: Road traffic 54-55dB(A), Dog barking 64-69 dB(A)	No
<b>Wattle Grove North</b>												
M4	39 Glenelg Court, Wattle Grove North	52	35	7/09/2020 6:53am 7:08am	79	76	68	54	Note 1	Note 1	Ambient noise environment dominated by noise from Anzac Rd: Road traffic 79-80dB(A), Bird 60-62dB(A), Moorebank Ave traffic 54-55 dB(A)	No
<b>Casula</b>												
M5	St Andrews Park, Casula	52	35	7/09/2020 5:28am 05:45am	78	75	60	50	Note 1	Note 1	Ambient noise environment dominated by noise from M5 Motorway: Road traffic 50-51, Rail traffic 75-78dB(A), Bird 66-67 dB(A)	No
M6	14 Dunmore Crescent, Casula (NMT 04 permanent noise monitor)	52	35	7/09/2020 5:53am to 6:09am	69	56	51	49	Note 1	Note 1	Ambient noise environment dominated by noise from M5 Motorway: Road traffic 49-50dB(A), Rail traffic 53-54dB(A), Birds 68-69 dBA	No
<b>Glenfield</b>												
M7	26 Goodenough St, Glenfield	52	35	7/09/2020 6:23am to 6:38am	67	59	56	54	Note 1	Note 1	Ambient noise environment dominated by noise from Cambridge Ave: Road traffic 53-55dB(A), Bird 55-67dB(A), Dog barking 59-60 dB(A), Rail traffic 59-60 dB(A)	No

Notes: 1: Since noise levels from the MLP were not audible during the measurement period, it was not possible to estimate the MLP noise contribution

### 3.4 On-site attended operational activity noise measurement results

Attended noise measurements of individual operational items and typical operations were undertaken at ATS on 16 September 2020, in order to quantify the noise emissions from noise-generating operational activities. These noise levels have been used to assist in establishing the source noise levels in the noise model.

During all measurements, the specific noise source being measured was the dominant noise source. Observations were made of the on-site operations, which have then been reviewed in conjunction with the video data to model 'reasonable' worst-case operational scenarios over the assessment periods. Critical on-site attended measurement results are summarised in Table 6.

**Table 6 On-site attended measurement results**

Activity noise sources	Date	Time	Measurement duration (t), sec	Measurement distance, m	Measured noise levels, dB(A)	
					L <sub>Aeq(t)</sub>	L <sub>Afmax</sub>
<b>Truck</b>						
Truck pass-by	16/9/2020	5:55am	10	10	65	69
Truck Idling	16/9/2020	5:56am	20	5	67	67
Truck reversing beeper	16/9/2020	5:23am	16	38	55	59
Air brake release (container delivery truck)	7/9/2020	1:27pm	5	12	84	87
<b>Combi-lift<sup>1</sup></b>						
Grabbing & dropping sound	7/9/2020	7:19am	2	44	67	71
Engine revving	7/9/2020	7:19am	10	23	75	76
Engine	7/9/2020	7:20am	20	38	60	61
Reversing beeper	7/9/2020	7:19am	12	23	71	74
<b>Loading</b>						
Loading & unloading activity	16/9/2020	6:06am	13	22	62	80
<b>Forklift</b>						
Forklift pass-by	16/9/2020	5:50am	10	8	66	70
<b>Internal warehouse noise levels (noise breakout)</b>						
Internal noise sources at loading dock door (radio, internal forklift operation)	16/9/2020	7:20am	900	At loading dock doorway	67	82
<b>Mechanical plant</b>						
Warehouse smoke exhaust fan <sup>2</sup>	16/9/2020	7:51am	15	11	62	62
Air condenser unit	16/9/2020	5:23am	60	1	55	56

Notes:

1. Same Combi-lift is used for the container handling at the ATS warehouse as that used at the Target warehouse. Attended measurement of the Target container handling area on the 7 September 2020 have been used for determining sound power levels.
2. Internal noise levels within the ATS warehouse meant that fan noise levels were not audible or quantifiable from accessible locations, and so fan noise levels are based upon Internal noise measurement undertaken at ATS Building Products warehouse, 16 September 2020.

### 3.5 Unattended noise measurements

Unattended noise measurements were undertaken over the period between 2 September and 15 September 2020 at a location adjacent to the ATS north warehouse (refer to Figure 3) and the period between 7 September and 15 September 2020 at a location of container terminal adjacent to the ATS south warehouse (refer to Figure 4). Two main areas of noise-generating operations were identified across the warehouse site, one on the northern side of the warehouse and one the southern side. These are shown in Figure 5.

The location of the unattended noise loggers is shown in Figure 5. These were selected so that they would capture noise from the main noise-generating areas as part of the typical warehouse operations. Camera units were setup as shown in Figure 5 at the noise logger location at ATS north, and the eastern boundary fence at ATS south, to assist the engineers in gaining a comprehensive understanding of the site operations and truck movements.

The purpose of the noise logging at the selected locations was for the following:

- Determine the noise emissions from the facility at a fixed location close enough to quantify on-site sources;
- Determine the long-term background noise levels when operations were not taking place at the site;
- A source for analysis to determine duration and nature of the different on-site activities through correlation with the facility activity data;
- Source of validation for the noise model calibration process.

Detailed unattended noise monitoring results are provided in APPENDIX B for ATS North and APPENDIX C for ATS South. The noise model was validated using the unattended noise logger results, refer to Section 3.7 for noise model calibration.

Figure 3 ATS South Unattended Noise Measurement Setup

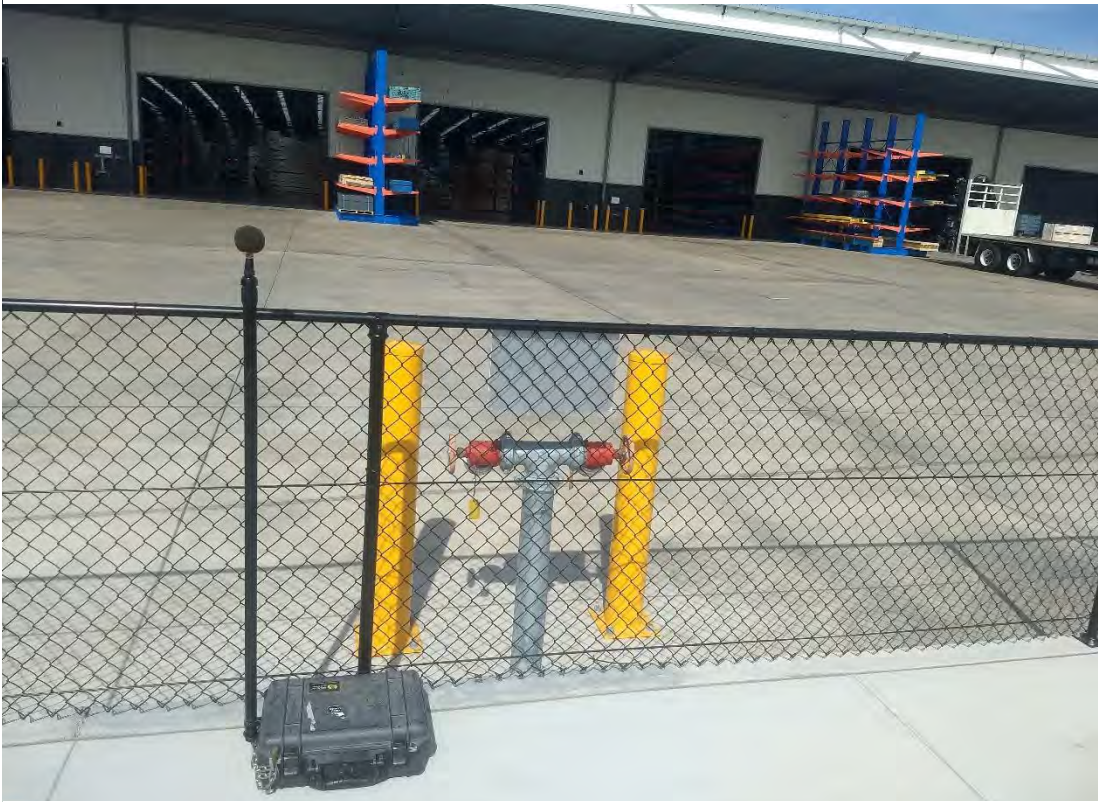


Figure 4 ATS North Unattended Noise Measurement Setup



Figure 5 Unattended noise logger locations and main noise generation areas (imagery: Nearmap, 2020)



MLP operates four continuous noise monitoring stations located in the surrounding residential noise catchment areas, as per Section 4.1.2 of the MPE ONVMP. However, following the attended noise measurements presented in Section 3.3, which found that the warehouse noise emissions were not audible at the nearby residential receivers locations, further analysis of the data from the continuous noise monitoring stations were not undertaken as it would not assist further in this compliance assessment.

### 3.6 Modelled operational scenarios

#### 3.6.1 Observed operations for modelling

Based upon the on-site attended measurements presented in Section 3.4, the video recording for the facility undertaken for the duration of the unattended monitoring period presented in Section 3.5, and discussions with ATS personnel, 'reasonable' worst-case operational scenarios were established and modelled to satisfy the assessment periods under SSD 7628.

The following section details the key observations of each of the noise-generating activities that take place across the warehouse operations.

### 3.6.1.1 Truck and despatching operations (ATS north)

The following data on truck operations was obtained from the site observations during the attended noise measurements, and in addition to the unattended noise measurements/concurrent video recordings that were undertaken between 10 September and 12 September 2020.

- It was observed and confirmed by video data, that truck operations were typically crane trucks, and that a typical 'in-and-out' cycle time in the facility was on median 30 minutes, with each loading and unloading cycle taking approximately 30-45 minutes to be fully loaded with building materials.
- ATS trucks are parked inside the warehouse the night prior. The noise intensive period for truck loading activities was typically between 5:30am to 6:30am at ATS north, and then trucks leave the facility after being loaded with materials.
- The maximum number of trucks being loaded with forklift are two simultaneously within the ATS dispatching area, which was confirmed through analysis of the video data and on-site attended measurement. As such, the reasonable worst-case would be two loading events concurrently.

### 3.6.1.2 Qube container handling operational area

- It was observed that one combi-lift is in use to move containers "in and out" of the ATS terminal at the Qube container handling operational area. From the video data, it was observed that the combi-lift operate could operate continuously throughout a 15-minute period when handling containers.
- Impact noise events associated with grabbing and dropping would occur when the combi-lift gripper contact individual containers as part of handling operations. This sound power level is adopted in the modelling for the sleep disturbance calculations.
- Tonal reversing beepers is used when a combi-lift is undertaking container handling activities.
- Movements of containers within the Qube area can occur throughout the day and night-time period depending upon train arrivals. It was observed from the video data that eleven container movements were recorded within the daytime period over the period between 7 September and 16 September 2020
- Two container movements were observed during the night-time period between 7 September and 16 September 2020. This indicates that night-time container operations at ATS south are not a typical operational scenario, and so this is not incorporated into the 'reasonable' worst-case operational scenario.

### 3.6.2 Assessment noise source levels

Source levels for the key noise-generating activities on-site have been based on the attended noise measurements (Section 3.4) and unattended noise measurements (Section 3.5) during periods of typical operation. The sound power level inputs presented in Table 7 were used in the operational noise compliance modelling, and adjusted for the duration and frequency of operations (Section 3.6.3).

**Table 7 Assessment noise source levels**

Site items / operation	Individual activity sound power level (SWL) ( $L_{Aeq}$ ), dB(A)
<b>ATS North</b>	
Trucks accelerating on site	101
Trucks idling on site/no engine load movement	72
Trucks reversing beeper	86
Truck (container delivery) airbrake event ( $L_{Amax}$ )	117
Forklift operations	96
Forklift operations ( $L_{Amax}$ )	111
Loading operations ( $L_{Amax}$ )	115
<b>ATS South</b>	
Container combi-lift (moving container activity)	103
Container gripping & drop ( $L_{Amax}$ )	114
<b>Internal noise breakout</b>	
Internal activities noise (breakout via warehouse doors)	67 $L_{Aeq}$ internal sound pressure level
<b>Mechanical Plant</b>	
Warehouse air smoke exhaust fan <sup>1</sup>	90
Air condenser unit (warehouse façade north)	69

Notes:

1. Based upon internal noise measurement undertaken at ATS Building Products warehouse, 16 September 2020.

### 3.6.3 Reasonable worst-case intrusiveness scenarios (15-minute period)

As the noise limits in CoC B80 are set at 35 dB(A)  $L_{Aeq}$  15 minute for the day, evening and night periods, specific separation of noise intensive periods for each of these time periods has not been undertaken. Instead, it is noted that there are three main areas of noise generation as part of typical warehouse operations, as presented in Figure 5.

In order to assess the operational noise emissions from the warehouse, the 'reasonable' worst-case operations for the three main areas of noise generation have been developed, along with the corresponding activities in the other noise-generating areas, in order to review a representative snapshot of activities from the warehouse operations. Each of the assessment scenarios have been developed from an analysis of the video movement data over during the one-week period, in addition to the information detailed in Section 3.6.1.

As activities at ATS North can occur prior to 6:00am, a representative scenario has been selected to assess a 'reasonable' worst-case scenario prior to 7:00am (night-time period). The most noise intensive activities for ATS north during the night period are the morning preparation and despatch activities which occur around the 6:00am period. The Qube container operational area at ATS is most active during daytime period after 7:00am. These two sets of activities represent the 'reasonable' worst-case operations for the two main areas of noise generation, and have been modelled to assess operational noise emissions. Table 8 provides the details of these two 'reasonable' worst-case scenarios (15-minute period).

All significant noise-generating equipment has been included the assessment modelling, in addition to the key noise-generating mechanical plant as required by CoC B85. The noise contribution from the mechanical plant items serving the warehouse and office area are included in the modelling, however, noise emissions from the site was generally controlled by other on-site activities such as truck departures, arrivals, loading and unloading activities.

**Table 8 Representative 'reasonable' worst-case 15-minute intrusive assessment scenarios**

Activity	ATS North 15-minute assessment period	ATS South 15-minute assessment period (Qube container area)
<b>ATS North 15-minute noise intensive period (Morning peak – typically 5:30am to 6:30am)</b>		
Departure	Five crane truck departures from ATS north dispatching area	No activity
Arrival	Two crane trucks arrive and move into the warehouse via dock 1	No activity
Operation	Two crane trucks being loaded concurrently outside of the warehouse with two forklifts.	No activity
<b>ATS South 15-minute noise intensive period (Daytime period with container handling taking place)</b>		
Departure	No activity	One container truck departs
Arrival	No activity	One container truck and one combi-lift
Operation	External loading activities: a) Two trucks being loaded with two forklifts  Noise breakout via open warehouse doors: b) Forklifts collecting goods are occurring inside the warehouse with warehouse doors open.	Container operations: a) Moving new containers into ATS warehouse site b) Removing container from ATS warehouse site onto container truck
<b>Mechanical Plant</b>		
	a) Roof top exhaust fan (4 fans) b) Warehouse Air condenser (8 units)	

## 3.7 Modelling methodology

### 3.7.1 Overview of noise modelling

Since noise levels from the warehouse operations were not audible at the nearest residential receivers, and it was not possible to directly measure or estimate the warehouse noise contribution directly,

computer noise modelling was used to calculate the operational noise levels from warehouse operations at the nearby noise sensitive receivers.

### 3.7.2 General modelling assumptions

Modelling and assessment of warehouse noise emissions was determined by modelling the noise sources, receiver locations, existing built structures and topographical features, using CadnaA (version 2020).

The modelling incorporated the worst-case prevailing meteorological conditions, as required by CoC B80, which are wind speeds of up to 3 m/s at 10 metres above ground level or stability category 'F' temperature inversion conditions.

The noise predictions are based on the CONCAWE noise prediction algorithms, noting that the nearby noise sensitive receivers are greater 100 metres from the site (except for MPW). The CONCAWE environmental noise prediction method is an appropriate method for predicting the noise propagation in these circumstances.

The noise prediction model considers:

- Location of noise sources on-site sensitive receiver locations
- Height of sources and receivers referenced to digital ground contours within the site and outside the site area
- Noise source levels of individual plant, equipment and internal building noise levels, modelled as either point, line or area noise sources. All noise sources associated with the ATS operations within the MPE boundary have been included in the noise modelling, including the truck movements outside of the WH4B ATS warehouse footprint, along internal MPE roads.
- Separation distances between sources and receivers
- Ground type between sources and receivers (mixed soft/ hard)
- Attenuation from buildings and built structures and topography (natural and purpose built)
- Atmospheric losses and assessment meteorological conditions.

The modelled activities and assumptions for the duration and frequency that the equipment operate as part of the 'reasonable' worst-case operational scenarios are described in Section 3.6.3.

### 3.7.3 Model validation

Following the development of each of the modelling scenarios, the noise model outputs were compared with the unattended noise measurement results for a period equivalent to the reasonable worst-case operational scenario. Validation of the reasonable worst-case on-site activities was

undertaken to check the final modelling inputs against a representative period, with the results of this process presented in Table 9.

**Table 9 Comparison between measured and modelled noise levels**

Time period	Logger	Measured noise levels L <sub>Aeq,15minute</sub> (dB(A))	Predicted noise levels L <sub>Aeq,15minute</sub> (dB(A))	Difference, dB(A)
5:55am to 6:10am 11 September 2020	ATS North	64	62	2
1:15pm to 1:30pm 7 September 2020	ATS South (Qube container handling area)	70	68	2

The differences between the modelled and the measured noise levels are the result of the following:

- For ATS North, the modelled levels for loading and unloading activities assumed that activities could be undertaken anywhere across the external hardstand. As such, the noise model has distributed this activity across this area. Actual operations would occur at specific loading docks with varying durations, which would change throughout the day. Modelled levels were based on worst-case average sound power levels of measured activities in this area. Differences between the specific locations and duration of activities during the comparison period is the likely reason for the differences between the measured and modelled levels. Similar minor differences resulted from assumed locations and durations of forklift operations.
- For ATS South, the modelled container handling and combi-lift levels assumed activities were assumed to generally occur in the middle of the container handling area, as any loading dock could be used as part of operations. During handling activities, containers could be placed at any loading dock or shifted between them. Differences between the specific locations and duration of activities (ie. truck movement close to logger) during the comparison period is the likely reason for the differences between the measured and modelled levels.

The results from the validation of the model demonstrates that it is suitable for determining the compliance noise levels for this assessment.

### 3.8 Noise compliance assessment

Predicted operational compliance noise levels are presented in Table 10 for each of the two compliance assessment scenarios. The noise levels have been predicted to each of the surrounding residential receiver noise catchments, and the highest residential receiver noise level in each catchment area is the reported level in Table 10. It should be noted that this is not necessarily the same receiver location for each assessment scenario.

These noise levels represent the reasonable worst-case intrusiveness operational scenarios (15-minute period) from typical operations of the warehouse. The results in Table 10 show that the predicted noise levels for both the L<sub>Aeq</sub> (15-minute) and L<sub>A1</sub> (1-minute) assessments comply with the overall operational noise limits presented in Table 2.

**Table 10 Predicted noise levels - Reasonable worst-case scenarios for warehouse (ATS)**

Noise catchment area/ receiver location	L <sub>Aeq</sub> (15-minute)			L <sub>A1</sub> (1-minute)		
	Noise limits	Predicted noise levels	Compliance	Noise limits	Predicted noise levels	Compliance
<b>ATS North 15-minute noise intensive period (Morning peak – typically 5:30am to 6:30am)</b>						
Wattle Grove (NCA 1)	35	27	Yes	52	38	Yes
Wattle Grove North (NCA 2)	35	21	Yes	52	29	Yes
Casula (NCA 3)	35	21	Yes	52	28	Yes
Glenfield (NCA 4)	35	< 20	Yes	52	<20	Yes
All Saints Senior College (S1)	45 <sup>1</sup>	< 20	Yes	-	N/A	N/A
Casula Powerhouse (S2)	45 <sup>1</sup>	23	Yes	-	N/A	N/A
Defence Joint Logistics Unit (DJLU) (I2)	70 <sup>1</sup>	33	Yes	-	N/A	N/A
ABB (I3)	70 <sup>1</sup>	21	Yes	-	N/A	N/A
<b>ATS South 15-minute noise intensive period (Daytime period with container handling taking place)</b>						
Wattle Grove (NCA 1)	35	30	Yes	52	38 <sup>2</sup>	Yes
Wattle Grove North (NCA 2)	35	< 20	Yes	52	29 <sup>2</sup>	Yes
Casula (NCA 3)	35	20	Yes	52	28 <sup>2</sup>	Yes
Glenfield (NCA 4)	35	< 20	Yes	52	<20 <sup>2</sup>	Yes
All Saints Senior College (S1)	45 <sup>1</sup>	21	Yes	-	N/A	N/A
Casula Powerhouse (S2)	45 <sup>1</sup>	21	Yes	-	N/A	N/A
Defence Joint Logistics Unit (DJLU) (I2)	70 <sup>1</sup>	31	Yes	-	N/A	N/A
ABB (I3)	70 <sup>1</sup>	20	Yes	-	N/A	N/A

- Notes;
1. Noise limits for these receivers are only applicable when the receiver is in use
  2. Activities do not typically occur during the night period, but levels have been included for completeness.

## 4 Conclusion

The noise assessment has been undertaken to address the operational noise requirements for the ATS warehouse (WH4B) within the Moorebank Precinct East in accordance with the *Operational Noise and Vibration Management Plan, Moorebank Logistics Park – East Precinct* (dated 27 March 2019, Revision 12) (MPE ONVMP), more specifically to address the requirements of Condition of Consent (CoC) B85 in State Significant Development (SSD) 7628.

As part of the compliance noise assessment, a series of noise measurements were undertaken over a two week period. Unattended noise monitoring was undertaken at two locations near the ATS warehouse in September 2020. Attended noise measurements were also performed at the nearest residential receivers and in close proximity to the ATS warehouse site. The aim of the attended measurements was to quantify operational noise levels at the nearby residential receivers and to confirm operational noise sources levels on site.

Attended noise measurements were undertaken on 7 September 2020 to determine if noise levels from warehouse operations were audible and quantifiable at nearby receivers. These measurements identified that the existing ambient noise levels were too high for direct quantification or estimation of operational noise emissions from the warehouse operations. For this reason, guidance from the NSW EPA Noise Policy for Industry (NPfI) Chapter 7 has been followed in order to compare the site noise emissions with the noise limits.

Noise emissions from the warehouse facility operations have been evaluated using a combination of the on-site attended and unattended noise monitoring, combined with noise modelling.

Two 'reasonable' worst-case assessment scenarios were established based upon on site unattended noise monitoring and video recording over the monitoring period, in addition to discussions with ATS personnel and observations made during on-site attended noise measurements. These were developed to capture the 'reasonable' worst-case operations for the two main areas of noise generation on the site. On the north side, this occurred prior to 7:00am as part of the morning preparation and despatch activities, while on the south side this was container handling activities that typically occurred during the daytime period after 7:00am.

All significant noise-generating equipment was included the assessment noise modelling, in addition to the key noise-generating mechanical plant as required by CoC B85. The noise contribution from the mechanical plant items serving the warehouse and office area are included in the modelling, however, noise emissions from the site was generally controlled by other on-site activities such as truck departures, arrivals, loading and unloading activities.

Using the calibrated noise model, noise levels were predicted to all nearby noise sensitive receiver locations, including the residential receivers in the suburbs of Casula, Glenfield, Wattle Grove and Wattle Grove North. Noise levels were assessed assuming the worst-case prevailing meteorological conditions were present, as required by CoC B80.

The outcome of the compliance noise monitoring and modelling demonstrated that the mechanical plant and other noisy equipment that operate as part of the ATS warehouse operations achieve the noise limits presented SSD 7628 CoC B80, which is consistent with the noise emission review undertaken prior to construction to satisfy CoC B84.

## APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).																																														
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.																																														
Assessment period	The period in a day over which assessments are made.																																														
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.																																														
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).																																														
Decibel [dB]	<p>The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:</p> <table border="0"> <tr> <td>threshold of hearing</td> <td>0 dB</td> <td>The faintest sound we can hear</td> </tr> <tr> <td></td> <td>10 dB</td> <td>Human breathing</td> </tr> <tr> <td></td> <td>20 dB</td> <td></td> </tr> <tr> <td>almost silent</td> <td>30 dB</td> <td>Quiet bedroom or in a quiet national park location</td> </tr> <tr> <td></td> <td>40 dB</td> <td>Library</td> </tr> <tr> <td>generally quiet</td> <td>50 dB</td> <td>Typical office space or ambience in the city at night</td> </tr> <tr> <td></td> <td>60 dB</td> <td>CBD mall at lunch time</td> </tr> <tr> <td>moderately loud</td> <td>70 dB</td> <td>The sound of a car passing on the street</td> </tr> <tr> <td></td> <td>80 dB</td> <td>Loud music played at home</td> </tr> <tr> <td>loud</td> <td>90 dB</td> <td>The sound of a truck passing on the street</td> </tr> <tr> <td></td> <td>100 dB</td> <td>Indoor rock band concert</td> </tr> <tr> <td>very loud</td> <td>110 dB</td> <td>Operating a chainsaw or jackhammer</td> </tr> <tr> <td></td> <td>120 dB</td> <td>Jet plane take-off at 100m away</td> </tr> <tr> <td>extremely loud</td> <td>130 dB</td> <td></td> </tr> <tr> <td></td> <td>140 dB</td> <td>Military jet take-off at 25m away</td> </tr> </table>		threshold of hearing	0 dB	The faintest sound we can hear		10 dB	Human breathing		20 dB		almost silent	30 dB	Quiet bedroom or in a quiet national park location		40 dB	Library	generally quiet	50 dB	Typical office space or ambience in the city at night		60 dB	CBD mall at lunch time	moderately loud	70 dB	The sound of a car passing on the street		80 dB	Loud music played at home	loud	90 dB	The sound of a truck passing on the street		100 dB	Indoor rock band concert	very loud	110 dB	Operating a chainsaw or jackhammer		120 dB	Jet plane take-off at 100m away	extremely loud	130 dB			140 dB	Military jet take-off at 25m away
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dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.																																														
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.																																														

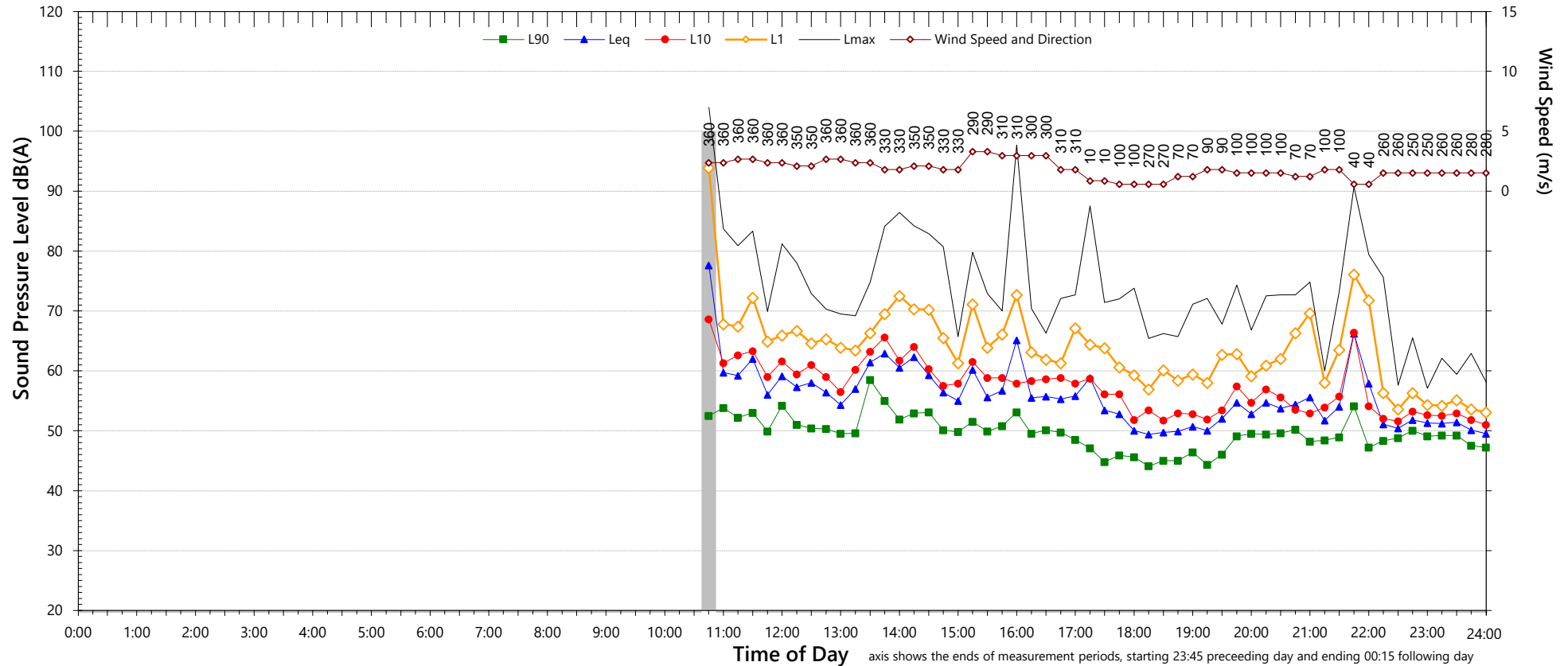
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L <sub>Max</sub>	The maximum sound pressure level measured over a given period.
L <sub>Min</sub>	The minimum sound pressure level measured over a given period.
L <sub>1</sub>	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L <sub>10</sub>	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L <sub>90</sub>	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L <sub>eq</sub>	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

## APPENDIX B      **Logger location 1 – ATS - North side**

# Unattended Noise Monitoring Results

## ATS North

Wednesday, 2 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	45	45
LA <sub>eq</sub>	-	57	56

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	66	to	84
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	24

Notes:

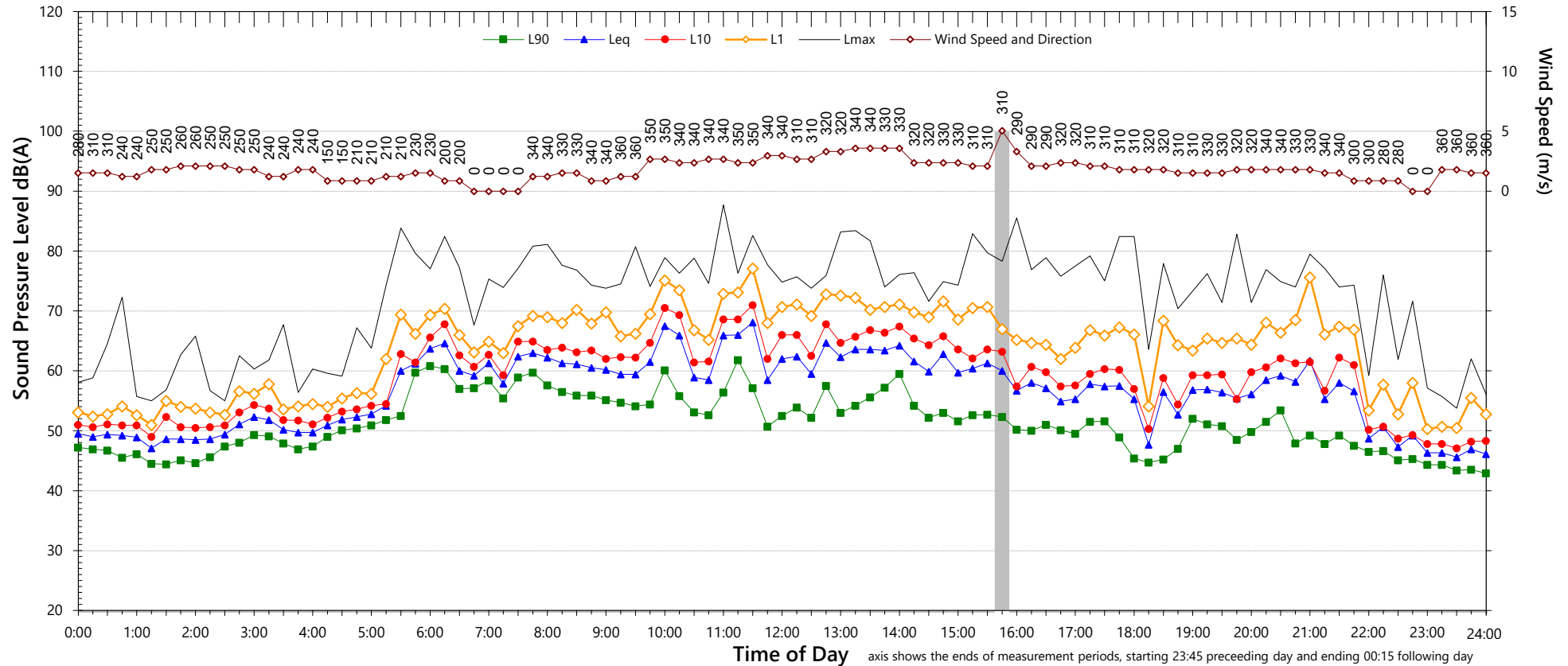
- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	61	58
L <sub>eq</sub> 1hr upper 10 percentile	64	64
L <sub>eq</sub> 1hr lower 10 percentile	55	51

# Unattended Noise Monitoring Results

ATS North

Thursday, 3 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	50	46	43
LA <sub>eq</sub>	62	57	55

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	67	to	92
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	32

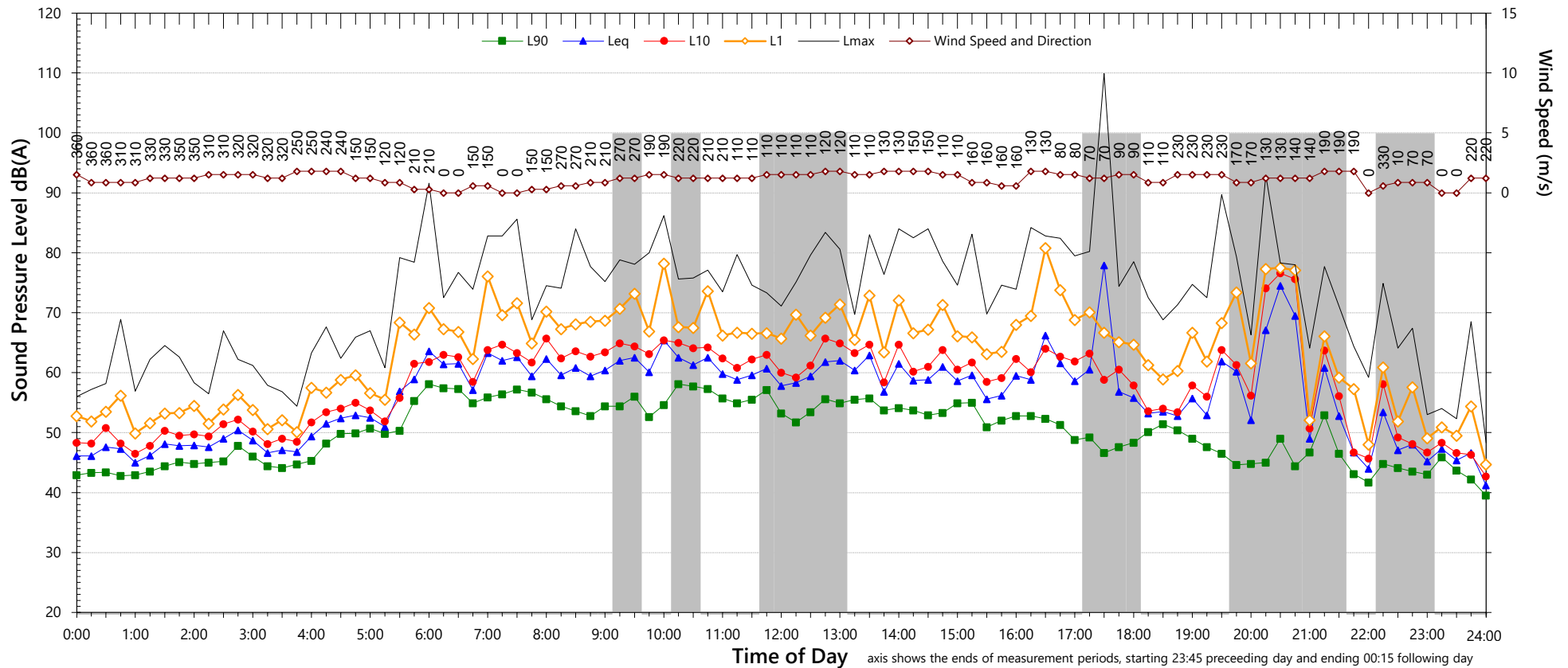
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Horsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Friday, 4 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	35
LA <sub>eq</sub>	-	-	50

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	66	to	88
L <sub>Max</sub> - L <sub>eq</sub> (Range)	17	to	30

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	63	52
L <sub>eq</sub> 1hr upper 10 percentile	65	52
L <sub>eq</sub> 1hr lower 10 percentile	57	42

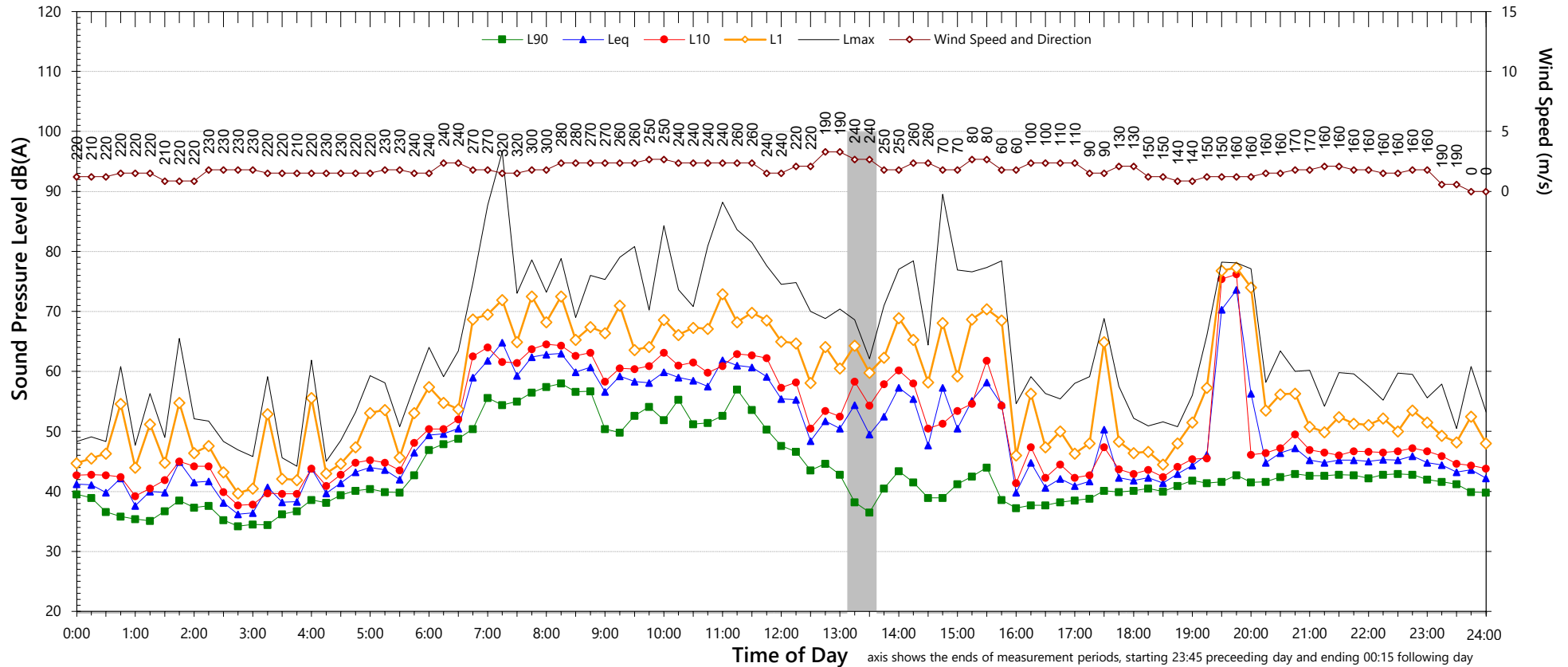
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Saturday, 5 September 2020



### NSW Noise Policy for Industry (Free Field)

Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	39	41	38
LA <sub>eq</sub>	58	63	44

### Night Time Maximum Noise Levels (see note 7)

L <sub>Max</sub> (Range)	66	to	67
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	23

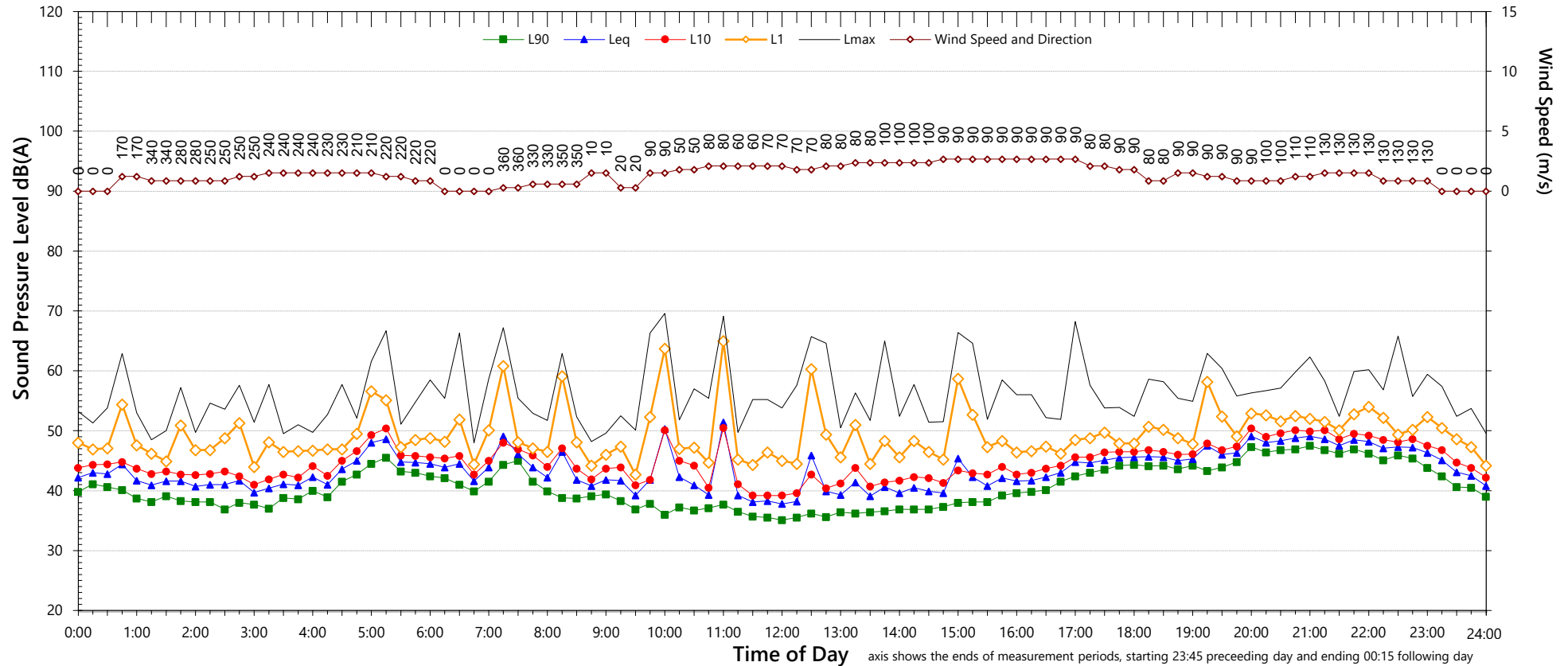
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Horsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Sunday, 6 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	36	44	38
LA <sub>eq</sub>	43	48	53

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	66	to	79
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	26

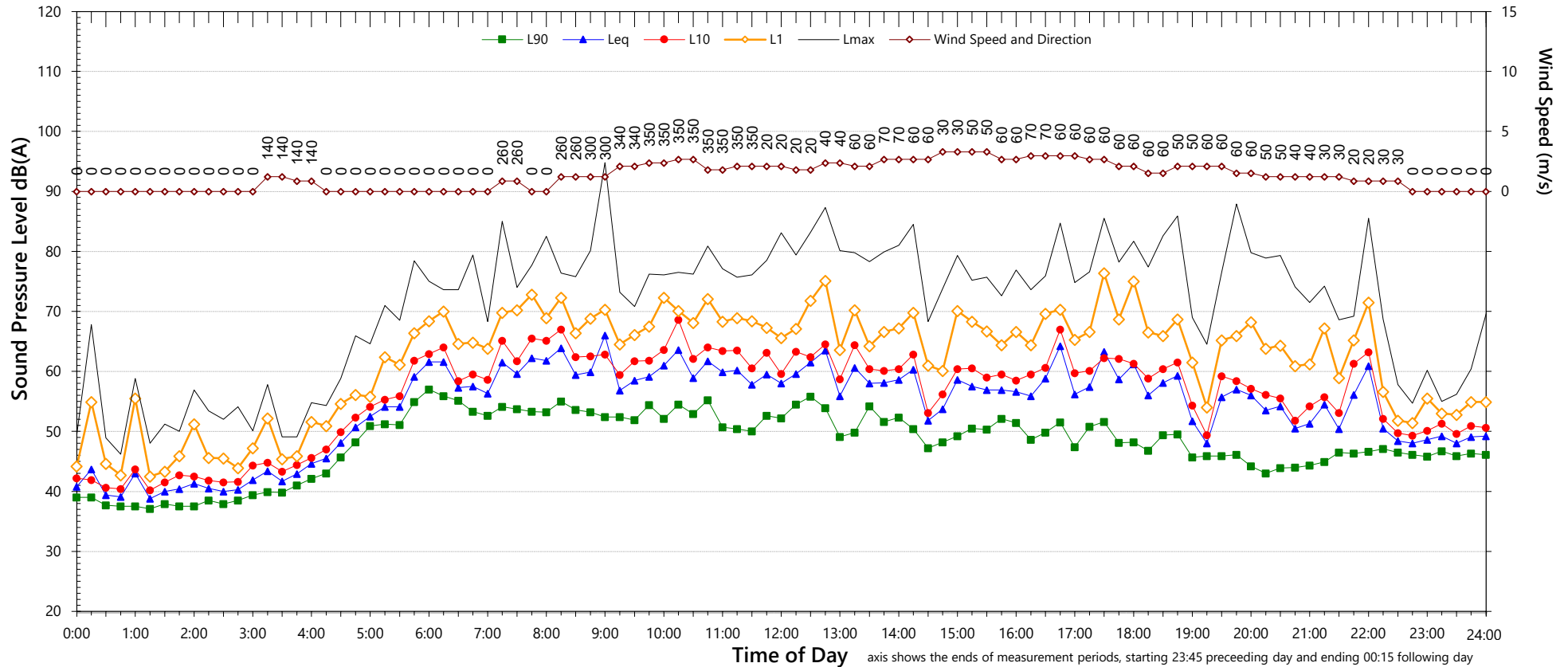
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

## ATS North

Monday, 7 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	48	44	44
LA <sub>eq</sub>	60	56	55

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	65	to	89
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	28

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	62	57
L <sub>eq</sub> 1hr upper 10 percentile	64	62
L <sub>eq</sub> 1hr lower 10 percentile	58	51

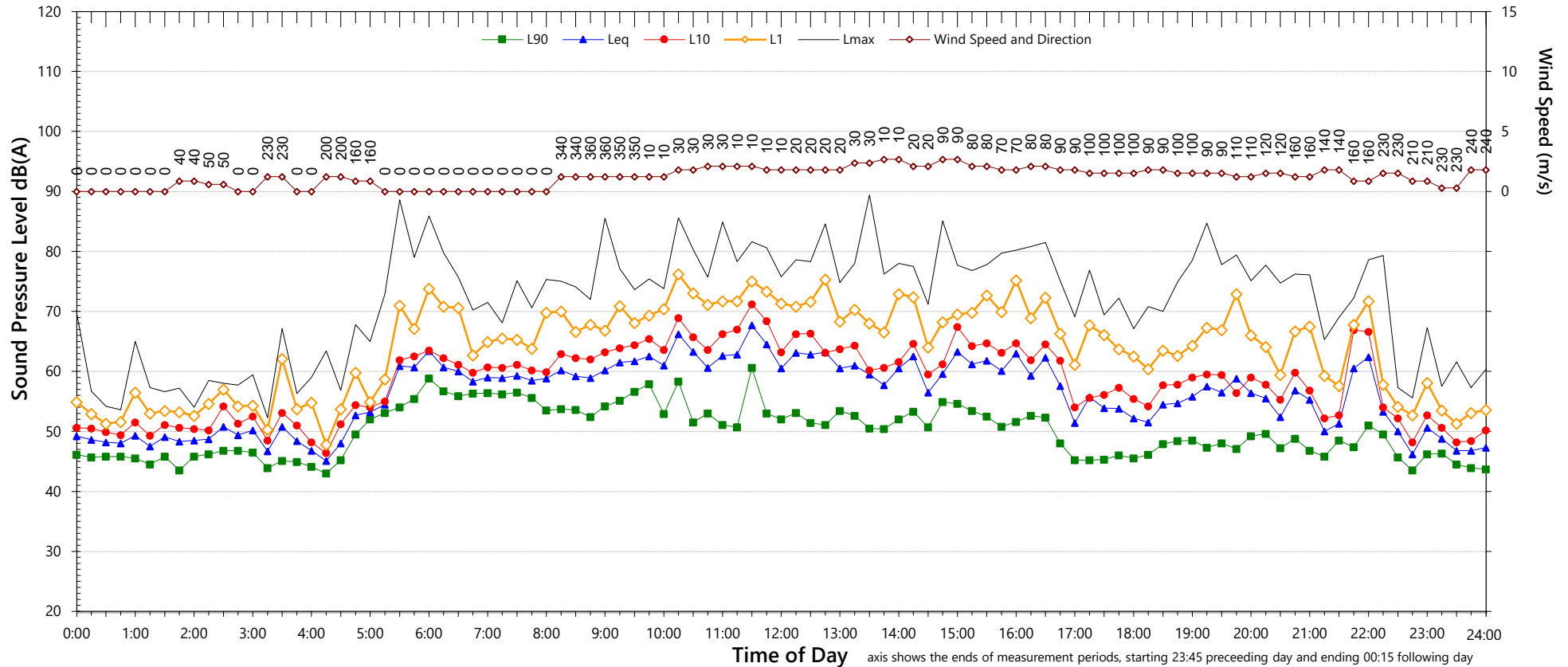
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Tuesday, 8 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	47	46	37
LA <sub>eq</sub>	61	57	54

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	66	to	81
L <sub>Max</sub> - L <sub>eq</sub> (Range)	18	to	29

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	63	57
L <sub>eq</sub> 1hr upper 10 percentile	66	62
L <sub>eq</sub> 1hr lower 10 percentile	57	44

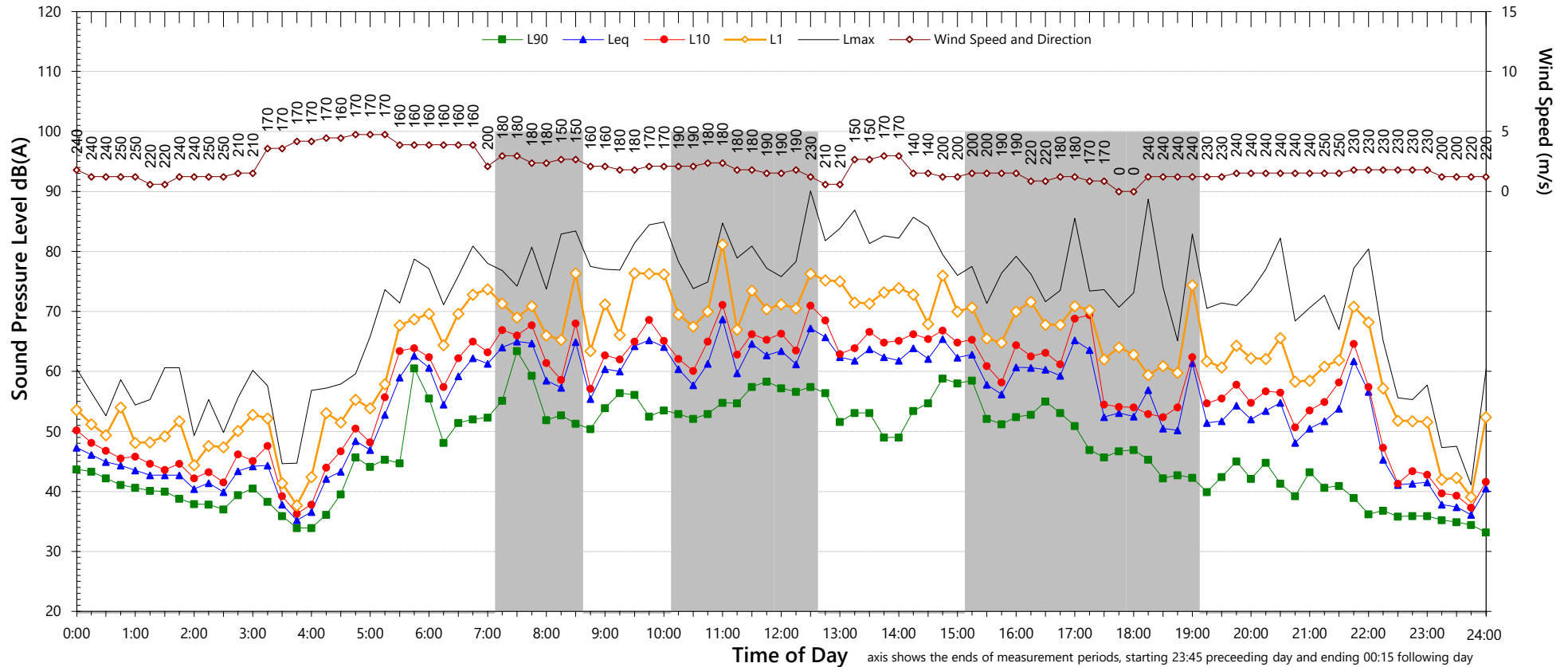
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Wednesday, 9 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	33
LA <sub>eq</sub>	-	-	64

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	65	to	110
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	37

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	64	66
L <sub>eq</sub> 1hr upper 10 percentile	66	66
L <sub>eq</sub> 1hr lower 10 percentile	55	40

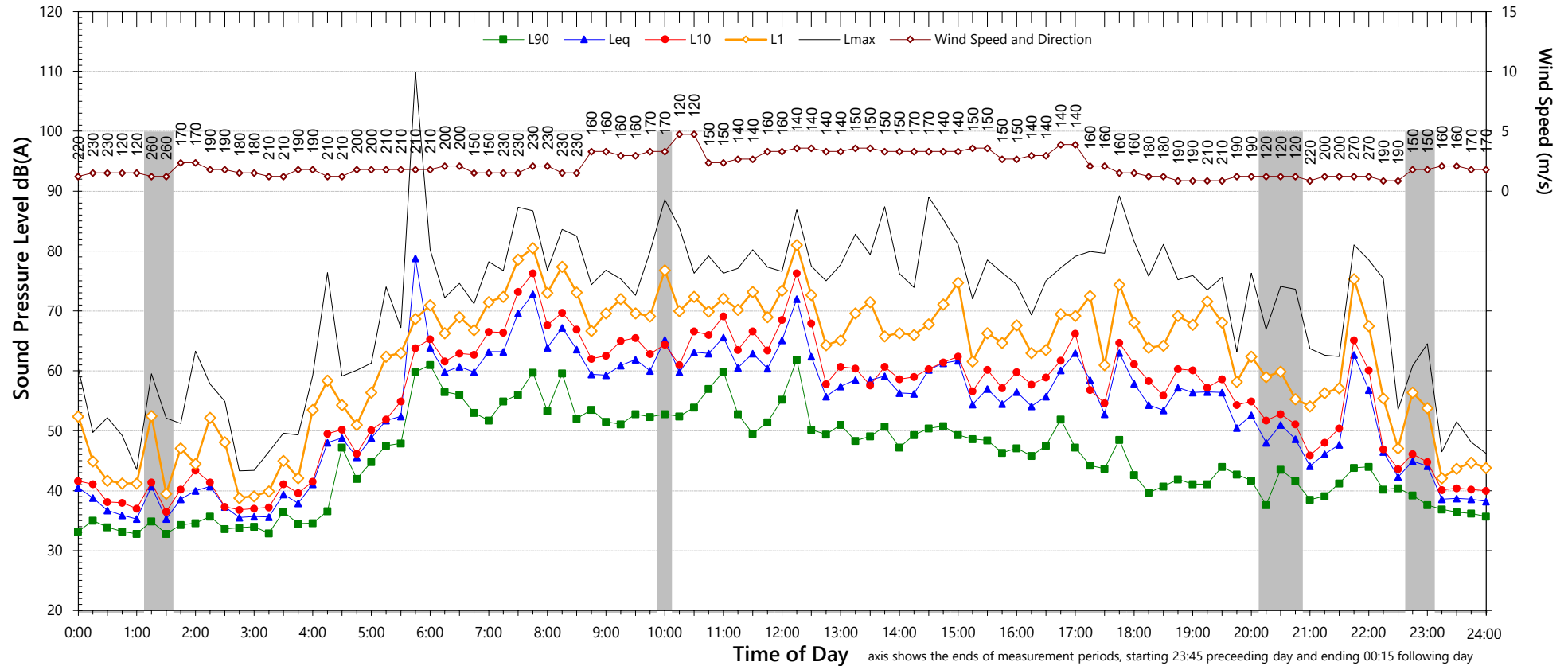
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Thursday, 10 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	46	-	36
LA <sub>eq</sub>	63	-	57

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	67	to	82
L <sub>Max</sub> - L <sub>eq</sub> (Range)	18	to	31

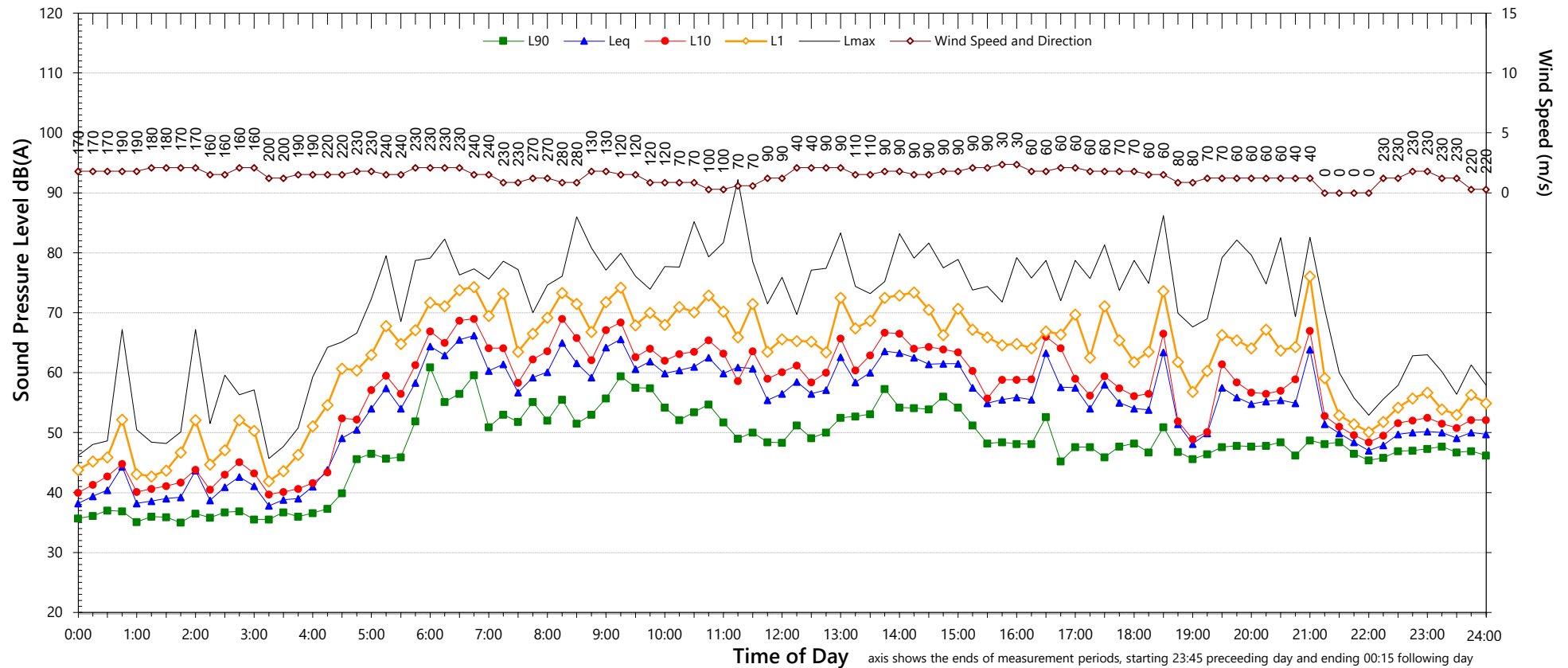
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Horsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Friday, 11 September 2020



axis shows the ends of measurement periods, starting 23:45 preceeding day and ending 00:15 following day

NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	48	46	43
LA <sub>eq</sub>	61	57	51

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	66	to	82
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	25

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	62	53
L <sub>eq</sub> 1hr upper 10 percentile	65	54
L <sub>eq</sub> 1hr lower 10 percentile	58	50

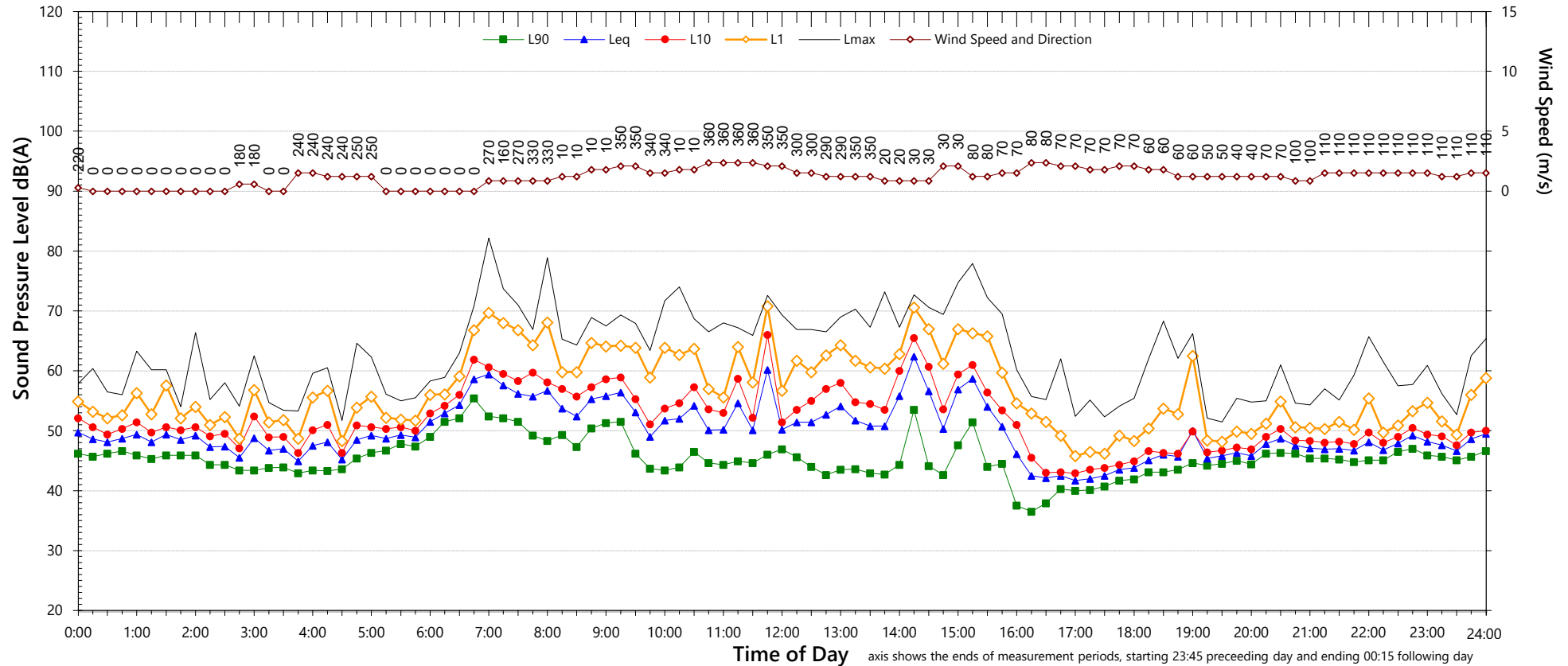
Notes:

- 1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- 2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- 3. "Evening" is the period from 6pm till 10pm
- 4. "Night" relates to the remaining periods
- 5. "Night" relates to period from 10pm on this graph to morning on the following graph.
- 6. Graphed data measured in free-field; tabulated results facade corrected
- 7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- 8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Saturday, 12 September 2020



### NSW Noise Policy for Industry (Free Field)

Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	40	43	37
LA <sub>eq</sub>	54	47	48

### Night Time Maximum Noise Levels (see note 7)

L <sub>Max</sub> (Range)	65	to	69
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	25

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

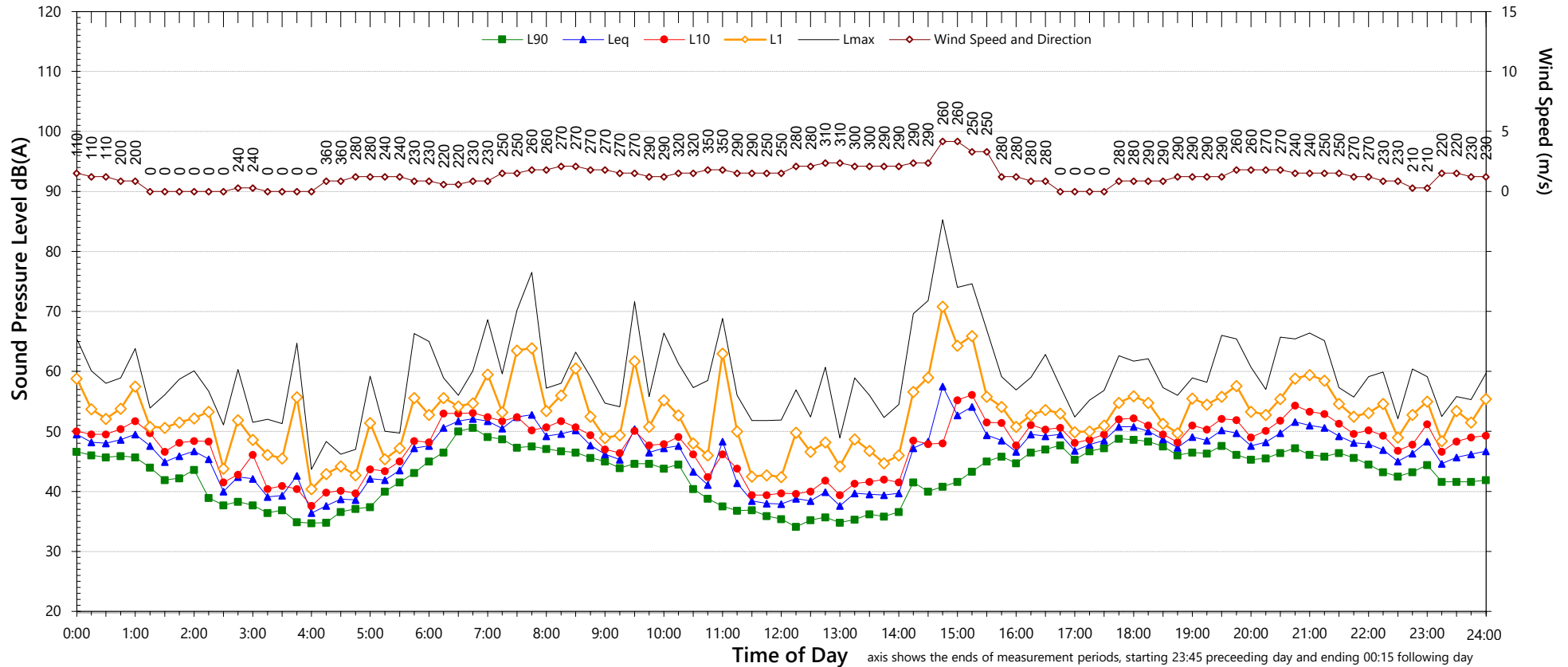
### NSW Road Noise Policy (1m from facade) (see note 6)

Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	56	50
L <sub>eq</sub> 1hr upper 10 percentile	59	52
L <sub>eq</sub> 1hr lower 10 percentile	47	42

# Unattended Noise Monitoring Results

ATS North

Sunday, 13 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	35	45	41
LA <sub>eq</sub>	48	49	56

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	72	to	86
L <sub>Max</sub> - L <sub>eq</sub> (Range)	23	to	35

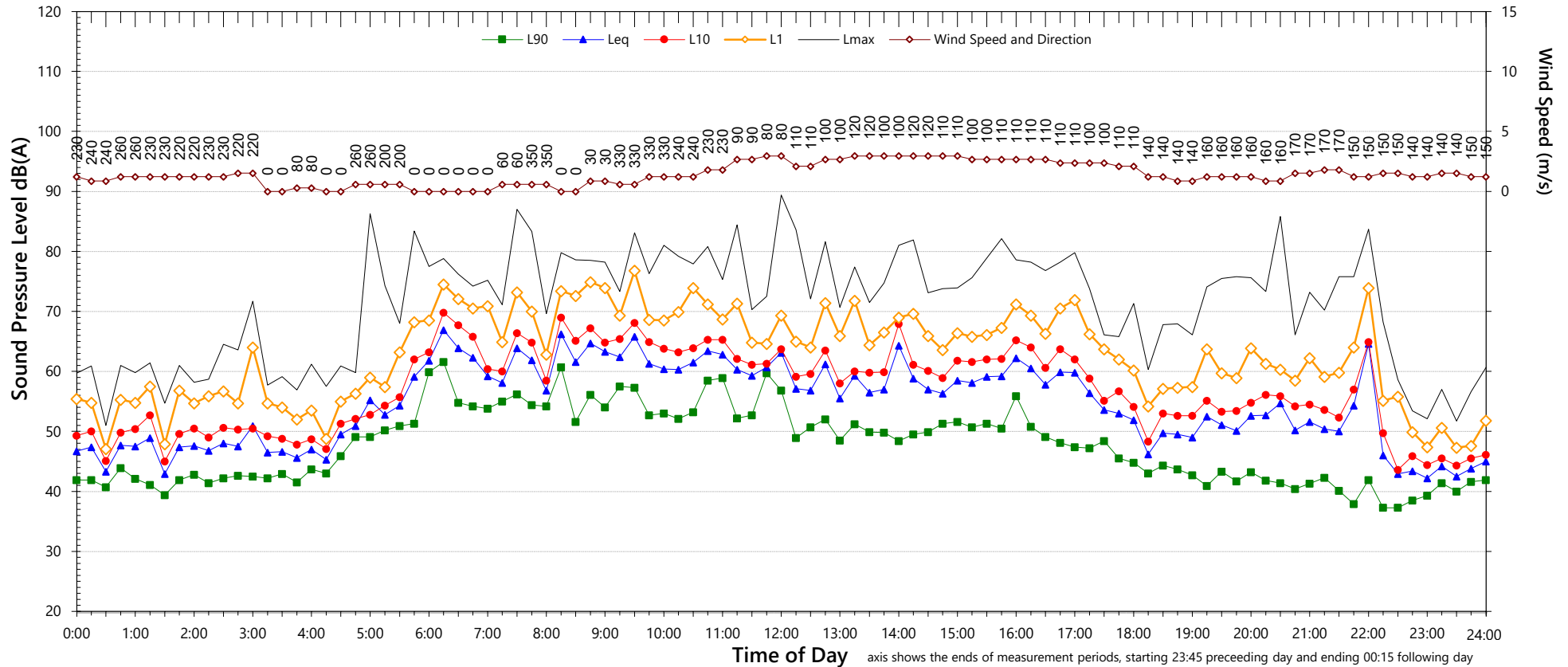
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Horsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Monday, 14 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	48	40	35
LA <sub>eq</sub>	61	55	54

Night Time Maximum Noise Levels		(see note 7)	
L <sub>Max</sub> (Range)	67	to	87
L <sub>Max</sub> - L <sub>eq</sub> (Range)	17	to	33

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	62	56
L <sub>eq</sub> 1hr upper 10 percentile	65	61
L <sub>eq</sub> 1hr lower 10 percentile	55	44

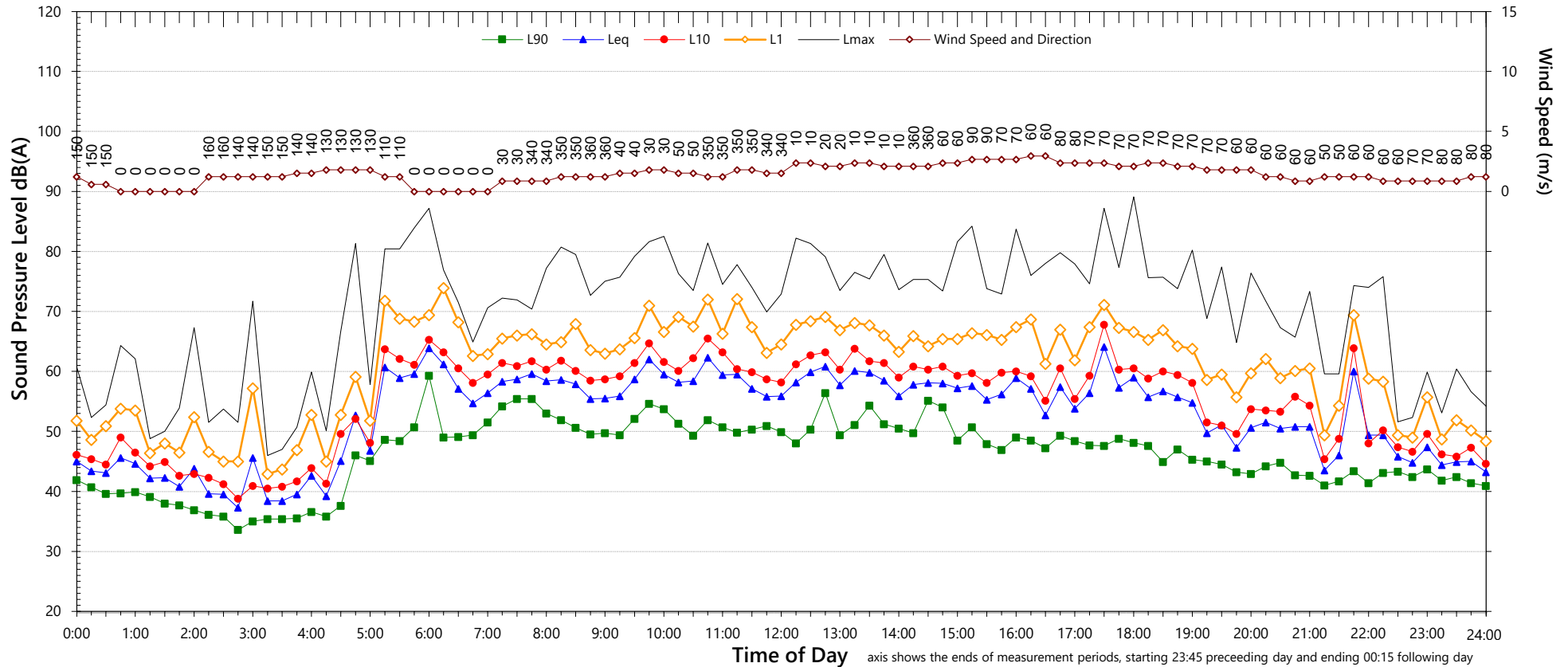
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Tuesday, 15 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	48	42	41
LA <sub>eq</sub>	59	53	55

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	76	to	81
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	29

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	60	57
L <sub>eq</sub> 1hr upper 10 percentile	62	61
L <sub>eq</sub> 1hr lower 10 percentile	55	47

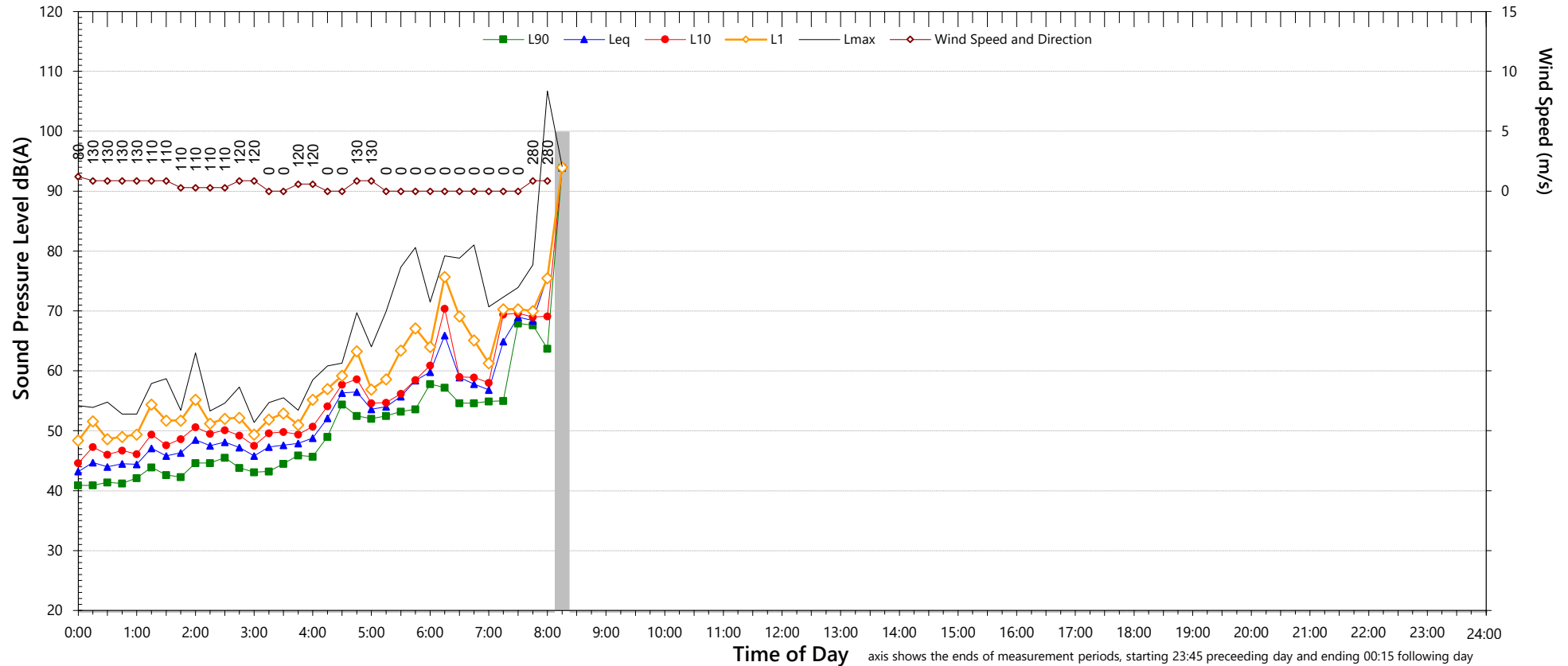
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS North

Wednesday, 16 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	-
LA <sub>eq</sub>	-	-	-

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	-	to	-
L <sub>Max</sub> - L <sub>eq</sub> (Range)	-	to	-

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-02\_SLM\_000\_123\_Rpt\_Report.txt

Logger Graphs ATS North (r0)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	74	-
L <sub>eq</sub> 1hr upper 10 percentile	74	-
L <sub>eq</sub> 1hr lower 10 percentile	74	-

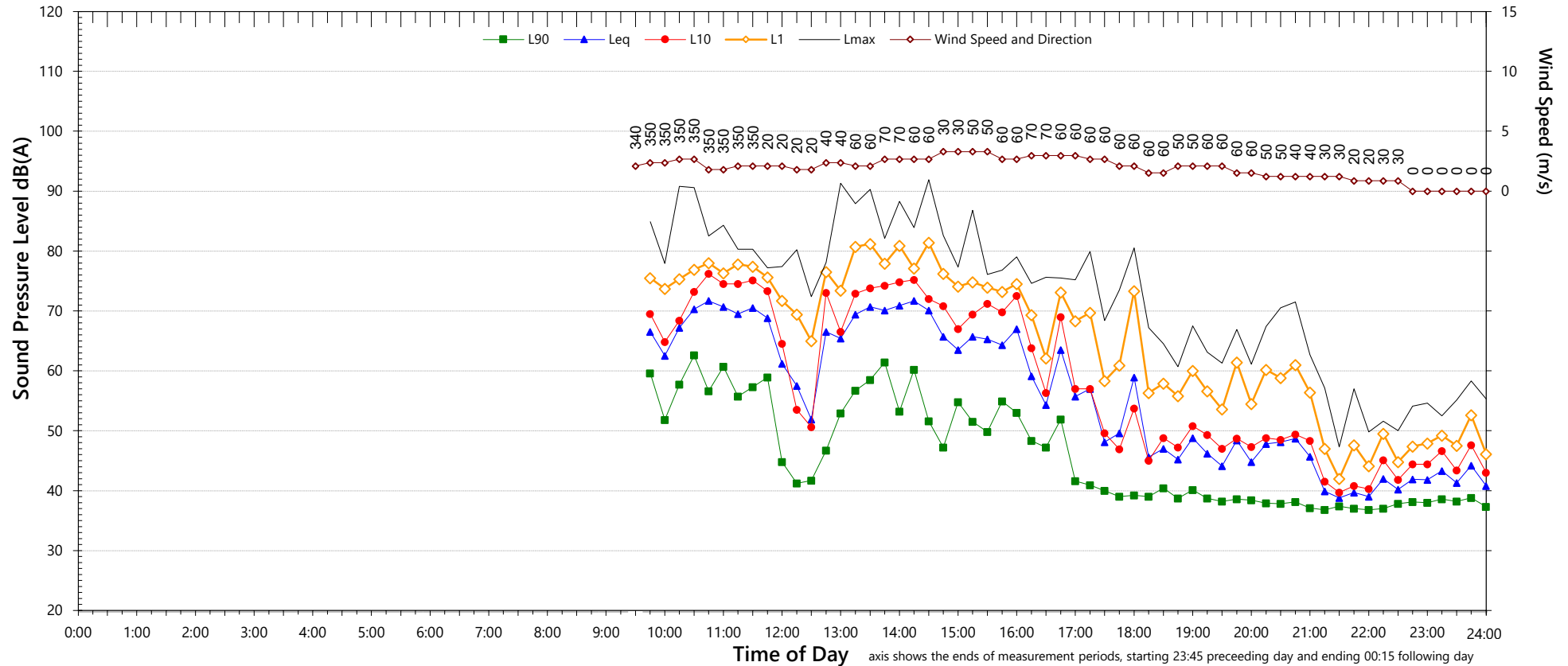
QTE-26 Logger Graphs Program (r34)

## APPENDIX C    **Logger location 2 – ATS – South side**

# Unattended Noise Monitoring Results

ATS South

Monday, 7 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	37	38
LA <sub>eq</sub>	-	46	50

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	76	to	81
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	25

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)

8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-07\_SLM\_000\_123\_Rpt\_Report.txt

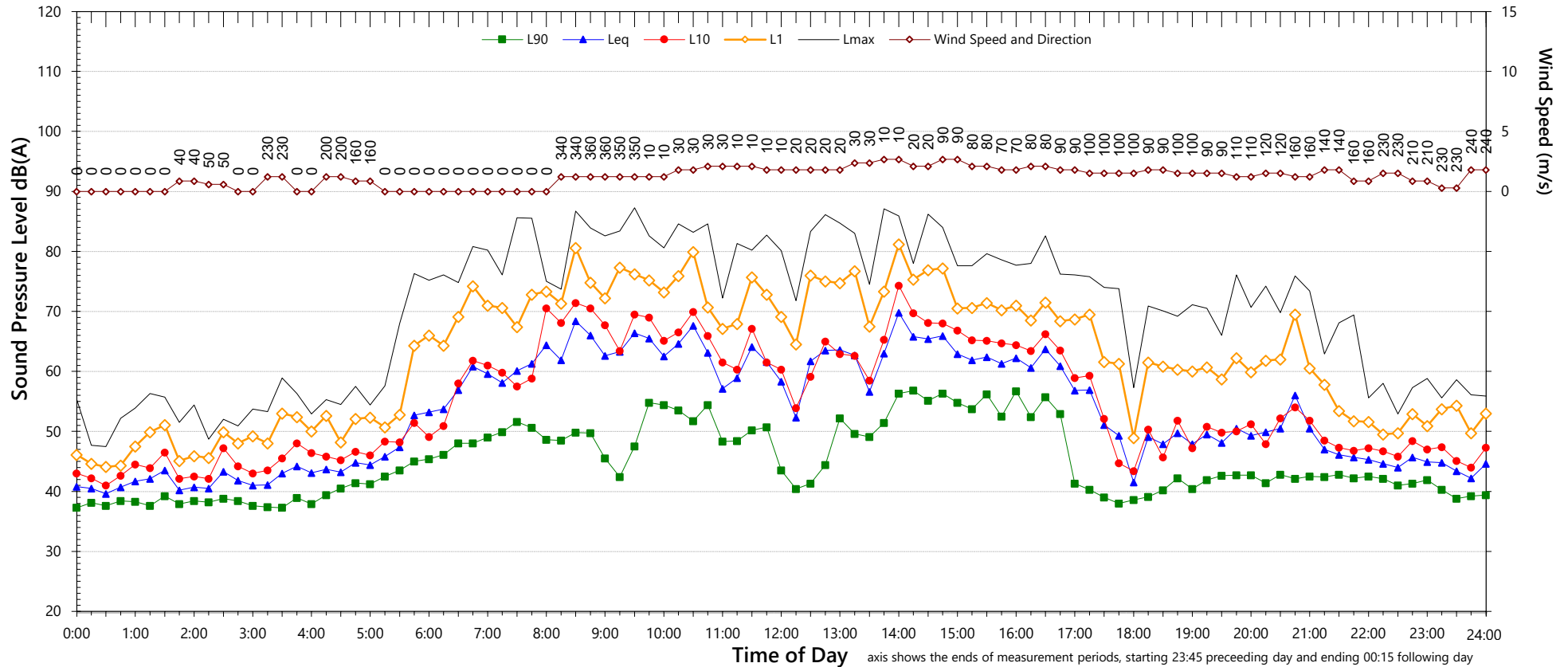
ATS south(r0)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	68	53
L <sub>eq</sub> 1hr upper 10 percentile	72	55
L <sub>eq</sub> 1hr lower 10 percentile	49	44

# Unattended Noise Monitoring Results

ATS South

Tuesday, 8 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	41	40	36
LA <sub>eq</sub>	63	50	53

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	66	to	97
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	35

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-07\_SLM\_000\_123\_Rpt\_Report.txt

ATS south(r0)

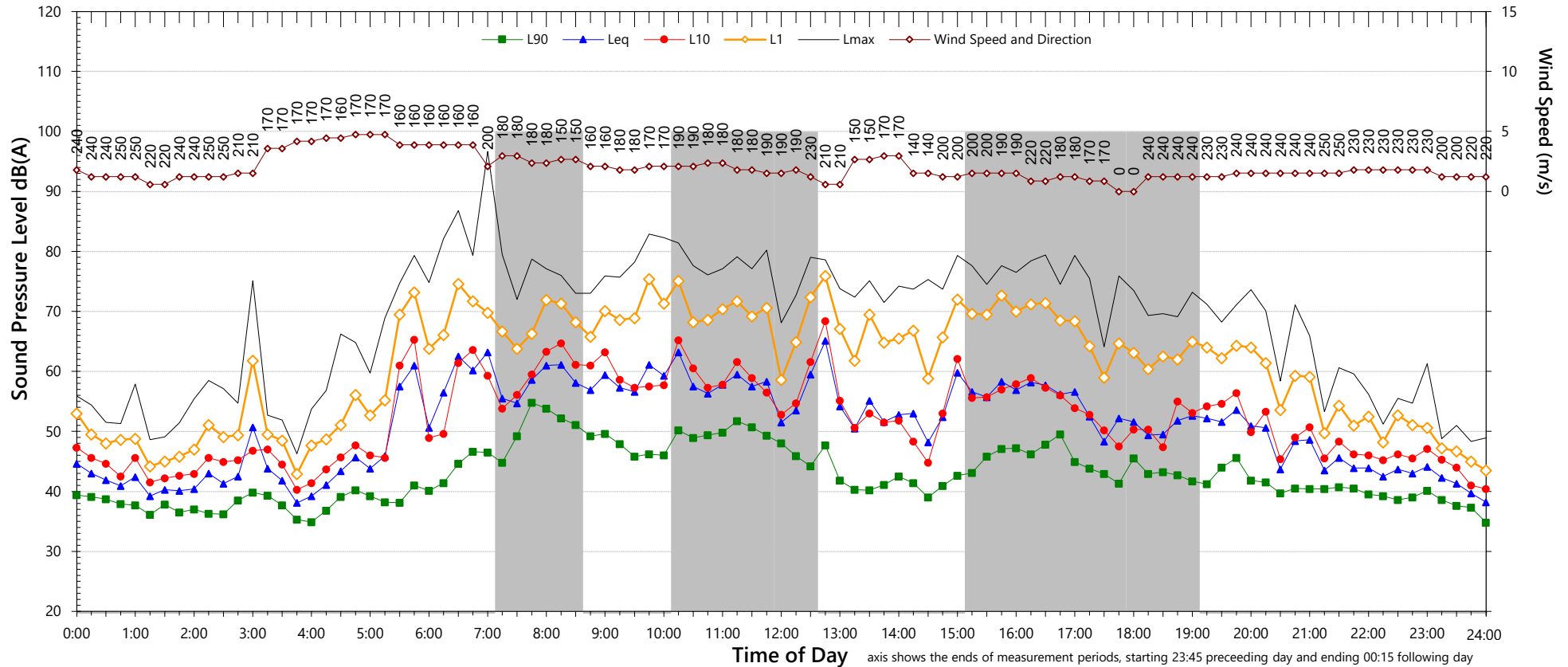
QTE-26 Logger Graphs Program (r34)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	65	56
L <sub>eq</sub> 1hr upper 10 percentile	68	60
L <sub>eq</sub> 1hr lower 10 percentile	52	44

# Unattended Noise Monitoring Results

ATS South

Wednesday, 9 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	34
LA <sub>eq</sub>	-	-	50

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	69	to	81
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	23

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-07\_SLM\_000\_123\_Rpt\_Report.txt

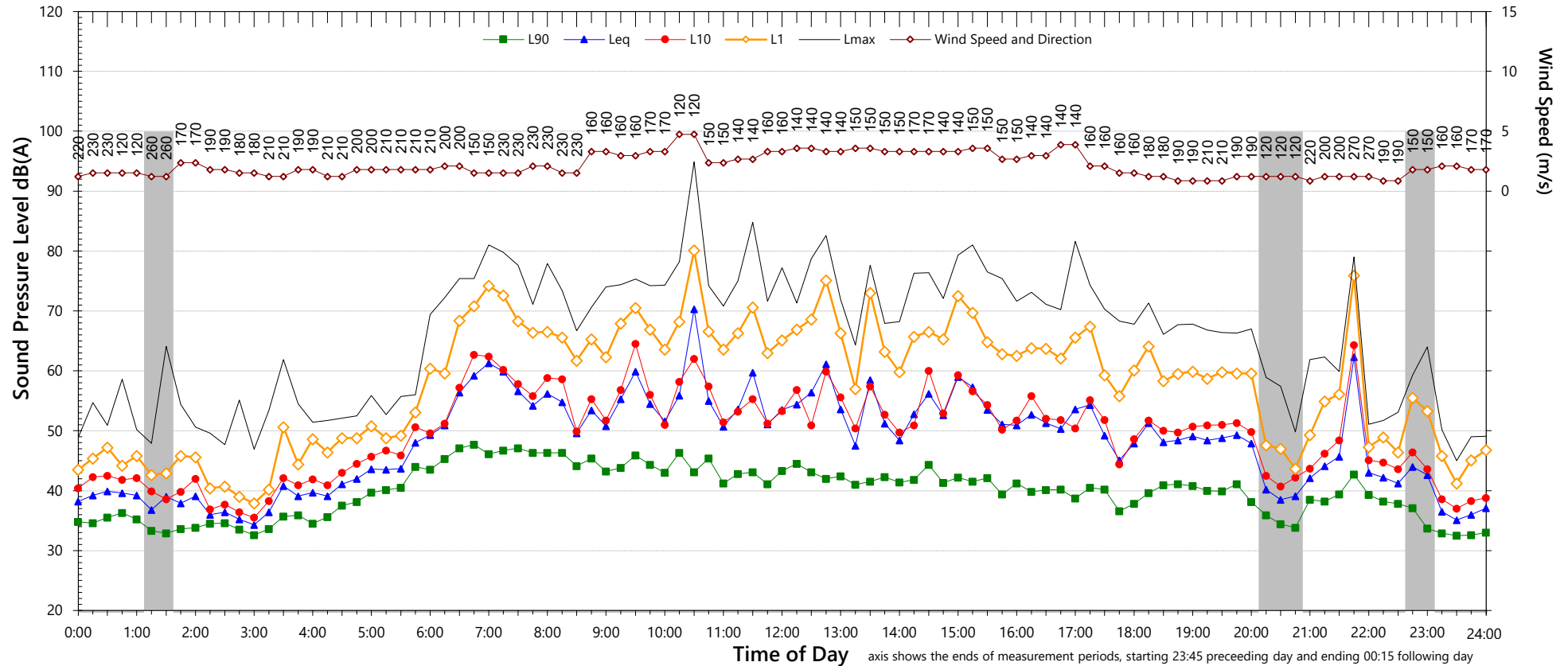
ATS south(r0)

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	59	52
L <sub>eq</sub> 1hr upper 10 percentile	62	52
L <sub>eq</sub> 1hr lower 10 percentile	50	40

# Unattended Noise Monitoring Results

ATS South

Thursday, 10 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	40	-	32
LA <sub>eq</sub>	57	-	51

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	69	to	84
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	30

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	59	54
L <sub>eq</sub> 1hr upper 10 percentile	60	58
L <sub>eq</sub> 1hr lower 10 percentile	51	39

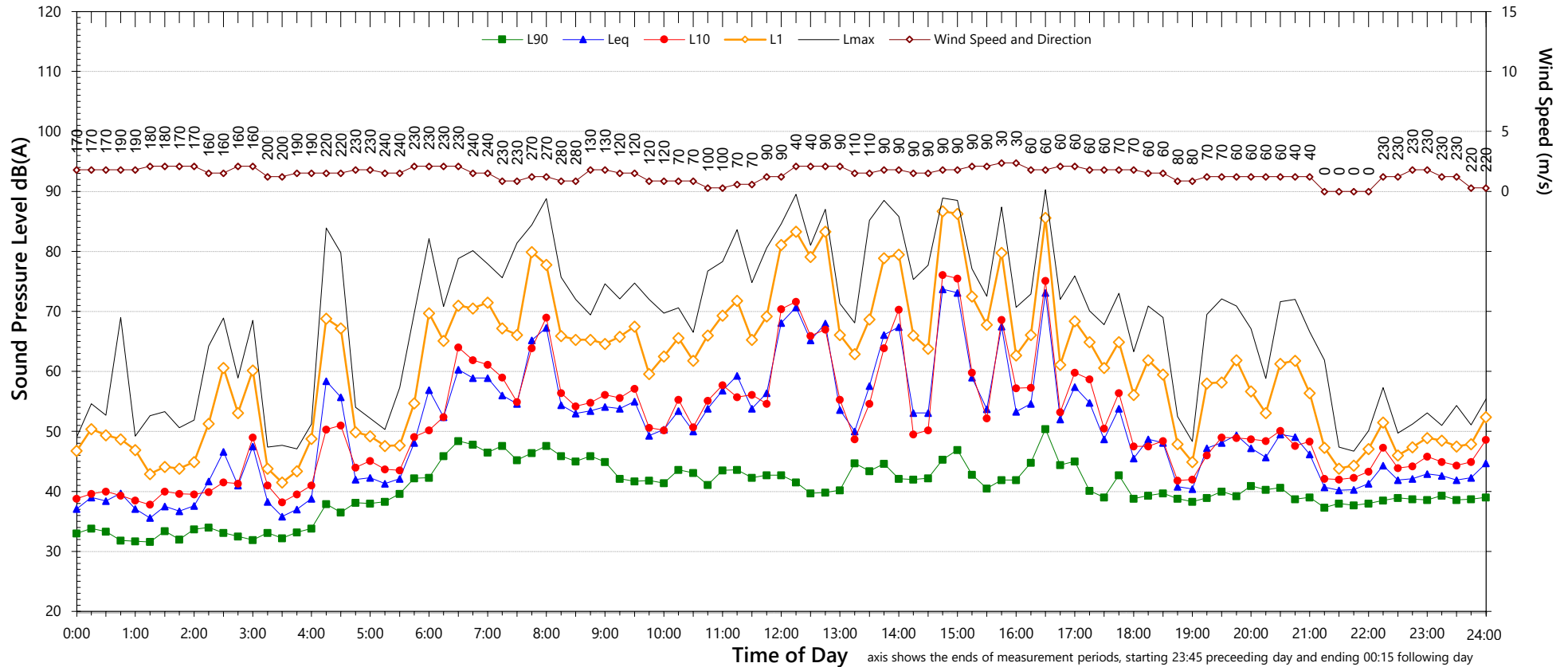
Notes:

- 1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- 2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- 3. "Evening" is the period from 6pm till 10pm
- 4. "Night" relates to the remaining periods
- 5. "Night" relates to period from 10pm on this graph to morning on the following graph.
- 6. Graphed data measured in free-field; tabulated results facade corrected
- 7. Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- 8. Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS South

Friday, 11 September 2020



### NSW Noise Policy for Industry (Free Field)

Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	40	38	36
LA <sub>eq</sub>	65	46	47

### Night Time Maximum Noise Levels (see note 7)

L <sub>Max</sub> (Range)	75	to	79
L <sub>Max</sub> - L <sub>eq</sub> (Range)	16	to	27

### NSW Road Noise Policy (1m from facade) (see note 6)

Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	66	50
L <sub>eq</sub> 1hr upper 10 percentile	70	52
L <sub>eq</sub> 1hr lower 10 percentile	49	43

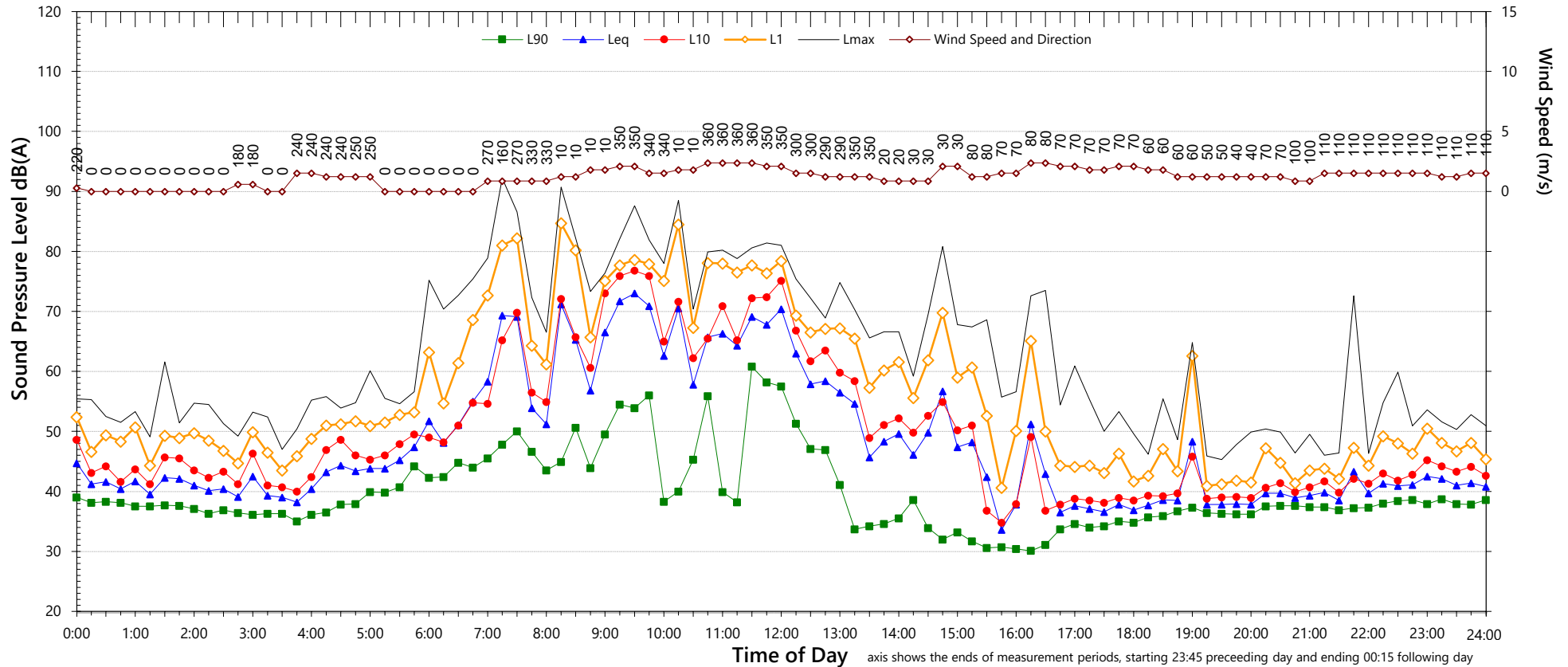
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS South

Saturday, 12 September 2020



## NSW Noise Policy for Industry (Free Field)

Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	31	36	34
LA <sub>eq</sub>	65	41	43

## Night Time Maximum Noise Levels (see note 7)

L <sub>Max</sub> (Range)	76	to	77
L <sub>Max</sub> - L <sub>eq</sub> (Range)	17	to	33

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-07\_SLM\_000\_123\_Rpt\_Report.txt

ATS south(r0)

## NSW Road Noise Policy (1m from facade) (see note 6)

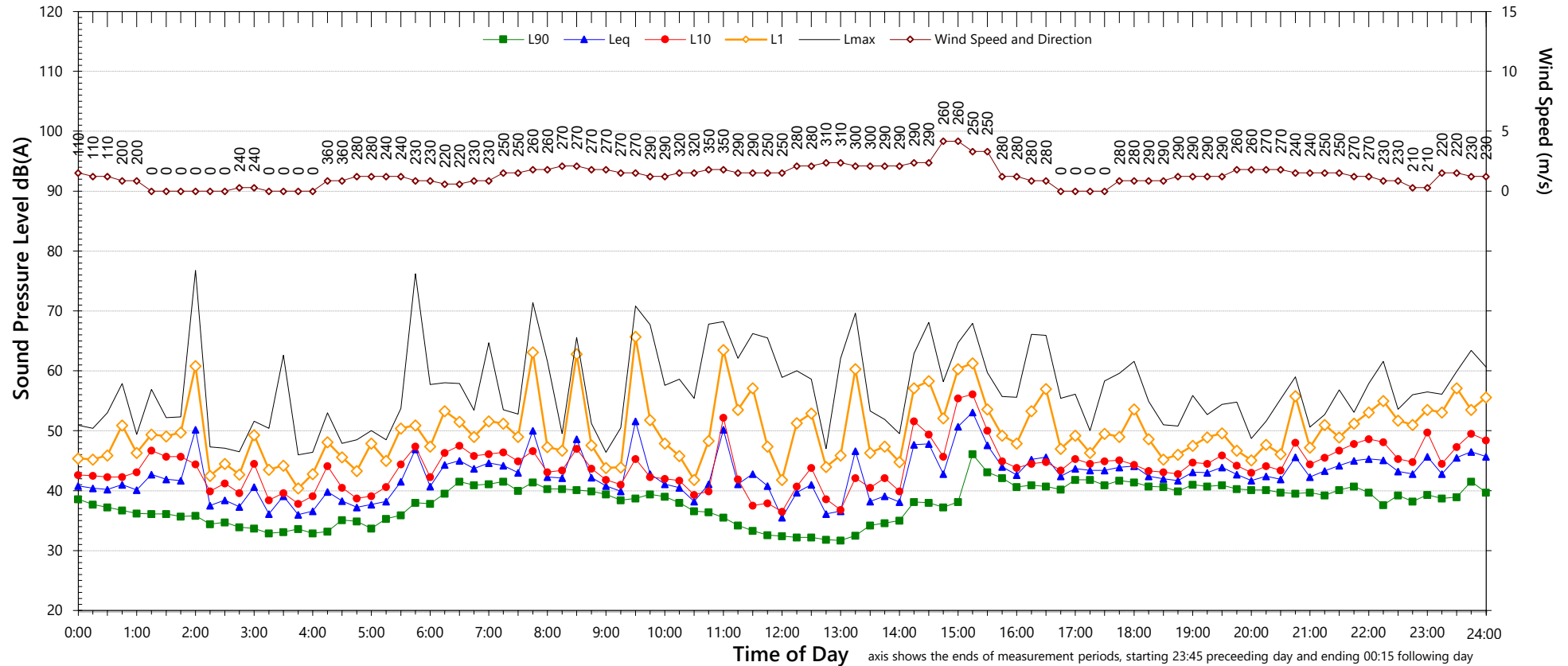
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	66	45
L <sub>eq</sub> 1hr upper 10 percentile	70	47
L <sub>eq</sub> 1hr lower 10 percentile	41	41

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

ATS South

Sunday, 13 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	32	40	37
LA <sub>eq</sub>	45	43	49

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	68	to	79
L <sub>Max</sub> - L <sub>eq</sub> (Range)	15	to	28

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-07\_SLM\_000\_123\_Rpt\_Report.txt

ATS south(r0)

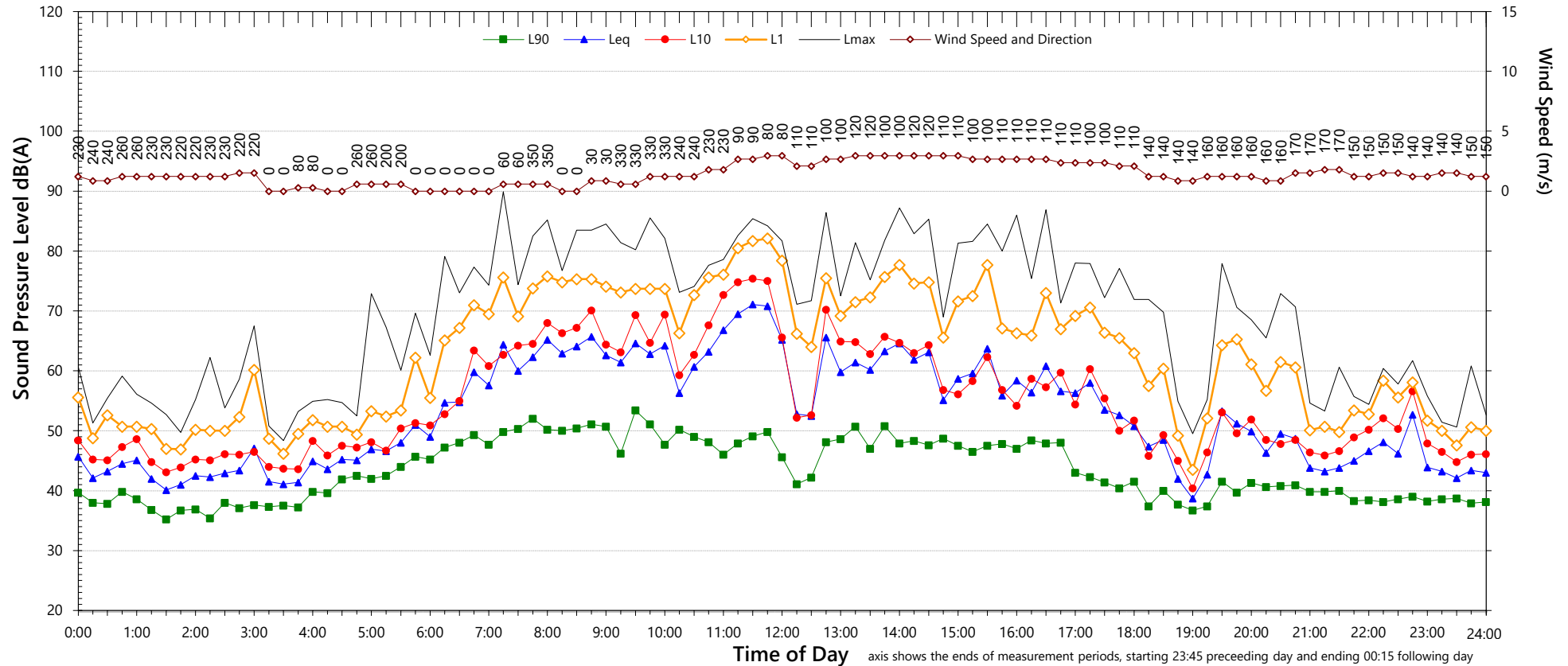
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	47	52
L <sub>eq</sub> 1hr upper 10 percentile	50	53
L <sub>eq</sub> 1hr lower 10 percentile	44	45

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

ATS South

Monday, 14 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	42	37	35
LA <sub>eq</sub>	63	48	51

Night Time Maximum Noise Levels			(see note 7)
L <sub>Max</sub> (Range)	79	to	82
L <sub>Max</sub> - L <sub>eq</sub> (Range)	18	to	27

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

Data File: 2020-09-07\_SLM\_000\_123\_Rpt\_Report.txt

ATS south(r0)

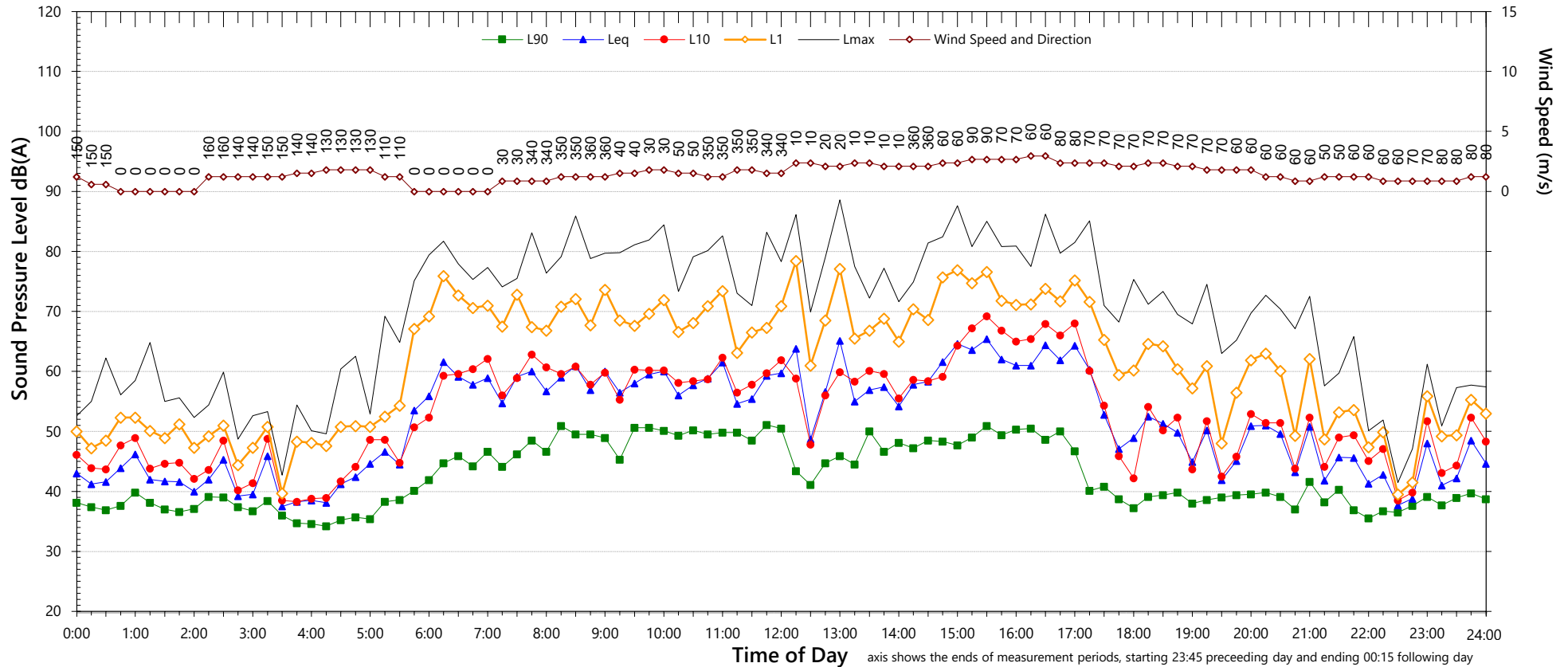
NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	65	54
L <sub>eq</sub> 1hr upper 10 percentile	66	56
L <sub>eq</sub> 1hr lower 10 percentile	49	44

QTE-26 Logger Graphs Program (r34)

# Unattended Noise Monitoring Results

ATS South

Tuesday, 15 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	42	37	37
LA <sub>eq</sub>	60	49	51

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	70	to	81
L <sub>Max</sub> - L <sub>eq</sub> (Range)	17	to	24

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	61	53
L <sub>eq</sub> 1hr upper 10 percentile	65	56
L <sub>eq</sub> 1hr lower 10 percentile	51	46

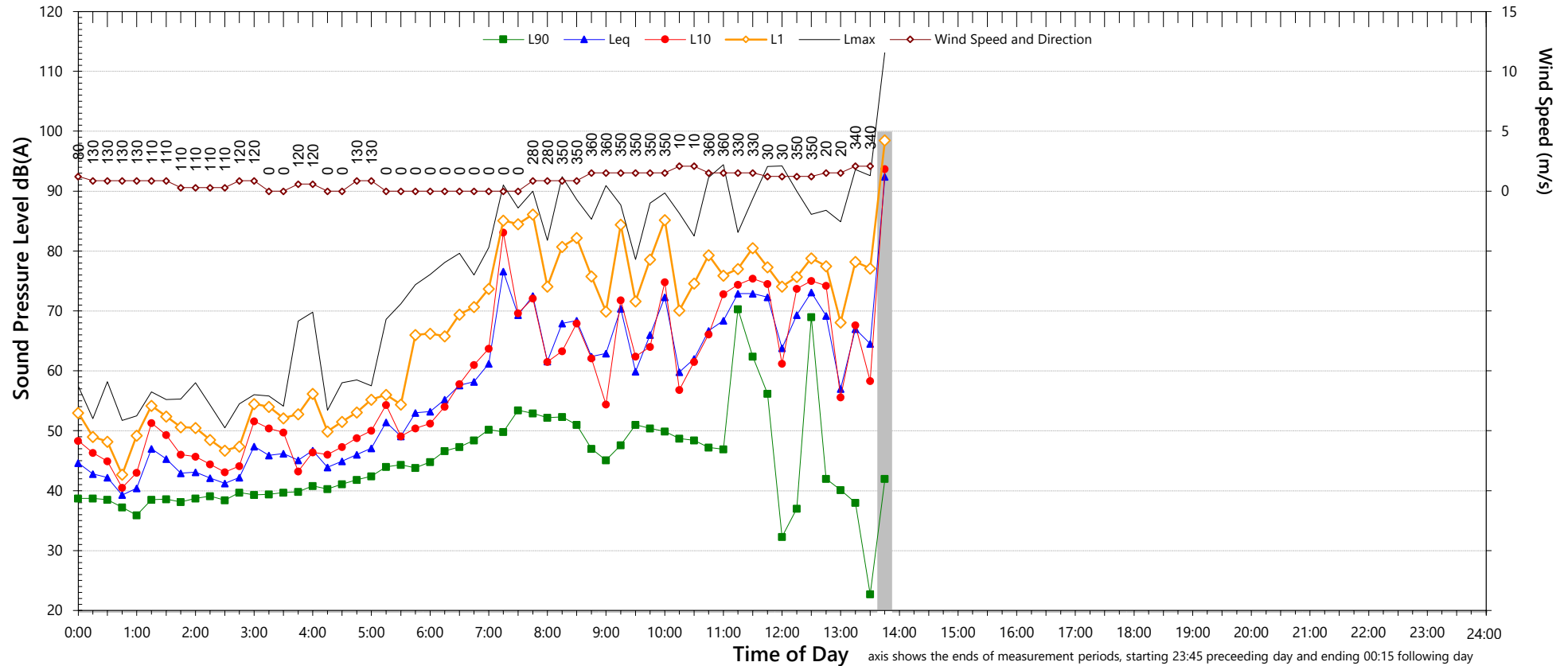
Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)

# Unattended Noise Monitoring Results

ATS South

Wednesday, 16 September 2020



NSW Noise Policy for Industry (Free Field)			
Descriptor	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4,5</sup>
L <sub>90</sub>	-	-	-
LA <sub>eq</sub>	-	-	-

Night Time Maximum Noise Levels (see note 7)			
L <sub>Max</sub> (Range)	-	to	-
L <sub>Max</sub> - L <sub>eq</sub> (Range)	-	to	-

NSW Road Noise Policy (1m from facade) (see note 6)		
Descriptor	Day	Night <sup>5</sup>
	7am-10pm	10pm-7am
L <sub>eq</sub> 15 hr and L <sub>eq</sub> 9 hr	72	-
L <sub>eq</sub> 1hr upper 10 percentile	75	-
L <sub>eq</sub> 1hr lower 10 percentile	68	-

Notes:

- Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
- "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
- "Evening" is the period from 6pm till 10pm
- "Night" relates to the remaining periods
- "Night" relates to period from 10pm on this graph to morning on the following graph.
- Graphed data measured in free-field; tabulated results facade corrected
- Night time L<sub>Max</sub> values are shown only where L<sub>Max</sub> > 65dB(A) and where L<sub>Max</sub> - L<sub>eq</sub> ≥ 15dB(A)
- Meteorological data has been sourced from the nearest Bureau of Meteorology station (Holsworthy Aerodrome AWS)



Moorebank Logistics Park East  
Precinct

Stormwater Network WaterQuality Monitoring Data &  
Reporting

October 2020

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**Prepared for: MID Plumbing P/L**

**Prepared by** Daniel Anderson & Romy Brien

*Master EnvSc (Planning & Ecology), Grad Cert (Bushfire Protection), Grad Dip (Conservation  
Land Management)*

E-mail: [daniel@apical-bushfire.com.au](mailto:daniel@apical-bushfire.com.au)

Phone: 0415617771

**Office: 5b/25 Noble Street Gerringong, NSW 2534**

**Apical Bushfire & Planning**

**ABN: 656 420 10 400**

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## Consulted Documents

Australia and New Zealand Guidelines for fresh and Marine Water Quality (2000)  
[NATIONAL WATER QUALITY MANAGEMENT STRATEGY - Australian and New Zealand Guidelines for Fresh and Marine Water Quality \(2000\) - Volume 2 - Aquatic ecosystems](#)

Moorebank Precinct East - Stage 2 Proposal Stormwater and Flooding Report 2016 – Arcadis  
[getContent \(nsw.gov.au\)](#)

Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Autumn 2019 Survey - Final Report, Bio-Analysis Pty Ltd (2019)

Stormwater Infrastructure Operation and Maintenance Plan Moorebank Logistics Park – East Precinct  
[PREC-QPMS-EN-PLN-0006-SIOMP\\_Rev-7\\_redacted.pdf \(simta.com.au\)](#)

Moorebank Precinct East - Stage 2 B106 – Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (SSD 7628)  
[NSW Ecology FF Standard Report Template \(simta.com.au\)](#)

Liverpool DCP  
[Liverpool's Development Control Plans | Liverpool City Council \(nsw.gov.au\)](#)

DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.  
<https://environment.gov.au/system/files/pages/dfb876c5-581e-48b7-868c-242fe69dad68/files/draft-environmental-mgt-guidance-pfos-pfoa.pdf>

Development Consent SSD 7709 - Section 4.38 of the Environmental Planning and Assessment Act 1979  
<https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2019/05/moorebank-intermodal-precinct-west-stage-2/referral-from-department-of-planning-and-environment/revised-recommended-conditions/mpw-stage-2-recommended-conditions-inclusive-of-edits-191105.pdf>

# 1. Introduction

## 1.1 Background

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 2 (the Project) of the Moorebank Precinct East (MPE) Project, which comprises the second stage of development under the MPE Concept Approval (MP10\_0193) and approved under Development Approval SSD 7628.

The MPE Project involves the development of an intermodal facility including warehouse and distribution facilities, freight village (ancillary site and operational services), stormwater, landscaping, servicing, and associated works on the eastern side of Moorebank Avenue, Stage 2 of the MPE Project involves the construction and operation of warehousing and distribution facilities on the MPE site and upgrades to approximately 1.5 kilometres of Moorebank Avenue.

This water quality monitoring program is guided by the Stormwater Infrastructure Operation and Maintenance Plan (SIOPM) and The Baseline Aquatic Ecological Monitoring Program (BAEMP) in accordance with:

CoC	Requirement
B44(a)	The Stormwater Monitoring Program must: assess water quality and quantity performance for construction discharges and ongoing stormwater discharges from the development to ensure protection of the desired ecological values of Anzac Creek.

## 1.2 Purpose

The Stormwater Infrastructure Operation and Maintenance Plan Moorebank Logistics Park – East Precinct (SIOMP) was developed to address the requirements of MPE stage 2 CoCs (SSD 7628). It identifies the operational environmental management measures that will be applied to activities undertaken across the MLP East Precinct to manage identified environmental risks associated with stormwater infrastructure.

# 2. Monitoring Program Methodology

## 2.1 Monitoring Sites

To support stormwater and drainage management of the facility the MLP East precinct has established a vast stormwater infrastructure system consisting of several Water Sensitive Urban Design (WSUD) functions including raingardens and bioswales. These networks are designed to minimise the velocity and peak discharge of stormwater draining from the site and act as onsite detention basins to harvest and sequester potential pollutants generated at the site.

The stormwater infrastructure system discharges water into the natural drainage system via three outlets:

- Outlet A discharges water to the north-east of the Facility to Anzac Creek
- Outlet B discharges water to the south-east of the Facility to Anzac Creek
- Outlet C discharges water west to the MLP West Precinct via a culvert underneath Moorebank Avenue that leads to the Georges River.

Monitoring of the discharge points has been established via our program with MID Plumbing to collect qualitative data and analyse the performance of the WSUD provisions and to establish any potential trends in water quality readings from the stormwater network discharge points prior to release of water into Anzac Creek and The Georges River.

Discharge Point (see figure 2)	Associated Outlet (see figure 1)	Type of outlet/detention basin
1	Outlet A	Bio-swale
1a	Outlet A	On-site Detention Basin
2	Outlet C	Bio-swale
5	Outlet B	Bio-swale
7	Outlet B	Bio-swale

## 2.2 Water Quality Assessment

Surface water quality data collected at the discharge points is assessed alongside ANZECC Guidelines (2000) and correlated with baseline Water Quality monitoring results provided by previous condition assessment reports. Annual spring and autumn water quality data presented from Anzac Creek and Georges River testing programs by other scientific consultants is cross referenced to the data prepared by Apical under the SIOMP to establish potential trends in results and identify potential increases in accumulated pollutants levels from the site under operational condition.

Site data was collected at the monitoring points, following Australia and New Zealand guidelines for fresh and marine water quality – 2000 (ANZECC Guidelines), In situ water quality parameters relevant to stream health and aquatic assessment profiling were collected in field with a multiparameter hand-held water quality monitoring probe (Aquatroll 600).

Measures taken:

- pH
- Dissolved Oxygen
- Electrical Conductivity
- Water Temperature and
- Turbidity

Water samples were collected at each discharge point and sent to Australian Laboratory Services (ALS) for analysis. The following water chemical sampling is undertaken for a range of nutrients, metals, and hydrocarbons relevant to stream health and aquatic assessment protocol, key nutrients, metals, and pollutants are listed below:

- Total phosphorous
- Total Nitrogen
- Kjeldahl Nitrogen
- Dissolved Metals
- PFAS
- Total Suspended Solids
- Total Hydrocarbons

The results from the lab analysis are presented within this report. Key measured values are compared against; previous condition baseline data, Liverpool Development Control Plan (DCP) water quality targets and ANZECC Guideline (2000) trigger limits under the condition category - (90% protection criteria for freshwater systems).

Trends observed in our datasets are analysed on a temporal scale with any trigger values for specific measures highlighted and presented within the results chapter of each seasonal report.

## 2.3 Data Analysis

The water quality measurements collected are used to assess water quality at each site in terms of health of aquatic ecosystems by comparison with guideline values recommended by the ANZECC and ARMCANZ (2000) guidelines for the protection of lowland streams (i.e. systems at < 150 m altitude) in south-east Australia. This categorisation for stream health is deemed relevant for the description of Anzac Creek, the recipient natural way due to the location in the geomorphic landscape and correlations of expected biophysical health and habitat profile.

## 2.4 Survey dates and personnel

On October 30<sup>th</sup> 2020 two staff from Apical Bushfire and Planning attended Moorebank Precinct East (MPE) to collect water quality data at five discharge points within the site (See figure 2.). This data was collected on behalf of MID plumbing in accordance with 'The Stormwater Infrastructure Operation and Maintenance Plan Moorebank Logistics Park – East Precinct 2020' and in compliance with Condition of Consent B40. The results of such monitoring data collection is presented within.

# 3. Results

Data results are presented upon comparison with previous water quality monitoring testing results, presented by Biosis P/L & Simta P/L in 2018, 2019 and baseline condition assessment undertaken by Apical P/L Spring 2020.

Threshold guideline values for the parameter measures are compared and correlated to ANZECC/ARMCANZ (2000) guidelines under the categorisation 'the protection of slightly disturbed lowland river ecosystems in southeast Australia'.

## **Nutrients**

Nutrient values remain under the thresholds for ANZECC/ARMCANZ (2000) guidelines under the categorisation 'the protection of slightly disturbed lowland river ecosystems in southeast Australia'.

There are no observed significant trend increases in nutrient values across the available datasets and temporal analysis period.

## **Hydrocarbons**

We have established (No trend) in Hydrocarbon concentrations across the current data sample.

Recorded values for hydrocarbons within the stormwater network are interpreted as being static and remain under the accepted thresholds.

- The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.

## **Metals**

Copper has increased by a small margin at Discharge Point (DP) 1, 5 and 7 across the data sample when analysed over the temporal scale.

Levels for copper at (DP 1,5, & 7) collected during October 2020 are recorded to exceed the ANZECC 2000 trigger value.

It is recommended that this marginal increase in copper concentration will be monitored closely over coming water quality monitoring programs to determine if increased concentrations continue. A literature review regarding copper concentrations and copper exceedances in freshwater environments was undertaken to broaden understanding on natural phenomena involving copper accretions and copper cycling and chemistry process.

### **Copper in freshwater and marine water ([waterquality.gov.au](http://waterquality.gov.au))**

Summary of factors affecting potential copper toxicity in aquatic environs

Copper is an essential trace element required by many aquatic organisms.

Copper toxicity decreases with increasing hardness and alkalinity and a hardness algorithm is available within (Table 3.4.3 of the ANZECC & ARMCANZ 2000 guidelines).

Levels of dissolved organic matter found in most freshwaters are generally sufficient to remove copper toxicity however this process is more dynamic in lower pH mediums.

Speciation measurements can account for this cycling process.

Copper is adsorbed strongly by suspended material. Filtration and speciation measurements should account for this in a balanced water medium over -time.

Copper complexing is increased at higher pH, but the relationship to toxicity is complex.

Copper toxicity in algae, invertebrates and fish generally increases as salinity decreases.

Copper can bioaccumulate in aquatic organisms but, as it is an essential element, it is commonly regulated by the organisms.

A marine **high reliability** trigger value for copper of 0.0013 mg/L was derived using the statistical distribution method with 95% protection. This figure is above the converted NOEC for *Mytilus edulis* but below the experimental EC50 (0.002 mg/L) and is considered appropriate for slightly-moderately disturbed systems.

Figure 1. Stormwater Infrastructure Operation and Maintenance Plan

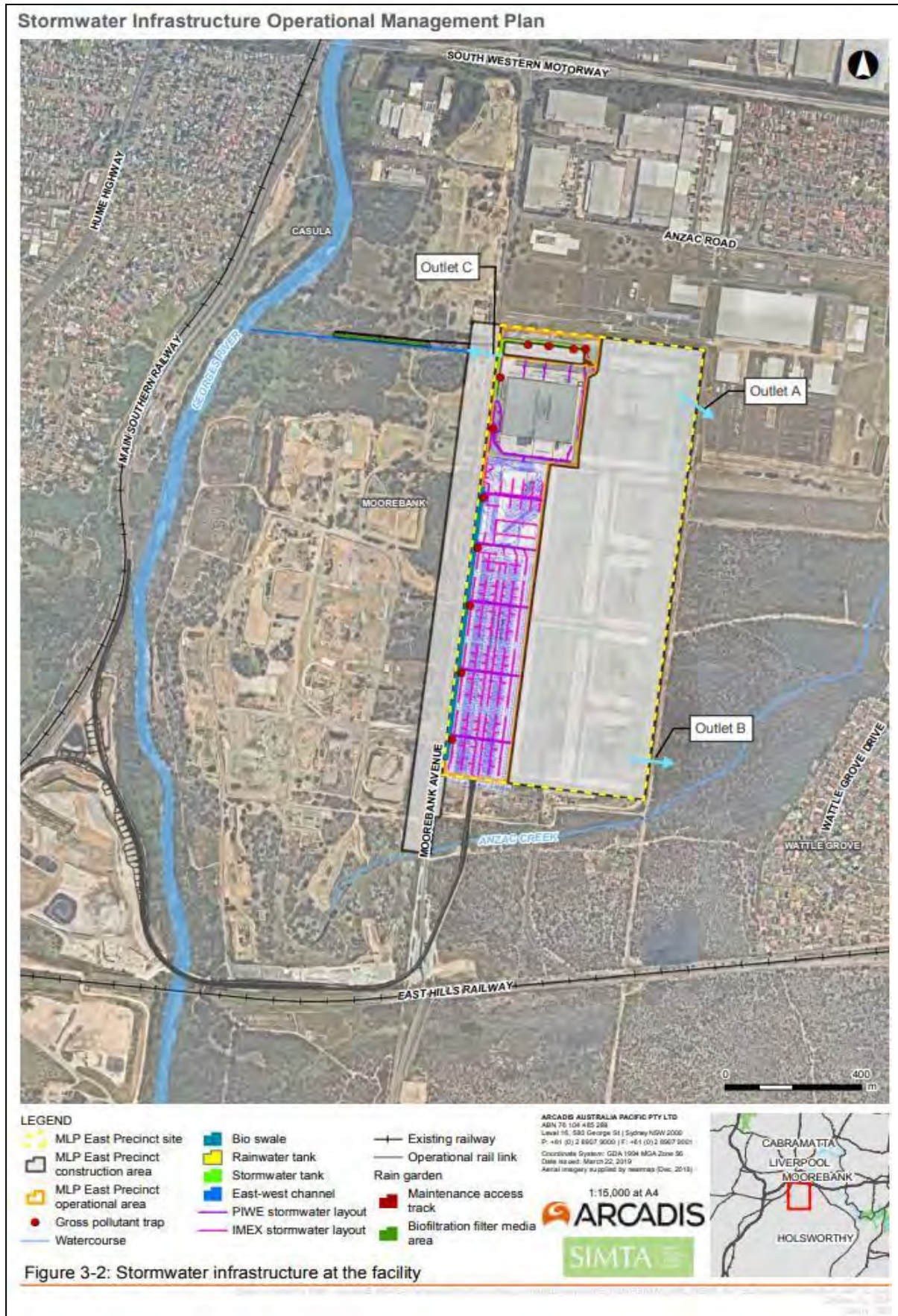
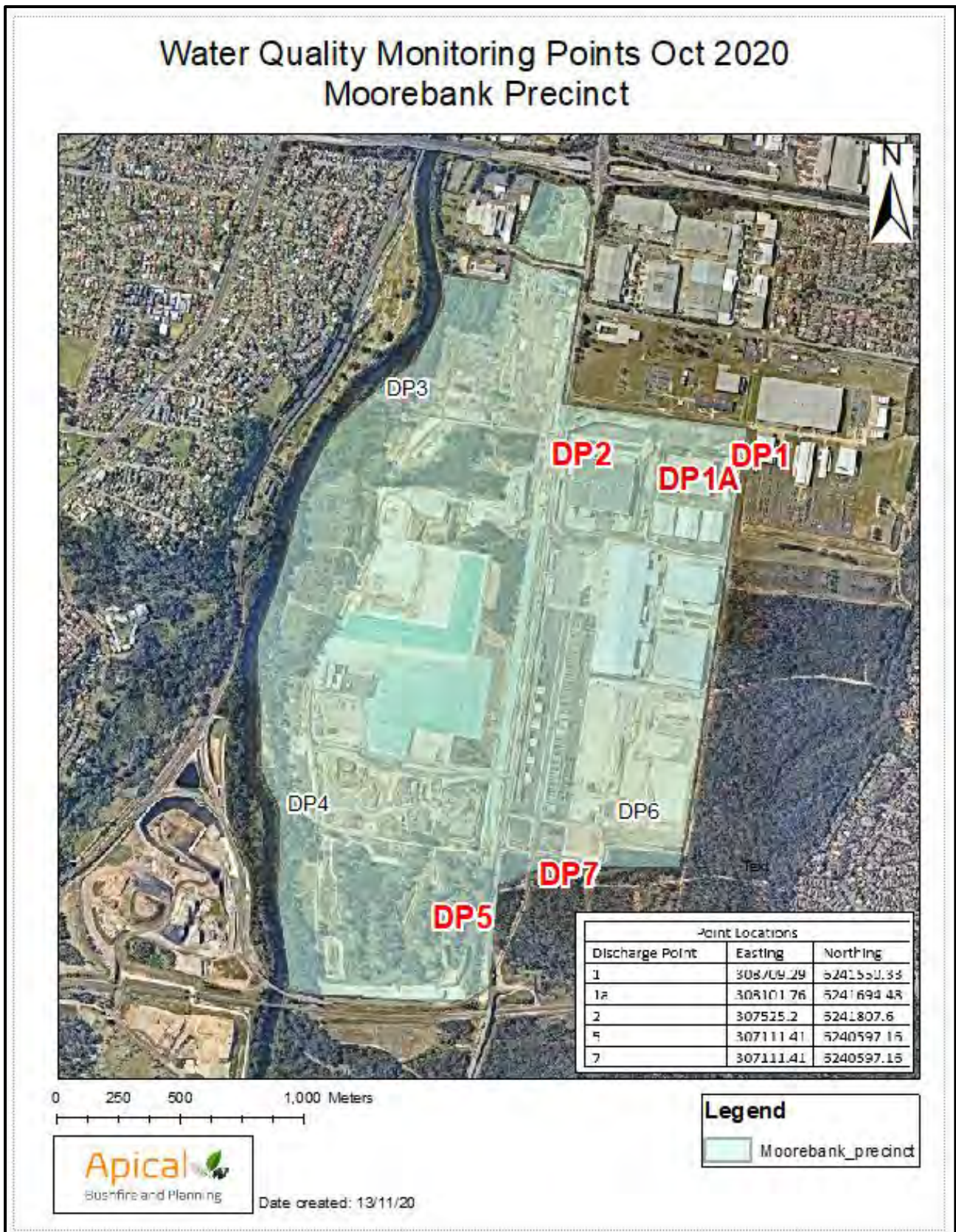


Figure 1. STORMWATER INFRASTRUCTURE OPERATION AND MAINTENANCE PLAN Moorebank Logistics Park – East Precinct 22 MARCH 2019. Figure 3.2- (REFERENCE ARCADIS)

FIGURE 2. STORMWATER DISCHARGE TESTING SITES



Discharge Point 1 – Qube Logistics Moorebank			
Date: 30/10/20	Time: 9am	Temp: 22'	Humidity: 54%
Operator: Romy	Location – Channel Culvert		
	Easting: 308709.29	Northing: 6241550.33	
Equipment used: Multifunction Aquatroll 600			
Method: Testing in standing pools with hand-held probe and collection of sample lab bottles. Bottle Lab results provided in database			
Parameter	Recording	Trigger Value - ANZECC 2000 Guidelines *Lowland rivers	Triggered
pH	6.85	Min 6.5 Max 8.5	N
Dissolved Oxygen	76.3%/L	*Lowland rivers Lower limit: 85% Upper Limit: 110%	N Trigger value associated with a lowland river. See notes.
Electrical Conductivity	287 $\mu$ S/cm	125–2200 $\mu$ S/cm	N
Temperature	18.18°C	Triggered if an UNNATURAL change in temperature occurs. (Table 3.3.1 ANZECC 2000 Guidelines).	N
Turbidity NTU	.39	Lowland rivers: 6–50 NTU Estuarine & marine 0.5-10 NTU	N
Notes:			
<ul style="list-style-type: none"> <li>The dissolved oxygen values recorded were below guideline values, however these readings are considered to be within the range of values typical of urbanised systems - Dissolved oxygen (DO) is a relative measure of the amount of oxygen (O<sub>2</sub>) dissolved in water. Oxygen gets into the water by diffusion from the atmosphere, aeration of the water as it tumbles over rocks and waterfalls, and as a product of photosynthesis.</li> <li>Turbidity trigger values: In general values in the lower part of the range will be found in rivers and streams during low flows and/or in more vegetated catchments. Values in the higher part of the range will be found in rivers and streams in high flows and lower in the catchment (particularly inland catchments).</li> </ul>			

**(a) Total phosphorus**

DP1 - Total phosphorous – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results - Total phosphorous:	20 µg/L	25 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>• Channel Culvert</li> <li>• Trigger value 50 µg/L for lowland rivers, trigger value 25 µg/L for rivers flowing to the coast Anzecc Guidelines 2000.</li> </ul>			

**(b) Total Nitrogen as N (TKN + NOx) by Discrete Analyser**

DP1 - Total nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results -Total nitrogen:	300 µg/L	350 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>• Total Nitrogen as N (TKN + NOx) by Discrete Analyser</li> <li>• Trigger values are based on a low-lying river</li> </ul>			

**(c) Kjeldahl nitrogen Total Kjeldahl Nitrogen as N**

DP1 - Kjeldahl nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results – kjeldahl nitrogen:	300 µg/L	-	N
Notes: <ul style="list-style-type: none"> <li>• Total Kjeldahl Nitrogen as N</li> </ul>			

**(d) Dissolved metals;**

DP1 - Dissolved metals – Qube Logistics, Moorebank, NSW			
Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			
Lab results – Dissolved metals:	Measures mg/L	Trigger value ANZECC Guidelines 2000 95% protection criteria	Triggered
Arsenic	0.003	0.013 mg/L	N
Cadmium	<0.0001	0.0002 mg/L	N
Chromium	<0.0001	0.001 mg/L	N
Copper	0.002	0.0014mg/L	Y See notes
Nickel	<0.001	0.011 mg/L	N
Lead	<0.001	0.0034 mg/L	N
Zinc	<0.005	0.008 mg/L	N
Mercury	<0.0001	0.0006 mg/L	N
Notes: - ANZECC Guidelines (2000) suggest 0.002 mg/L is considered appropriate for slightly-moderately disturbed systems.  - From baseline data, copper has increased by 0.001mg/L at this site. This has caused it to trigger the ANZECC Guidelines 90% protection criteria. As discharge point 1 is a channel culvert with filtration principles in place this is not a concern, though will be monitored through future data collection.			

**(e) PFAS;**

DP1 - PFAS – Qube Logistics, Moorebank, NSW			
PFAS Surrogate	Measure %	95% species protection (DEE 2016)	Triggered
13C4-PFOS %	0.02 µg/L	.13 (µg/L)	N
13C8-PFOA %	<0.01 µg/L	220 (µg/L)	N
Notes: This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include: <ul style="list-style-type: none"> <li>• Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation.</li> <li>• PFOS and PFOA can also be the breakdown endpoint of other precursor products.</li> <li>• PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife.</li> <li>• Information on other PFASs, of which there are several hundred known, is more limited.</li> <li>• Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present.</li> </ul> <p>* DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.</p>			

**(f) Total suspended solids.**

DP1 - Total suspended solids – Qube Logistics, Moorebank, NSW		EPA exceedance value	Trigger
Lab results – Total suspended solids: mg/L	17 mg/L	50 mg/L	N
Notes: <ul style="list-style-type: none"> <li>Total Suspended Solids dried at 104 ± 2°C</li> <li>Total Suspended Solids (TSS)</li> </ul>			

**(g) Total hydrocarbons**

DP1 - Total hydrocarbons – Qube Logistics, Moorebank, NSW						
Total Hydrocarbons assessed alongside baseline data (2018) and Autumn monitoring (2019) for Aquatic Monitoring location 11&12 (AQ11 & AQ12 Anzac Creek).						
Lab results - Total hydrocarbons:	Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem	Triggered	Baseline monitoring April 2018 (presented by Biosis)	Autumn Monitoring May 2019 (Presented by Bio-Analysis)	Monitoring discharge points October 2020 (Apical Bushfire and Planning)	Trend
Benzene µg/L	1300 µg/L	N	<1	<1	<1	No change
Toluene µg/L	-	N	<2	<1	<2	Varied
Ethylbenzene µg/L	-	N	<2	<1	<2	Varied
meta- & para-Xylene µg/L	200 µg/L	N	-	-	<2	-
Ortho-Xylene µg/L	470 µg/L	N	<2	<1	<2	Varied
Total Xylenes µg/L	-	-	-	-	<2	-
Sum of BTEX µg/L	-	-	-	-	<1	-
Naphthalene µg/L	85 µg/L	N	-	-	<5	-
Notes: <ul style="list-style-type: none"> <li>The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.</li> <li>Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Autumn 2019 Survey - Final Report, Bio-Analysis Pty Ltd (2019)</li> <li>Moorebank Precinct East - Stage 2 B106 – Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (SSD 7628) Biosis (2018)</li> <li>A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX</li> </ul>						



DP-1 MONITORING TEST SITE

DP1a – Qube Logistics Moorebank			
<b>Date:</b> 30/10/20	<b>Time:</b> 8:55	<b>Temp:</b> 22'	<b>Humidity:</b> 54%
<b>Operator:</b> Romy	<b>Location</b> - Detention Basin Adjacent to DP-1		
	<b>Easting:</b> 308101.76	<b>Northing:</b> 6241694.48	
<b>Equipment used:</b> Multifunction Aquatroll 600			
<b>Method:</b> Testing in standing pools (small residual water pool) with hand-held probe and collection of sample lab bottles. Bottle Lab results provided in database			
Parameter	Recording	Trigger Value - ANZECC 2000 Guidelines *Lowland rivers	Triggered
<b>pH</b>	6.14	Min 6.5 Max 8.5	N
<b>Dissolved Oxygen</b>	76.4%/L	*Lowland rivers Lower limit: 85% Upper Limit: 110%	N Trigger value associated with a lowland river. See notes.
<b>Electrical Conductivity</b>	280 $\mu$ S/cm	125–2200 $\mu$ S/cm	N
<b>Temperature</b>	18.02°C	Triggered if an UNNATURAL change in temperature occurs. (Table 3.3.1 ANZECC 2000 Guidelines).	N
<b>Turbidity NTU</b>	.42	Lowland rivers: 6–50 NTU Estuarine & marine 0.5-10 NTU	N See notes
<b>Notes:</b> <ul style="list-style-type: none"> <li>Dissolved oxygen (DO) is a relative measure of the amount of oxygen (O<sub>2</sub>) dissolved in water. Oxygen gets into the water by diffusion from the atmosphere, aeration of the water as it tumbles over rocks and waterfalls, and as a product of photosynthesis.</li> <li>Turbidity trigger values: In general values in the lower part of the range will be found in rivers and streams during low flows and/or in more vegetated catchments. Values in the higher part of the range will be found in rivers and streams in high flows and lower in the catchment (particularly inland catchments).</li> </ul>			

**(a) Total phosphorus DP-1A)**

DP1a Total phosphorous – Qube Logistics, Moorebank, NSW Detention Basin Adjacent to DP-1		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results - Total phosphorous:	40 µg/L	25 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>Channel Culvert - Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report</li> <li>µg/L + microseimens per cm</li> <li>Trigger value 50 µg/L for lowland rivers, trigger value 25 µg/L for rivers flowing to the coast Anzecc Guidelines 2000.</li> </ul>			

**(b) Total nitrogen Total Nitrogen as N (TKN + NOx) by Discrete Analyser**

Total nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results -Total nitrogen:	200 µg/L	350 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>Total Nitrogen as N (TKN + NOx) by Discrete Analyser</li> <li>Trigger values are based on a low-lying river</li> </ul>			

**(c) Kjeldahl nitrogen Total Kjeldahl Nitrogen as N**

Kjeldahl nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results – kjeldahl nitrogen:	200 µg/L	-	N
Notes: <b>Total Kjeldahl Nitrogen as N</b>			

**d) Dissolved metals;**

DP1a Dissolved metals – Qube Logistics, Moorebank, NSW			
Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			
Lab results – Dissolved metals:	Measures mg/L	Trigger value ANZECC Guidelines 2000 95% protection criteria	Triggered
Arsenic	0.001	0.013 mg/L	N
Cadmium	<0.0001	0.0002 mg/L	N
Chromium	<0.002	0.001 mg/L	N
Copper	<0.001	0.0014mg/L	N
Nickel	<0.001	0.011 mg/L	N
Lead	<0.001	0.0034 mg/L	N
Zinc	<0.005	0.008 mg/L	N
Mercury	<0.0001	0.0006 mg/L	N
Notes:			

**(e) PFAS;**

DP1a PFAS – Qube Logistics, Moorebank, NSW			
PFAS Surrogate	Measure %	95% species protection (DEE 2016)	Exceedance?
13C4-PFOS %	<0.01 µg/L	.13 (µg/L)	N
13C8-PFOA %	<0.01 µg/L	220 (µg/L)	N
Notes: This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include: <ul style="list-style-type: none"> <li>• Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation.</li> <li>• PFOS and PFOA can also be the breakdown endpoint of other precursor products.</li> <li>• PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife.</li> <li>• Information on other PFASs, of which there are several hundred known, is more limited.</li> <li>• Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present.</li> </ul>			

**(f) Total suspended solids.**

DP1a Total suspended solids – Qube Logistics, Moorebank, NSW		EPA exceedance value	Trigger
Lab results – Total suspended solids: mg/L	36 mg/L	50 mg/L	N
Notes: <ul style="list-style-type: none"> <li>Total Suspended Solids dried at 104 ± 2°C</li> <li>Total Suspended Solids (TSS)</li> </ul>			

**(g) Total hydrocarbons**

DP1a - Total hydrocarbons – Qube Logistics, Moorebank, NSW						
Total Hydrocarbons assessed alongside baseline data (2018) and Autumn monitoring (2019) for Aquatic Monitoring location 11&12 (AQ11 & AQ12 Anzac Creek).						
Lab results - Total hydrocarbons:	Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem	Triggered	Baseline monitoring April 2018 (presented by Biosis)	Autumn Monitoring May 2019 (Presented by Bio-Analysis)	Monitoring discharge points October 2020 (Apical Bushfire and Planning)	Trend
Benzene µg/L	1300 µg/L	N	<1	<1	<1	No change
Toluene µg/L	-	N	<2	<1	<2	Varied
Ethylbenzene µg/L	-	N	<2	<1	<2	Varied
meta- & para-Xylene µg/L	200 µg/L	N	-	-	<2	-
Ortho-Xylene µg/L	470 µg/L	N	<2	<1	<2	Varied
Total Xylenes µg/L	-	-	-	-	<2	-
Sum of BTEX µg/L	-	-	-	-	<1	-
Naphthalene µg/L	85 µg/L	N	-	-	<5	-
Notes: <ul style="list-style-type: none"> <li>The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.</li> <li>Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Autumn 2019 Survey - Final Report, Bio-Analysis Pty Ltd (2019)</li> <li>Moorebank Precinct East - Stage 2 B106 – Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (SSD 7628) (2018)</li> <li>A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX</li> </ul>						



DP-1A) (DETENTION POND) MONITORING TEST SITE (TESTING SHALLOW POOLS – RESIDUAL STORAGE POST RAINFALL EVENT (2 DAYS AFTER)

DP2 - Discharge Point 2 – Qube Logistics Moorebank			
<b>Date:</b> 30/10/20	<b>Time:</b> 8:35am	<b>Temp:</b> 22'	<b>Humidity:</b> 54%
<b>Operator:</b> Romy	<b>Location</b>		
	<b>Easting:</b> 307525.2	<b>Northing:</b> 6241807.6	
<b>Equipment used:</b> Multifunction Aquatroll 600			
<b>Method:</b> Testing in standing pools (Use ladder to access stormwater culvert) with hand-held probe and collection of sample lab bottles. Bottle Lab results provided in database			
Parameter	Recording	Trigger Value - ANZECC 2000 Guidelines *Lowland rivers	Triggered
<b>pH</b>	67.44	Min 6.5 Max 8.5	N
<b>Dissolved Oxygen</b>	176.11%/L	*Lowland rivers Lower limit: 85% Upper Limit: 110%	N Trigger value associated with a lowland river. See notes.
<b>Electrical Conductivity</b>	312 $\mu$ S/cm	125–2200 $\mu$ S/cm	N
<b>Temperature</b>	17.31°C	Triggered if an UNNATURAL change in temperature occurs. (Table 3.3.1 ANZECC 2000 Guidelines).	N
<b>Turbidity NTU</b>	.34	Lowland rivers: 6–50 NTU Estuarine & marine 0.5-10 NTU	N
<b>Notes:</b> <ul style="list-style-type: none"> <li>Dissolved oxygen (DO) is a relative measure of the amount of oxygen (O<sub>2</sub>) dissolved in water. Oxygen gets into the water by diffusion from the atmosphere, aeration of the water as it tumbles over rocks and waterfalls, and as a product of photosynthesis.</li> <li>Turbidity trigger values: In general values in the lower part of the range will be found in rivers and streams during low flows and/or in more vegetated catchments. Values in the higher part of the range will be found in rivers and streams in high flows and lower in the catchment (particularly inland catchments).</li> </ul>			

**(a) Total phosphorus**

DP2 - Total phosphorous – Qube Logistics, Moorebank, NSW Detention Basin Adjacent to DP-1		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results - Total phosphorous:	10 µg/L	25 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>• Channel Culvert</li> <li>• µg/L + microseimens per cm</li> <li>• Trigger value 50 µg/L for lowland rivers, trigger value 25 µg/L for rivers flowing to the coast Anzecc Guidelines 2000.</li> </ul> Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			

**(b) Total nitrogen Total Nitrogen as N (TKN + NO<sub>x</sub>) by Discrete Analyser**

DP2 - Total nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results -Total nitrogen:	300 µg/L	350 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>• Total Nitrogen as N (TKN + NO<sub>x</sub>) by Discrete Analyser</li> <li>• Trigger values are based on a low-lying river</li> </ul>			

**(c) Kjeldahl nitrogen Total Kjeldahl Nitrogen as N**

DP2 - Kjeldahl nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results – kjeldahl nitrogen:	200 µg/L	-	N
Notes: Total Kjeldahl Nitrogen as N			

**d) Dissolved metals;**

<b>DP2 - Dissolved metals – Qube Logistics, Moorebank, NSW</b>			
Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			
<b>Lab results – Dissolved metals:</b>	<b>Measures mg/L</b>	<b>Trigger value ANZECC Guidelines 2000 95% protection criteria</b>	<b>Triggered</b>
<b>Arsenic</b>	<0.001	0.013 mg/L	N
<b>Cadmium</b>	<0.0001	0.0002 mg/L	N
<b>Chromium</b>	0.002	0.001 mg/L	N
<b>Copper</b>	0.002	0.0014mg/L	Y See notes
<b>Nickel</b>	<0.001	0.011 mg/L	N
<b>Lead</b>	<0.001	0.0034 mg/L	N
<b>Zinc</b>	<0.005	0.008 mg/L	Y
<b>Mercury</b>	<0.0001	0.0006 mg/L	Y
Notes:  From baseline data, copper has increased by 0.001mg/L at DP2. This has caused it to trigger the ANZECC Guidelines 90% protection criteria. As discharge point 1 is a channel culvert with filtration principles in place this is not a concern, though will be monitored through future data collection.			

**(e) PFAS;**

<b>DP2 - PFAS – Qube Logistics, Moorebank, NSW</b>			
<b>PFAS Surrogate</b>	<b>Measure %</b>	<b>95% species protection (DEE 2016)</b>	<b>Exceedance?</b>
<b>13C4-PFOS %</b>	<0.01 µg/L	.13 (µg/L)	N
<b>13C8-PFOA %</b>	<0.01 µg/L	220 (µg/L)	N
Notes: This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include: <ul style="list-style-type: none"> <li>• Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation.</li> <li>• PFOS and PFOA can also be the breakdown endpoint of other precursor products.</li> <li>• PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife.</li> <li>• Information on other PFASs, of which there are several hundred known, is more limited.</li> <li>• Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present.</li> </ul>			

**(f) Total suspended solids.**

DP2 - Total suspended solids – Qube Logistics, Moorebank, NSW		EPA exceedance value	Trigger
Lab results – Total suspended solids: mg/L	18 mg/L	50 mg/L	N
Notes: Total Suspended Solids dried at 104 ± 2°C Total Suspended Solids (TSS)			

**(g) Total hydrocarbons**

DP2 - Total hydrocarbons – Qube Logistics, Moorebank, NSW						
Total Hydrocarbons assessed alongside baseline data (2018) and Autumn monitoring (2019) for Aquatic Monitoring location 11&12 (AQ11 & AQ12 Anzac Creek).						
Lab results - Total hydrocarbons:	Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem	Triggered	Baseline monitoring April 2018 (presented by Biosis)	Autumn Monitoring May 2019 (Presented by Bio-Analysis)	Monitoring discharge points October 2020 (Apical Bushfire and Planning)	Trend
Benzene µg/L	1300 µg/L	N	<1	<1	<1	No change
Toluene µg/L	-	N	<2	<1	<2	Varied
Ethylbenzene µg/L	-	N	<2	<1	<2	Varied
meta- & para-Xylene µg/L	200 µg/L	N	-	-	<2	-
Ortho-Xylene µg/L	470 µg/L	N	<2	<1	<2	Varied
Total Xylenes µg/L	-	-	-	-	<2	-
Sum of BTEX µg/L	-	-	-	-	<1	-
Naphthalene µg/L	85 µg/L	N	-	-	<5	-
Notes:						
<ul style="list-style-type: none"> <li>The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.</li> <li>Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Autumn 2019 Survey - Final Report, Bio-Analysis Pty Ltd (2019)</li> <li>Moorebank Precinct East - Stage 2 B106 – Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (SSD 7628) (2018)</li> <li>A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX</li> </ul>						

<b>DP2 - Total hydrocarbons – Qube Logistics, Moorebank, NSW</b>			
<b>Lab results -Total hydrocarbons:</b>	<b>BTEXN</b>	<b>Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem</b>	<b>Exceedance of Guidelines</b>
<b>Benzene µg/L</b>	<1	1300 µg/L	N
<b>Toluene µg/L</b>	<2	-	N
<b>Ethylbenzene µg/L</b>	<2	-	N
<b>meta- &amp; para-Xylene µg/L</b>	<2	200 µg/L	N
<b>Ortho-Xylene µg/L</b>	<2	470 µg/L	N
<b>Total Xylenes µg/L</b>	<2	-	N
<b>Sum of BTEX µg/L</b>	<1	-	
<b>Naphthalene µg/L</b>	<5	85 µg/L	N
<b>Notes:</b> <ul style="list-style-type: none"> <li>• The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.</li> <li>• A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX</li> </ul>			



DP-2 STORMWATER CULVERT (POOL 0.5M DEPTH) TO THE NORTH WEST OF THE (EAST PRECINCT)

Discharge Point 5 – Qube Logistics Moorebank			
<b>Date:</b> 30/10/20	<b>Time:</b> 9.48am	<b>Temp:</b> 24	<b>Humidity:</b> 54%
<b>Operator:</b> Romy	<b>Location</b>		
	<b>Easting:</b> 307111.41	<b>Northing:</b> 6240597.16	
<b>Equipment used:</b> Multifunction Aquatroll 600			
<b>Method:</b> Testing in flowing stream (Anzac Creek) with hand-held probe and collection of sample lab bottles. Bottle Lab results provided in database			
Parameter	Recording	Trigger Value - ANZECC 2000 Guidelines *Lowland rivers	Triggered
<b>pH</b>	5.6	Min 6.5 Max 8.5	N
<b>Dissolved Oxygen</b>	75.94%/L	*Lowland rivers Lower limit: 85% Upper Limit: 110%	N Trigger value associated with a lowland river. See notes.
<b>Electrical Conductivity</b>	412 $\mu$ S/cm	125–2200 $\mu$ S/cm	N
<b>Temperature</b>	16.33°C	Triggered if an UNNATURAL change in temperature occurs. (Table 3.3.1 ANZECC 2000 Guidelines).	N
<b>Turbidity NTU</b>	.21	Lowland rivers: 6–50 NTU Estuarine & marine 0.5-10 NTU	N
<b>Notes:</b> <ul style="list-style-type: none"> <li>Dissolved oxygen (DO) is a relative measure of the amount of oxygen (O<sub>2</sub>) dissolved in water. Oxygen gets into the water by diffusion from the atmosphere, aeration of the water as it tumbles over rocks and waterfalls, and as a product of photosynthesis.</li> <li>Turbidity trigger values: In general values in the lower part of the range will be found in rivers and streams during low flows and/or in more vegetated catchments. Values in the higher part of the range will be found in rivers and streams in high flows and lower in the catchment (particularly inland catchments).</li> </ul>			

**(a) Total phosphorus DP-5**

DP5 - Total phosphorous – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results - Total phosphorous:	70 µg/L	25 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>• Channel Culvert</li> <li>• µg/L + microseimens per cm</li> <li>• Trigger value 50 µg/L for lowland rivers, trigger value 25 µg/L for rivers flowing to the coast Anzecc Guidelines 2000.</li> </ul> Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			

**(b) Total nitrogen Total Nitrogen as N (TKN + NOx) by Discrete Analyser**

DP5 - Total nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results -Total nitrogen:	1300 µg/L	350 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>• Total Nitrogen as N (TKN + NOx) by Discrete Analyser</li> <li>• Trigger values are based on a low-lying river</li> </ul>			

**(c) Kjeldahl nitrogen Total Kjeldahl Nitrogen as N**

DP5 - Kjeldahl nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results – kjeldahl nitrogen:	1100 µg/L	-	
Notes: <b>Total Kjeldahl Nitrogen as N</b>			

**d) Dissolved metals;**

<b>DP5 - Dissolved metals – Qube Logistics, Moorebank, NSW</b>			
Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			
<b>Lab results – Dissolved metals:</b>	<b>Measures mg/L</b>	<b>Trigger value ANZECC Guidelines 2000 95% protection criteria</b>	<b>Exceedance of PQL?</b>
<b>Arsenic</b>	<0.001	0.013 mg/L	Y
<b>Cadmium</b>	<0.0001	0.0002 mg/L	N
<b>Chromium</b>	0.001	0.001 mg/L	N
<b>Copper</b>	0.006	0.0014mg/L	Y
<b>Nickel</b>	<0.001	0.011 mg/L	N
<b>Lead</b>	<0.001	0.0034 mg/L	N
<b>Zinc</b>	<0.005	0.008 mg/L	Y
<b>Mercury</b>	<0.0001	0.0006 mg/L	Y
Notes:  From baseline data, copper has increased by 0.005mg/L at this site. This has caused it to trigger the ANZECC Guidelines 90% protection criteria. As discharge point 5 is a channel culvert with filtration principles in place this is not a concern, though will be monitored through future data collection.			

**(e) PFAS;**

<b>DP5 - PFAS – Qube Logistics, Moorebank, NSW</b>			
<b>PFAS Surrogate</b>	<b>Measure %</b>	<b>95% species protection (DEE 2016)</b>	<b>Exceedance?</b>
<b>13C4-PFOS %</b>	0.09 µg/L	.13 (µg/L)	N
<b>13C8-PFOA %</b>	0.01 µg/L	220 (µg/L)	N
Notes: This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include: <ul style="list-style-type: none"> <li>• Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation.</li> <li>• PFOS and PFOA can also be the breakdown endpoint of other precursor products.</li> <li>• PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife.</li> <li>• Information on other PFASs, of which there are several hundred known, is more limited.</li> <li>• Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present.</li> </ul>			

**(f) Total suspended solids.**

DP5 - Total suspended solids – Qube Logistics, Moorebank, NSW		EPA exceedance value	Trigger
Lab results – Total suspended solids: mg/L	19 mg/L	50 mg/L	N
Notes: Total Suspended Solids dried at 104 ± 2°C Total Suspended Solids (TSS)			

**(g) Total hydrocarbons**

DP5 - Total hydrocarbons – Qube Logistics, Moorebank, NSW						
Total Hydrocarbons assessed alongside baseline data (2018) and Autumn monitoring (2019) for Aquatic Monitoring location 11&12 (AQ11 & AQ12 Anzac Creek).						
Lab results - Total hydrocarbons:	Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem	Triggered	Baseline monitoring April 2018 (presented by Biosis)	Autumn Monitoring May 2019 (Presented by Bio-Analysis)	Monitoring discharge points October 2020 (Apical Bushfire and Planning)	Trend
Benzene µg/L	1300 µg/L	N	<1	<1	<1	No change
Toluene µg/L	-	N	<2	<1	<2	Varied
Ethylbenzene µg/L	-	N	<2	<1	<2	Varied
meta- & para-Xylene µg/L	200 µg/L	N	-	-	<2	-
Ortho-Xylene µg/L	470 µg/L	N	<2	<1	<2	Varied
Total Xylenes µg/L	-	-	-	-	<2	-
Sum of BTEX µg/L	-	-	-	-	<1	-
Naphthalene µg/L	85 µg/L	N	-	-	<5	-
Notes:						
<ul style="list-style-type: none"> <li>The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.</li> <li>Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Autumn 2019 Survey - Final Report, Bio-Analysis Pty Ltd (2019)</li> <li>Moorebank Precinct East - Stage 2 B106 – Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (SSD 7628) (2018)</li> <li>A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX</li> </ul>						



DP-5 FLOWING WATER AT RAILWAY BRIDGE CULVERT ANZAC CREEK

Discharge Point 7 – Qube Logistics Moorebank			
Date: 30/10/20	Time: 9.37am	Temp: 24	Humidity: 54%
Operator: Romy	Location		
	Easting: 307111.41	Northing: 6240597.16	
Equipment used: Multifunction Aquatroll 600			
Method: Testing in flowing stream (Anzac Creek up-stream of DP-5) with hand-held probe and collection of sample lab bottles. Bottle Lab results provided in database			
Parameter	Recording	Trigger Value - ANZECC 2000 Guidelines *Lowland rivers	Triggered
pH	5.6	Min 6.5 Max 8.5	N
Dissolved Oxygen	78.2%/L	*Lowland rivers Lower limit: 85% Upper Limit: 110%	N Trigger value associated with a lowland river. See notes.
Electrical Conductivity	410 $\mu$ S/cm	125–2200 $\mu$ S/cm	N
Temperature	18.27°C	Triggered if an UNNATURAL change in temperature occurs. (Table 3.3.1 ANZECC 2000 Guidelines).	N
Turbidity NTU	.42	Lowland rivers: 6–50 NTU Estuarine & marine 0.5-10 NTU	N
Notes:			
<ul style="list-style-type: none"> <li>Dissolved oxygen (DO) is a relative measure of the amount of oxygen (O<sub>2</sub>) dissolved in water. Oxygen gets into the water by diffusion from the atmosphere, aeration of the water as it tumbles over rocks and waterfalls, and as a product of photosynthesis.</li> <li>Turbidity trigger values: In general values in the lower part of the range will be found in rivers and streams during low flows and/or in more vegetated catchments. Values in the higher part of the range will be found in rivers and streams in high flows and lower in the catchment (particularly inland catchments).</li> </ul>			

DP7 - Total phosphorous – Qube Logistics, Moorebank, NSW Detention Basin Adjacent to DP-1		Trigger Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results - Total phosphorous:	60 µg/L	50 µg/	N see notes
Notes: <ul style="list-style-type: none"> <li>• Channel Culvert</li> <li>• µg/L + microseimens per cm</li> <li>• Trigger value 50 µg/L for lowland rivers, trigger value 25 µg/L for rivers flowing to the coast Anzecc Guidelines 2000.</li> </ul> Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			

**(b) Total nitrogen Total Nitrogen as N (TKN + NOx) by Discrete Analyser**

DP7 - Total nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results -Total nitrogen:	700 µg/L	350 µg/L for rivers flowing to the coast	N
Notes: <ul style="list-style-type: none"> <li>• Total Nitrogen as N (TKN + NOx) by Discrete Analyser</li> <li>• Trigger values are based on a low-lying river</li> </ul>			

**C) Kjeldahl nitrogen Total Kjeldahl Nitrogen as N**

DP7 - Kjeldahl nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results – kjeldahl nitrogen:	600 µg/L	-	
Notes: Total Kjeldahl Nitrogen as N			

**d) Dissolved metals;**

<b>DP7 - Dissolved metals – Qube Logistics, Moorebank, NSW</b>			
Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			
<b>Lab results – Dissolved metals:</b>	<b>Measures mg/L</b>	<b>Trigger value ANZECC Guidelines 2000 95% protection criteria</b>	<b>Exceedance of PQL?</b>
<b>Arsenic</b>	<0.001	0.013 mg/L	N
<b>Cadmium</b>	<0.0001	0.0002 mg/L	N
<b>Chromium</b>	<0.001	0.001 mg/L	N
<b>Copper</b>	0.006	0.0014mg/L	Y
<b>Nickel</b>	<0.001	0.011 mg/L	N
<b>Lead</b>	<0.001	0.0034 mg/L	N
<b>Zinc</b>	<0.005	0.008 mg/L	N
<b>Mercury</b>	<0.0001	0.0006 mg/L	N
Notes: From baseline data, copper has increased by 0.005mg/L at this site. This has caused it to trigger the ANZECC Guidelines 90% protection criteria. As discharge point 7 is a channel culvert with filtration principles in place this is not a concern, though will be monitored through future data collection.			

**(e) PFAS;**

<b>DP7 - PFAS – Qube Logistics, Moorebank, NSW</b>			
<b>PFAS Surrogate</b>	<b>Measure %</b>	<b>95% species protection (DEE 2016)</b>	<b>Exceedance?</b>
<b>13C4-PFOS %</b>	0.07 µg/L	.13 (µg/L)	N
<b>13C8-PFOA %</b>	<0.01 µg/L	220 (µg/L)	N
Notes: This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include: <ul style="list-style-type: none"> <li>• Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation.</li> <li>• PFOS and PFOA can also be the breakdown endpoint of other precursor products.</li> <li>• PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife.</li> <li>• Information on other PFASs, of which there are several hundred known, is more limited.</li> <li>• Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present.</li> </ul>			

**(f) Total suspended solids.**

DP7 - Total suspended solids – Qube Logistics, Moorebank, NSW		EPA exceedance value	Trigger
Lab results – Total suspended solids: mg/L	22 mg/L	50 mg/L	N
Notes: Total Suspended Solids dried at 104 ± 2°C Total Suspended Solids (TSS)			

**(g) Total hydrocarbons**

DP7 - Total hydrocarbons – Qube Logistics, Moorebank, NSW						
Total Hydrocarbons assessed alongside baseline data (2018) and Autumn monitoring (2019) for Aquatic Monitoring location 11&12 (AQ11 & AQ12 Anzac Creek).						
Lab results - Total hydrocarbons:	Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem	Triggered	Baseline monitoring April 2018 (presented by Biosis)	Autumn Monitoring May 2019 (Presented by Bio-Analysis)	Monitoring discharge points October 2020 (Apical Bushfire and Planning)	Trend
Benzene µg/L	1300 µg/L	N	<1	<1	<1	No change
Toluene µg/L	-	N	<2	<1	<2	Varied
Ethylbenzene µg/L	-	N	<2	<1	<2	Varied
meta- & para-Xylene µg/L	200 µg/L	N	-	-	<2	-
Ortho-Xylene µg/L	470 µg/L	N	<2	<1	<2	Varied
Total Xylenes µg/L	-	-	-	-	<2	-
Sum of BTEX µg/L	-	-	-	-	<1	-
Naphthalene µg/L	85 µg/L	N	-	-	<5	-
Notes: <ul style="list-style-type: none"> <li>The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.</li> <li>Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Autumn 2019 Survey - Final Report, Bio-Analysis Pty Ltd (2019)</li> <li>Moorebank Precinct East - Stage 2 B106 – Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (SSD 7628) (2018)</li> <li>A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX</li> </ul>						



DP-7 UPSTREAM OF DP-5 ANZAC CREEK

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### Water Quality Monitoring

DP - 1	Baseline Aug 2020 WQR	Oct 2020 WQR - 1	WQR - 2	WQR - 3	WQR - 4
pH	6.83	6.85			
Dissolved Oxygen - %/L	30.1	76.38			
Electronic Conductivity - $\mu$ S/cm	162.5	287			
Temperature - $^{\circ}$ C	11.1	18.18			
Turbidity	11 FNU	0.39 NTU			
<b>Total phosphorous - mg/L</b>					
Total phosphorous - mg/L	0.04	0.02			
<b>Total nitrogen - mg/L</b>					
Total nitrogen - mg/L	0.5	0.3			
<b>Kjeldahl nitrogen mg/L</b>					
Kjeldahl nitrogen mg/L	0.4	0.3			
<b>Dissolved metals</b>					
Arsenic	0.002	0.003			
Cadmium	<0.0001	<0.0001			
Chromium	<0.001	<0.001			
Copper	0.001	0.002			
Nickel	<0.001	<0.001			
Lead	<0.001	<0.001			
Zinc	0.009	<0.005			
Mercury	<0.0001	<0.0001			
<b>PFAS</b>					
Lab results – SUM of PFAS Micrograms/L	0.28	0.02			
SUM of PFHxS & PFOS Micrograms/L	0.13	0.02			
Total suspended solids mg/L	32	17			
<b>Total hydrocarbons</b>					
Benzene	<1	<1			
Toluene	<2	<2			
Ethylbenzene	<2	<2			
meta- & para-Xylene	<2	<2			
Ortho-Xylene	<2	<2			
Total Xylenes	<2	<2			
Sum of BTEX	<1	<1			
Naphthalene	<5	<5			

DP – 1a	Baseline Aug 2020 WQR	Oct 2020 WQR – 1	WQR - 2	WQR - 3	WQR - 4
pH	6.12	6.14			
Dissolved Oxygen - %/L	65.4	76.40			
Electronic Conductivity - µS/cm	186.4	280			
Temperature - °C	10.3	18.022			
Turbidity	61FNU	0.36 NTU			
Total phosphorous - mg/L	<0.01mg/L	0.04			
Total nitrogen - mg/L	0.2mg/L	0.2			
Kjeldahl nitrogen mg/L	0.2mg/L	0.2			
Dissolved metals					
Arsenic	<0.001	<0.001			
Cadmium	<0.0001	<0.0001			
Chromium	0.002	0.002			
Copper	<0.001	<0.001			
Nickel	<0.001	<0.001			
Lead	<0.001	<0.001			
Zinc	<0.005	<0.005			
Mercury	<0.0001	<0.0001			
PFAS					
Lab results – SUM of PFAS Micrograms/L	0.01	<0.01			
SUM of PFHxS & PFOS Microgrms/L	0.01	<0.01			
Total suspended solids mg/L	28	36			
Total hydrocarbons					
Benzene	<1	<1			
Toluene	<2	<2			
Ethylbenzene	<2	<2			
meta-& para-Xylene	<2	<2			
Ortho-Xylene	<2	<2			
Total Xylenes	<2	<2			
Sum of BTEX	<1	<1			
Naphthalene	<5	<5			

DP - 2	Baseline Aug 2020 WQR	Oct 2020 WQR - 1	WQR - 2	WQR - 3	WQR - 4
pH	7.46	7.44			
Dissolved Oxygen - %/L	69.4	76.11			
Electronic Conductivity - $\mu$ S/cm	184.6	312			
Temperature - $^{\circ}$ C	12.5	17.31			
Turbidity	92 FNU	0.34 NTU			
Total phosphorous - mg/L	0.02	0.01			
Total nitrogen - mg/L	2.6	0.3			
Kjeldahl nitrogen mg/L	2.0	0.2			
Dissolved metals					
Arsenic	0.002	<0.001			
Cadmium	<0.0001	<0.0001			
Chromium	0.002	0.002			
Copper	0.003	0.002			
Nickel	0.002	<0.001			
Lead	<0.001	<0.001			
Zinc	0.006	<0.005			
Mercury	<0.0001	<0.0001			
PFAS					
Lab results – SUM of PFAS Micrograms/L	0.14	<0.01			
SUM of PFHxS & PFOS Micrograms/L	0.10	<0.01			
Total suspended solids mg/L	11	18			
Total hydrocarbons					
Benzene	<1	<1			
Toluene	3	<2			
Ethylbenzene	<2	<2			
meta- & para-Xylene	<2	<2			
Ortho-Xylene	<2	<2			
Total Xylenes	<2	<2			
Sum of BTEX	3	<1			
Naphthalene	<5	<5			

DP – 5	Baseline Aug 2020 WQR	Oct 2020 WQR - 1	WQR - 2	WQR - 3	WQR - 4
pH	5.58	5.6			
Dissolved Oxygen - %/L	48.3	75.94			
Electronic Conductivity - μS/cm	186.2	412			
Temperature - °C	11.8	16.43			
Turbidity	24.7 FNU	.21 NTU			
<b>Total phosphorous - mg/L</b>					
	0.02	0.07			
<b>Total nitrogen - mg/L</b>					
	0.5	1.3			
<b>Kjeldahl nitrogen mg/L</b>					
	0.4	1.1			
<b>Dissolved metals</b>					
Arsenic	<0.001	<0.001			
Cadmium	<0.0001	<0.0001			
Chromium	<0.001	0.001			
Copper	<0.001	0.006			
Nickel	<0.001	<0.001			
Lead	<0.001	<0.001			
Zinc	0.006	<0.005			
Mercury	<0.0001	<0.0001			
<b>PFAS</b>					
Lab results – SUM of PFAS Micrograms/L	0.10	0.1			
SUM of PFHxS & PFOS Micrograms/L	0.10	0.09			
<b>Total suspended solids mg/L</b>					
		19			
<b>Total hydrocarbons</b>					
Benzene	<1	<1			
Toluene	<2	<2			
Ethylbenzene	<2	<2			
meta-& para-Xylene	<2	<2			
Ortho-Xylene	<2	<2			
Total Xylenes	<2	<2			
Sum of BTEX	<1	<1			
Naphthalene	<5	<5			

DP - 7	Baseline Aug 2020 WQR	Oct 2020 WQR - 1	WQR – 2	WQR – 3	WQR - 4
pH	5.58	5.6			
Dissolved Oxygen - %/L	50.1	76.25			
Electronic Conductivity - $\mu\text{S}/\text{cm}$	169.2	410 $\mu\text{S}/\text{cm}$			
Temperature - $^{\circ}\text{C}$	12.1	18.27			
Turbidity	32.6 FNU	0.42 NTU			
Total phosphorous - mg/L	<0.01	0.06			
Total nitrogen - mg/L	0.6	0.7			
Kjeldahl nitrogen mg/L	0.5	0.6			
Dissolved metals					
Arsenic	<0.001	<0.001			
Cadmium	<0.0001	<0.0001			
Chromium	<0.001	<0.001			
Copper	<0.001	0.006			
Nickel	<0.001	<0.001			
Lead	<0.001	<0.001			
Zinc	0.009	<0.005			
Mercury	<0.0001	<0.0001			
PFAS					
Lab results – SUM of PFAS Micrograms/L	0.11	0.07			
SUM of PFHxS & PFOS Micrograms/L	0.11	0.07			
Total suspended solids mg/L	8	22			
Total hydrocarbons					
Benzene	<1	<1			
Toluene	<2	<2			
Ethylbenzene	<2	<2			
meta- & para-Xylene	<2	<2			
Ortho-Xylene	<2	<2			
Total Xylenes	<2	<2			
Sum of BTEX	<1	<1			
Naphthalene	<5	<5			

Summary of Results Table

Client - Matrix: <b>Apical Bushfire &amp; Planning</b>	WATER			Sample Type:	REG	REG	REG	REG	REG
Workgroup: Water Quality Monitoring - <b>Stormwater</b>	EW2004893			ALS Sample number:	EW2004893 001	EW2004893 002	EW2004893 003	EW2004893 004	EW2004893 005
Project name/number: <b>Moorebank Logisitics Park</b>	QUBE MLP			Sample date:	30/10/2020	30/10/2020	30/10/2020	30/10/2020	30/10/2020
				Client sample ID (Primary):	DP1	DP1 A	DP2	DP6	DP7
				Client sample ID (Secondary):					
				Sample Site:					
				Purchase Order:					
Analyte grouping/Analyte	CAS Number	Unit s	LOR						
EA025: Total Suspended Solids dried at 104 Å± 2Å°C									
Suspended Solids (SS)		mg/ L	5		17	36	18	19	22
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	mg/ L	0.00 1		0.003	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	mg/ L	0.00 01		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	mg/ L	0.00 1		<0.001	0.002	0.002	0.001	<0.001
Copper	7440-50-8	mg/ L	0.00 1		0.002	<0.001	0.002	0.006	0.006
Lead	7439-92-1	mg/ L	0.00 1		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	mg/ L	0.00 1		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	mg/ L	0.00 5		<0.005	<0.005	<0.005	<0.005	<0.005

EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	mg/ L	0.00 01		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N		mg/ L	0.01		<0.01	0.05	0.14	0.18	0.11
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N		mg/ L	0.1		0.3	0.2	0.2	1.1	0.6
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
Total Nitrogen as N		mg/ L	0.1		0.3	0.2	0.3	1.3	0.7
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P		mg/ L	0.01		0.02	0.04	0.01	0.07	0.06
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction		Âµg /L	20		<20	<20	<20	<20	<20
C10 - C14 Fraction		Âµg /L	50		<50	<50	<50	<50	<50
C15 - C28 Fraction		Âµg /L	100		<100	<100	<100	<100	<100
C29 - C36 Fraction		Âµg /L	50		<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)		Âµg /L	50		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									

C6 - C10 Fraction	C6_C10	Âµg /L	20		<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	Âµg /L	20		<20	<20	<20	<20	<20
>C10 - C16 Fraction		Âµg /L	100		<100	<100	<100	<100	<100
>C16 - C34 Fraction		Âµg /L	100		<100	<100	<100	<100	<100
>C34 - C40 Fraction		Âµg /L	100		<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)		Âµg /L	100		<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)		Âµg /L	100		<100	<100	<100	<100	<100
EPO80: BTEXN									
Benzene	71-43-2	Âµg /L	1		<1	<1	<1	<1	<1
Toluene	108-88-3	Âµg /L	2		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	Âµg /L	2		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	Âµg /L	2		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	Âµg /L	2		<2	<2	<2	<2	<2
Total Xylenes		Âµg /L	2		<2	<2	<2	<2	<2
Sum of BTEX		Âµg /L	1		<1	<1	<1	<1	<1
Naphthalene	91-20-3	Âµg /L	5		<5	<5	<5	<5	<5
EPO80S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	%	0.1		118	124	107	125	115
Toluene-D8	2037-26-5	%	0.1		103	106	91.9	104	89.2
4-Bromofluorobenzene	460-00-4	%	0.1		96.9	102	85.4	100	87.1

EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Âµg /L	0.02		<0.02	<0.02	<0.02	0.03	0.03
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Âµg /L	0.01		0.02	<0.01	<0.01	0.06	0.04
Perfluorodecane sulfonic acid (PFDS)	335-77-3	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	Âµg /L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	Âµg /L	0.01		<0.01	<0.01	<0.01	0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									

Perfluorooctane sulfonamide (FOSA)	754-91-6	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	Âµg /L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	Âµg /L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS		Âµg /L	0.01		0.02	<0.01	<0.01	0.1	0.07
Sum of PFHxS and PFOS	355-46-4/1763-23-1	Âµg /L	0.01		0.02	<0.01	<0.01	0.09	0.07
Sum of PFAS (WA DER List)		Âµg /L	0.01		0.02	<0.01	<0.01	0.1	0.07

C10 - C36 Fraction (sum)		Âµ g/L	50		<50	<50	<50	<50	<50
EPO80/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	Âµ g/L	20		<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	C6_C10- BTEX	Âµ g/L	20		<20	<20	<20	<20	<20
>C10 - C16 Fraction		Âµ g/L	100		<100	<100	<100	<100	<100
>C16 - C34 Fraction		Âµ g/L	100		<100	<100	<100	<100	<100
>C34 - C40 Fraction		Âµ g/L	100		<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)		Âµ g/L	100		<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)		Âµ g/L	100		<100	<100	<100	<100	<100
EPO80: BTEXN									
Benzene	71-43-2	Âµ g/L	1		<1	<1	<1	<1	<1
Toluene	108-88-3	Âµ g/L	2		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	Âµ g/L	2		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	Âµ g/L	2		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	Âµ g/L	2		<2	<2	<2	<2	<2

Total Xylenes		Âµ g/L	2		<2	<2	<2	<2	<2
Sum of BTEX		Âµ g/L	1		<1	<1	<1	<1	<1
Naphthalene	91-20-3	Âµ g/L	5		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	%	0.1		118	124	107	125	115
Toluene-D8	2037-26-5	%	0.1		103	106	91.9	104	89.2
4-Bromofluorobenzene	460-00-4	%	0.1		96.9	102	85.4	100	87.1
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Âµ g/L	0.02		<0.02	<0.02	<0.03	0.35	0.03
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Âµ g/L	0.01		0.02	<0.01	<0.01	0.06	0.04
Perfluorodecane sulfonic acid (PFDS)	335-77-3	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	Âµ g/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02

Perfluorohexanoic acid (PFHxA)	307-24-4	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	Âµ g/L	0.01		<0.01	<0.01	<0.01	0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02

N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	Âµ g/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	Âµ g/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS		Âµ g/L	0.01		0.02	<0.01	<0.01	0.1	0.07
Sum of PFHxS and PFOS	355-46-4/1763-23-1	Âµ g/L	0.01		0.02	<0.01	<0.01	0.09	0.07
Sum of PFAS (WA DER List)		Âµ g/L	0.01		0.02	<0.01	<0.01	0.1	0.07

QC - Matrix:	WATER			Sample Type:	MB	LCS	DUP	DUP	MS
Workgroup:	EW2004893			ALS Sample number:	QC-MRG2-3345138001	QC-3345137-003	QC-3345137-006	QC-MRG2-3345137019	QC-3345137-008
				Sample date:	4/11/2020	4/11/2020	30/10/2020	29/10/2020	30/10/2020
Analyte grouping/Analyte	CAS Number	Units	LOR						
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)		mg/L	5						
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	mg/L	0.001		<0.001	94.1	<0.001	<0.001	90.3
Cadmium	7440-43-9	mg/L	0.001		<0.0001	93.4	<0.0001	<0.0001	93.4
Chromium	7440-47-3	mg/L	0.001		<0.001	94.2	<0.001	<0.001	89.7
Copper	7440-50-8	mg/L	0.001		<0.001	92.6	<0.001	0.001	88.6
Lead	7439-92-1	mg/L	0.001		<0.001	92.6	<0.001	<0.001	82
Nickel	7440-02-0	mg/L	0.001		<0.001	92.4	<0.001	0.006	89.9
Zinc	7440-66-6	mg/L	0.005		<0.005	92	<0.005	0.009	91.1
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	mg/L	0.001		<0.0001				

EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N		mg/ L	0.01						
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N		mg/ L	0.1						
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P		mg/ L	0.01						
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction		µg /L	20						
C10 - C14 Fraction		µg /L	50						
C15 - C28 Fraction		µg /L	100						
C29 - C36 Fraction		µg /L	50						
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	µg /L	20						
>C10 - C16 Fraction		µg /L	100						
>C16 - C34 Fraction		µg /L	100						
>C34 - C40 Fraction		µg /L	100						
EP080: BTEXN									
Benzene	71-43-2	µg /L	1						

Toluene	108-88-3	Âµg /L	2						
Ethylbenzene	100-41-4	Âµg /L	2						
meta- & para-Xylene	108-38-3 106-42-3	Âµg /L	2						
ortho-Xylene	95-47-6	Âµg /L	2						
Naphthalene	91-20-3	Âµg /L	5						
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	%	0.1						
Toluene-D8	2037-26-5	%	0.1						
4-Bromofluorobenzene	460-00-4	%	0.1						
EP231P: PFAS Sums									
Sum of PFAS		Âµg /L	0.01						
EP231S: PFAS Surrogate									
13C4-PFOS		%	0.1						
13C8-PFOA		%	0.1						





Chemical	Trigger values for freshwater (µg/L <sup>-1</sup> )				Trigger values for marine water (µg/L <sup>-1</sup> )			
	Level of protection (% species)							
	99%	95%	90%	80%	99%	95%	90%	80%
Hexazinone	ID	ID	ID	ID	ID	ID	ID	ID
Simazine	0.2	3.2	11	35	ID	ID	ID	ID
<b>Urea herbicides</b>								
Diuron	ID	ID	ID	ID	ID	ID	ID	ID
Tebuthiuron	0.02	2.2	20	160 <sup>C</sup>	ID	ID	ID	ID
<b>Miscellaneous herbicides</b>								
Acrolein	ID	ID	ID	ID	ID	ID	ID	ID
Bromacil	ID	ID	ID	ID	ID	ID	ID	ID
Glyphosate	370	1200	2000	3600 <sup>A</sup>	ID	ID	ID	ID
Imazethapyr	ID	ID	ID	ID	ID	ID	ID	ID
loxynil	ID	ID	ID	ID	ID	ID	ID	ID
Metolachlor	ID	ID	ID	ID	ID	ID	ID	ID
Sethoxydim	ID	ID	ID	ID	ID	ID	ID	ID
Trifluralin	B	2.6	4.4	6	9 <sup>A</sup>	ID	ID	ID
<b>GENERIC GROUPS OF CHEMICALS</b>								
<b>Surfactants</b>								
Linear alkylbenzene sulfonates (LAS)	65	280	520 <sup>C</sup>	1000 <sup>C</sup>	ID	ID	ID	ID
Alcohol ethoxylated sulfate (AES)	340	650	850 <sup>C</sup>	1100 <sup>C</sup>	ID	ID	ID	ID
Alcohol ethoxylated surfactants (AE)	50	140	220	360 <sup>C</sup>	ID	ID	ID	ID
<b>Oils &amp; Petroleum Hydrocarbons</b>								
<b>Oil Spill Dispersants</b>								
BP 1100X	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 7664	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 8667		ID	ID	ID	ID	ID	ID	ID
Corexit 9527	ID	ID	ID	ID	230	1100	2200	4400 <sup>A</sup>
Corexit 9550	ID	ID	ID	ID	ID	ID	ID	ID

**Notes:** Where the final water quality guideline to be applied to a site is below current analytical practical quantitation limits, see Section 3.4.3.3 for guidance.

Most trigger values listed here for metals and metalloids are High reliability figures, derived from field or chronic NOEC data (see 3.4.2.3 for reference to Volume 2). The exceptions are Moderate reliability for freshwater aluminium (pH >6.5), manganese and marine chromium (III).

Most trigger values listed here for non-metallic inorganics and organic chemicals are Moderate reliability figures, derived from acute LC<sub>50</sub> data (see 3.4.2.3 for reference to Volume 2). The exceptions are High reliability for freshwater ammonia, 3,4-DCA, endosulfan, chlorpyrifos, esfenvalerate, tebutiuron, three surfactants and marine for 1,1,2-TCE and chlorpyrifos.

<sup>\*</sup> = High reliability figure for esfenvalerate derived from mesocosm NOEC data (no alternative protection levels available).

A = Figure may not protect key test species from acute toxicity (and chronic) — check Section 8.3.7 for spread of data and its significance. 'A' indicates that trigger value > acute toxicity figure; note that trigger value should be <1/3 of acute figure (Section 8.3.4.4).

B = Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered (see Sections 8.3.3.4 and 8.3.5.7).

C = Figure may not protect key test species from chronic toxicity (this refers to experimental chronic figures or geometric mean for species) — check Section 8.3.7 for spread of data and its significance. Where grey shading and 'C' coincide, refer to text in Section 8.3.7.

D = Ammonia as TOTAL ammonia as [NH<sub>3</sub>-N] at pH 8. For changes in trigger value with pH refer to Section 8.3.7.2.

E = Chlorine as total chlorine, as [Cl]; see Section 8.3.7.2.

F = Cyanide as un-ionised HCN, measured as [CN]; see Section 8.3.7.2.

G = Sulfide as un-ionised H<sub>2</sub>S, measured as [S]; see Section 8.3.7.2.

H = Chemicals for which algorithms have been provided in table 3.4.3 to account for the effects of hardness. The values have been calculated using a hardness of 30 mg/L CaCO<sub>3</sub>. These should be adjusted to the site-specific hardness (see Section 3.4.3).

J = Figures protect against toxicity and do not relate to eutrophication issues. Refer to Section 3.3 if eutrophication is the issue of concern.

ID = Insufficient data to derive a reliable trigger value. Users advised to check if a low reliability value or an ECL is given in Section 8.3.7.

T = Tainting or flavour impairment of fish flesh may possibly occur at concentrations below the trigger value. See Sections 4.4.5.3/3 and 8.3.7.

*Table 5. Ecological water quality guideline values developed by water regulators*

Exposure scenario	PFOS	PFOA	Exposure scenario	Comments and source
Freshwater	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	Australian and New Zealand Guidelines for Fresh and Marine Water Quality - technical draft default guideline values for PFOS and PFOA.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	Note 1: The 99% species protection level for PFOS is close to the level of detection. Agencies may wish to apply a 'detect' threshold in such circumstances rather than a quantified measurement.
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	Note 2: The draft guidelines do not account for effects which result from the biomagnification of toxicants in air-breathing animals or in animals which prey on aquatic organisms.
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	Note 3: The WQGs advise <sup>41</sup> that the 99% level of protection be used for slightly to moderately disturbed systems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. Regulators may specify or environmental legislation may prescribe the level of species protection required, rather than allowing for case-by-case assessments.
Interim marine	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	As above. Freshwater values are to be used on an interim basis until final marine guideline values can be set using the nationally-agreed process under the Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	Note 1: The WQG advise that in the case of estuaries, the most stringent of freshwater and marine criteria apply, taking account of any available salinity correction.
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	Note 2: Marine guideline values developed by CRC CARE are under consideration through the nationally-agreed water quality guideline development process.
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	

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**Maintenance Log Book DEFECTS Summary Only December 2020**

Scope Origin: SIOMP Table 3.5																
				Month Action Carried Out												
Focus	Area/Location	Timing	Responsibility		1	2	3	4	5	6	7	8	9	10	11	12
Quarterly Inspection	The entire Facility	Three monthly	Maintenance contractor	Work												
				Invoice												
Infrastructure Inspection	The entire Facility	Following a major rainfall or storm event (i.e. greater than 100mm over 40 hour)	Maintenance contractor	Work												
Precise Work Zone, Site Ref.		Complete MLP East Precinct 400 Moorebank Ave Moorebank Refer Drawing No. PREC-RCG-AR														
Scheduled Service Date		October 2020 Quarterly Service.														
Date Works Completed		16/10/20														
Date Client Notified of Works Status		23/10/20														
Date Photos emailed to client		23/10/20														
Quote for Additional Works Y/N		Yes														
Quote Ref No.		E12621MC														

		Service Frequency	
SW-07	Gross Pollutant Traps (Rocla CDS Units)	Annually/and Additionally After Major Storm	July 2020
ID	Mgmt Measure	Maintenance Action	Outcome/Results
SW-07	Refer manufacturers Operation & Maintenance Manual	Refer manufacturers Operation & Maintenance Manual	Sludge & Debris removed and disposed from site in accordance with Manufacturers guidelines.
Precise Work Zone, Site Ref.	MLP East Precinct GPTs 1-5. Refer Drawing No. PREC-RCG-AR		
Scheduled Service Date	July 2020		
Date Works Completed	27/7/20		
Date Client Notified of Works Status	31/7/20		
Date Photos emailed to client. Defects Identified/Provide supporting documentation and photographic evidence	31/7/20		
Quote for Additional Works Y/N	Yes		
Quote Ref No.	E12621MC		
<b>Comments:</b> <b>Penstock spill valve to be installed as per Qube requirements.</b> <b>The Penstock valve will need to be included in service procedures following installation.</b> <b>GPT No`s 1 &amp; 2 are approximately 6 metres deep and contain construction formwork at the base which could not be removed during scheduled procedures.</b> <b>Quotation to be supplied for confined space retrieval of waste.</b>			

Focus/Item SIOMP Reference		Service Frequency	
SW-15	Internal Drainage System	6 Monthly	July 2020
ID	Mgmt Measure	Maintenance Action	Outcome/Results
SW-15	General inspection of complete stormwater drain system	Inspect all drainage structures noting any dilapidation in structures and report on required repairs	
Precise Work Zone, Site Ref.		Complete MLP East Precinct 400 Moorebank Ave Moorebank Refer Drawing No. PREC-RCG-AR	
Scheduled Service Date		July 2020	
Date Works Completed		31/7/20	
Date Client Notified of Works Status		Yes	
Date Photos emailed to client. Defects Identified/Provide supporting documentation and photographic evidence		31/7/20	
Quote for Additional Works Y/N		Yes	
Quote Ref No.		E12621MC	
<p><b>Comments: Removed all debris from pits, pipes, channel drains and adjacent kerb &amp; gutters. Additional works required within the Target hardstand areas to remove concrete from internal pit areas, and grates, Additional grouting recommended at pipe penetration to pits in main warehouse driveway. Refer photos and quotation.</b></p>			

Focus/Item SIOMP Reference		Service Frequency	
SW-31	On Site Detention	6 Monthly	July 2020
ID	Mgmt Measure	Maintenance Action	Outcome/Results
SW-31	Check condition of vegetation is satisfactory (density, weeds, watering, replanting, pruning, mowing/slashing etc.)	Replant and/or fertilize weed and water in accordance with landscape consultant specifications	
Precise Work Zone, Site Ref.		Complete MLP East Precinct 400 Moorebank Ave Moorebank Refer Drawing No. PREC-RCG-AR	
Scheduled Service Date		July 2020	
Date Works Completed		31/7/20	
Date Client Notified of Works Status		Yes	
Date Photos emailed to client. Defects Identified/Provide supporting documentation and photographic evidence		31/7/20 <b>Refer to additional detail in the attached Apical report.</b>	
Quote for Additional Works Y/N		Yes	
Quote Ref No.		SIOMP Defect No E12621MC-6	
<b>Comments:</b> Area within OSD-01 and immediate surrounds has low density of sedge plants, additional planting recommended, refer Defect E12621MC-6			

MLP East Precinct 400 Moorebank Ave Moorebank SIOMP References.



Photo showing concrete formwork in the base of GPT No.1 & 2

GPT No 1 North East Target to be carried out by Fulton Hogan as advised by Cathal McGann Tactical 2/12/20

Refer Quote E12621MC-1 for Defect Rectification.



**Photo below showing Rocla access pit lid adjacent GPT No.1 has been covered over and is not accessible. Refer defect summary.**

**Refer Quote E12621MC-2 for Defect Rectification.**



Target Warehouse Driveway North Side, Galvanised grate is locked in from concrete residue.

Refer Quote E12621MC-3 for Defect Rectification.



Photo showing Concrete overspill to be removed.

Refer Quote E12621MC-4 for Defect Rectification.



Target Warehouse Driveway, additional works recommended at pipe penetrations to pit wall.

Refer Quote E12621MC-5 for Defect Rectification.



# Biannual Trip Origin Destination Report

Moorebank Precinct East

Ref: 1065r01v1  
15/02/2021

[Info@asongroup.com.au](mailto:Info@asongroup.com.au) | +61 2 9083 6601 | Suite 5.02, Level 5, 1 Castlereagh Street, Sydney, NSW, 2000

## Document Control

**Project No:** P1065r01

**Project:** Moorebank Precinct East

**Client:** Qube Property Management Services Pty Limited

**File Reference:** 1065r01v1\_Biannual Trip Origin Destination Report, MPE

## Revision History

Revision	Date	Details	Author	Approved by
-	03/02/2021	Draft	S. Hu / J. Laidler	P. Trethewey
1	15/02/2021	Issue I	J. Laidler	J. Laidler

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## Table of Contents

<b>1</b>	<b>INTRODUCTION.....</b>	<b>3</b>
1.1	INTRODUCTION.....	3
1.2	PURPOSE .....	4
1.3	SCOPE .....	4
1.4	PERIOD OF REPORT .....	4
<b>2</b>	<b>SHIPPING CONTAINER TRANSPORT .....</b>	<b>6</b>
<b>3</b>	<b>TRUCK GATE OPENING PERIODS .....</b>	<b>7</b>
3.1	PERIOD OF OPENING .....	7
3.2	EXCEPTIONS TO FULL TIME OPENING .....	7
3.3	ACTUAL HOURS OF OPENING .....	7
<b>4</b>	<b>TRAFFIC VOLUMES .....</b>	<b>8</b>
4.1	MPE MAIN ACCESS.....	8
4.2	MPE INDIVIDUAL WAREHOUSING FACILITIES.....	8
<b>5</b>	<b>ORIGIN-DESTINATION RESULTS.....</b>	<b>10</b>
<b>6</b>	<b>EMPLOYEE NUMBERS .....</b>	<b>16</b>
<b>7</b>	<b>SUMMARY .....</b>	<b>17</b>

## Appendices

Appendix A: BTODR Framework Report

## Glossary

Abbreviation	Description
BTODR	Biannual Trip Origin Destination Report
GFA	Gross Floor Area
IMEX	IMEX (Import-Export) Intermodal Terminal
MLP	Moorebank Logistics Park
MPE	Moorebank Precinct East
OD	Origin - Destination
QUBE	Qube Property Management Services Pty Limited
RMS	Roads & Maritime Services
SSD	State Significant Development
TA	Transport Assessment
TEU	Twenty Foot Equivalent Units
TfNSW	Transport for New South Wales

## Reference Documents

Abbreviation	Document
BTODR Framework Report	Moorebank Precinct East -Biannual Trip Origin Destination Report Framework for Data Collection and Reporting, (Arcadis, August 2019)
MPE Stage 1 - TAIA	SIMTA Intermodal Terminal Facility Stage 1 Traffic & Accessibility Impact Assessment (Hyder Consulting, March 2015)
MPE Stage 2 - OTTIA	Moorebank Precinct East Stage 2 Proposal - Operational Traffic and Transport Impact Assessment (Arcadis, December 2016)
MPE Stage 2 – RTS	Moorebank Precinct East Stage 2 Proposal – Response to Submission - Appendix C3: Consolidated Traffic Table (Arcadis, July 2017)
OPR June 2020	Operations performance Report, Rolling Quarterly Update – Quarter Ending June 2020 (Qube, June 2020)
OPR October 2020	Operations performance Report, Rolling Quarterly Update – Quarter Ending October 2020 (Qube, October 2020)

# 1 Introduction

## 1.1 Introduction

Ason Group has been commissioned by Qube Property Management Services Pty Limited to prepare an initial BTODR for MPE (including IMEX), as outlined within the development consents SSD 7628 and SSD 6766. This report has been prepared following Condition B28 of SSD 7628, which outlines;

**Condition B28.** *The Applicant is to prepare a Biannual Trip Origin and Destination Report each six months following commencement of any operation (in a format agreed with TfNSW and RMS) that advises:*

- a) *the number of actual and standard twenty foot equivalent shipping containers despatched and received during the period;*
- b) *the number of days in the period that the truck gate was open for despatching trucks 24 hours a day, 7 days a week and detail any exceptions to this and advise actual hours of operation;*
- c) *records of vehicle numbers accessing the site; and*
- d) *representative vehicle origins and destinations, based on a cordon in the surrounding network.*

*A framework for recording and reporting on the data required for the report, prepared to the satisfaction of TfNSW and RMS, is to be submitted to the Secretary three months prior to the commencement of operation.*

*The report is to be submitted within one month of its preparation throughout operation of the project, starting six months from the commencement of operation, unless otherwise agreed by the Secretary, TfNSW and RMS.*

*The cordon count at (d) above will:*

- *apply to all classes of vehicles; and*
- *cover the intermodal terminal, the warehousing facility and any other uses such as the freight village.*

As such, this report has been prepared on the basis of a review of the documentation provided and relevant publicly available documentation associated with the staged redevelopment of the MPE. Additionally, the reference BTODR Framework report (within Appendix A) forms the basis and format of this report and has been prepared to the satisfaction of transport for NSW.

The BTODR is a document ultimately intended for when MPE is fully operational. Currently MPE has a mixture of lots where warehouses are operational, under construction, or where construction has not fully commenced, therefore there are challenges to collect the full extent of data envisaged at this stage. Accordingly, this BTODR has been compiled on the basis of the data available at this time, with a view to achieving as best as possible the objectives of the BTODR.

## 1.2 Purpose

This BTODR addresses the relevant requirements of the Project Approvals, and other guidelines and standards applicable during operations of MPE. The BTODR is proposed to keep an accurate record of the shipping containers and vehicle arrivals / departures against approved volumes.

## 1.3 Scope

For the purpose of the BTODR, the scope of this report shall include:

- Review of the number of twenty-foot equivalent shipping containers dispatched and received during this time period.
- Review the number of days in the period that the truck gate was open for despatching trucks and detail any exceptions to the actual hours of operation.
- Record the number of vehicles accessing MPE.
- Outline the vehicle origin and destinations based on a cordon in the surrounding road network.
- Comment on the employee numbers at MPE.

With respect to the OD data, this report has assumed the selected cordons (as outlined within **Figure 1**) will apply to all classes of vehicles while also covering the IMEX, warehousing facilities and any other uses such as the freight village.

## 1.4 Period of Reporting

As mentioned above, the main objective of the BTODR is to report on traffic when MPE is completed and fully operational. At this stage, MPE is only partially operational and has a number of areas within the Site that are under construction.

**Table 1: Breakdown of Operational Status within MPE**

Tenanted Area	Operational
IMEX	Yes - Partially
WH 1	Yes
WH 3A	Yes
WH 3B	No
WH 4A	No
WH 4B	Yes
WH 5	No
WH 6	No
WH 7	No
WH 8	No
WH 49	Yes
WH 51/52	Yes
WH 53	Yes
WH54	Yes

Furthermore, some key functions of the Site were not fully operational throughout the reporting period, therefore these timings do not directly align with the requirements outlined within BTODR Framework report.

Accordingly, the reporting periods assessed by this BTODR – based on available data – are outlined below:

- Shipping Container Transport: 1 May 2020 – 31 October 2020
- Truck Gate opening period: 1 May 2020 – 31 October 2020
- Traffic Volumes: 26 August 2020 – 5 September 2020 &  
9 November 2020 – 14 November 2020
- Origin / Destination Numbers: 9 November 2020 – 14 November 2020
- Employee Numbers: 1 May 2020 – 31 October 2020

## 2 Shipping Container Transport

This section provides the total number of actual TEUs dispatched and received during the reporting period. The analysis is based on the operational data from logistical schedules.

The information outlined below has been extracted from the Operations performance Report, Rolling Quarterly Update – Quarter Ending June 2020 (OPR June 2020) and Operations performance Report, Rolling Quarterly Update – Quarter Ending October 2020 (OPR October 2020).

**Table 1** presents the total TEUs received and dispatched from the IMEX terminal. It should be noted that the OPR June 2020 and OPR October 2020 reports outline that between August and October, no containers left the Site by truck.

**Table 2: Shipping Container Transport**

Reporting Period	Month	Total Containers received / dispatched	Cumulative total for period
Period 1	May-2020	1,377	1,377
	Jun-2020	196	1,573
	Jul-2020	4	1,577
	Aug-2020	0	1,577
	Sep-2020	0	1,577
	Oct-2020	0	1,577

## 3 Truck Gate Opening Periods

### 3.1 Period of Opening

The BTODR Framework requires reporting on the number of days in a specific period that the truck gate was operational. In this instance, the period of time where the gate was operation has been outlined below.

**Table 3: Period of Opening**

Reporting Period	Period of Opening
Period 1 2020	1 May 2020 – 31 October 2020

### 3.2 Exceptions to Full Time Opening

Further to the above, the BTODR Framework requires reporting on any periods when the gates were not open. In response, there was a period of time between late-July 2020 and October 2020 where no containers left IMEX by truck, and therefore it is understood that the gates were closed during this period.

**Table 4: Truck Gate Opening Period Exceptions.**

Reporting Period	Period of closure	Reason for closure
Period 1 2020	Late July - October 2020	No containers left from IMEX Terminal

### 3.3 Actual Hours of Opening

At present, the general truck gate daily opening times are outlined below.

- Monday – Friday: 7:00am – 3:00pm
- Saturday & Sunday: Closed

## 4 Traffic Volumes

### 4.1 MPE Main Access

Traffic data has been collected to identify the volumes of light and heavy vehicles accessing MPE from the current main access on Moorebank Avenue. **Table 5** summarises the average daily volumes from the data collected.

**Table 5: Average Daily Traffic Volumes**

Reporting Period	Reporting Dates	Vehicles In		Vehicles Out	
		Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Period 1 2020	26-Aug-20 - 05 Sep 20	962	190	1,121	248

### 4.2 MPE Individual Warehousing Facilities

Warehouses within MPE will not be gated (in the same manner as IMEX), therefore data on individual warehouses have been collected separately. This data has been collected to record the number of vehicles entering and exiting each warehouse; these results are presented below.

#### 4.2.1 Warehouse 1: Target Warehouse

Internal access to and from Warehouse 1 (Target Warehouse) is outlined below within **Table 6**.

**Table 6: Warehouse 1 – Average Daily Traffic Volumes**

Reporting Period	Reporting Dates	Vehicles In		Vehicles Out	
		Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Period 1 2020	8 – 14 Nov 2020	846	146	828	145

#### 4.2.2 Warehouse 3A: Caesarstone Warehouse

Internal access to and from Warehouse 3A (Caesarstone Warehouse) is outlined below within **Table 7**

**Table 7: Warehouse 3A – Average Daily Traffic Volumes**

Reporting Period	Reporting Dates	Vehicles In		Vehicles Out	
		Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Period 1 2020	8 – 14 Nov 2020	378	38	369	38

#### 4.2.3 Warehouse 4B

Internal access to and from Warehouse 4B is outlined below within **Table 8**

**Table 8: Warehouse 4B – Average Daily Traffic Volumes**

Reporting Period	Reporting Dates	Vehicles In		Vehicles Out	
		Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Period 1 2020	8 – 14 Nov 2020	376	18	377	18

## 5 Origin-Destination Results

OD surveys have been undertaken to understand the distribution of MPE traffic on the surrounding road network. To meet the requirements of the BTODR, the OD surveys have recorded traffic volumes across an 18-hour period (05.00AM – 11.00PM), with the locations of the survey and corresponding gate numbers presented on **Figure 1** and outlined below.

**Table 9: OD Survey Gates**

Gate Number	Gate Location
OD1	Moorebank Avenue, about 350metres north of the M5 South Western Motorway
OD2	Westbound off-ramp of M5 Interchange
OD3	Eastbound on-ramp of M5 Interchange
OD4	Westbound on-ramp of M5 Interchange
OD5	Eastbound off-ramp of M5 Interchange
OD6	Moorebank Avenue, about 300metres south of the M5 South Western Motorway
OD7	Anzac Road
OD8	Defense Joint Logistics Access
OD9	IMEX/MPE Main Access
OD10	Cambridge Avenue
OD11	Moorebank Avenue, south of Cambridge Avenue

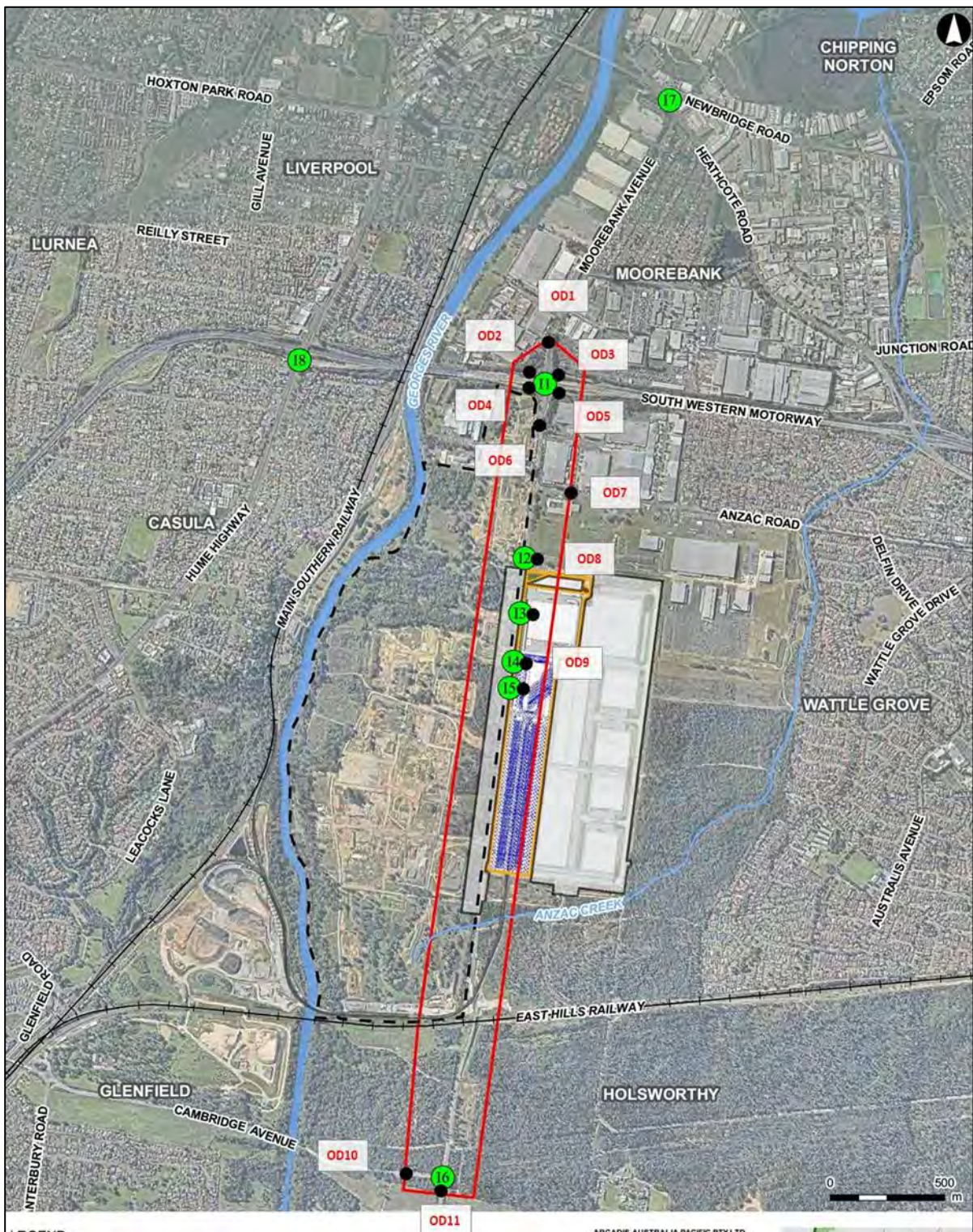


Figure 1: Origin / Destination Gates

The data of the OD surveys have been collated and is presented on the following tables for the relevant vehicle classes, as well as graphically on the following figures.

Table 10: Average OD Movements – All Vehicles (05:00AM – 11:00PM)

From Station	To Station											Total
	1	2	3	4	5	6	7	8	9	10	11	
1	0	0	388	10,510	0	2,428	965	37	128	1,017	29	15,502
2	13,422	0	0	378	0	4,364	1,789	138	353	1,656	98	22,197
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	1,744	0	1,744	0	0	2,840	995	56	158	1,141	44	8,723
6	2,978	0	2,819	3,640	0	0	3,996	328	802	3,978	244	18,786
7	1,259	0	1,070	1,563	0	3,881	0	0	40	1,115	0	8,928
8	33	0	114	168	0	315	3	0	6	128	1	768
9	152	0	305	390	0	825	0	0	0	111	0	1,784
10	874	0	2,570	1,640	0	5,076	1,759	127	5	0	455	12,505
11	53	0	221	252	0	525	20	1	0	452	0	1,524
<b>Total</b>	<b>20,515</b>	<b>0</b>	<b>9,230</b>	<b>18,541</b>	<b>0</b>	<b>20,254</b>	<b>9,528</b>	<b>687</b>	<b>1,491</b>	<b>9,599</b>	<b>871</b>	<b>90,717</b>

Below is a visual representation of the OD Movements within Table 10.

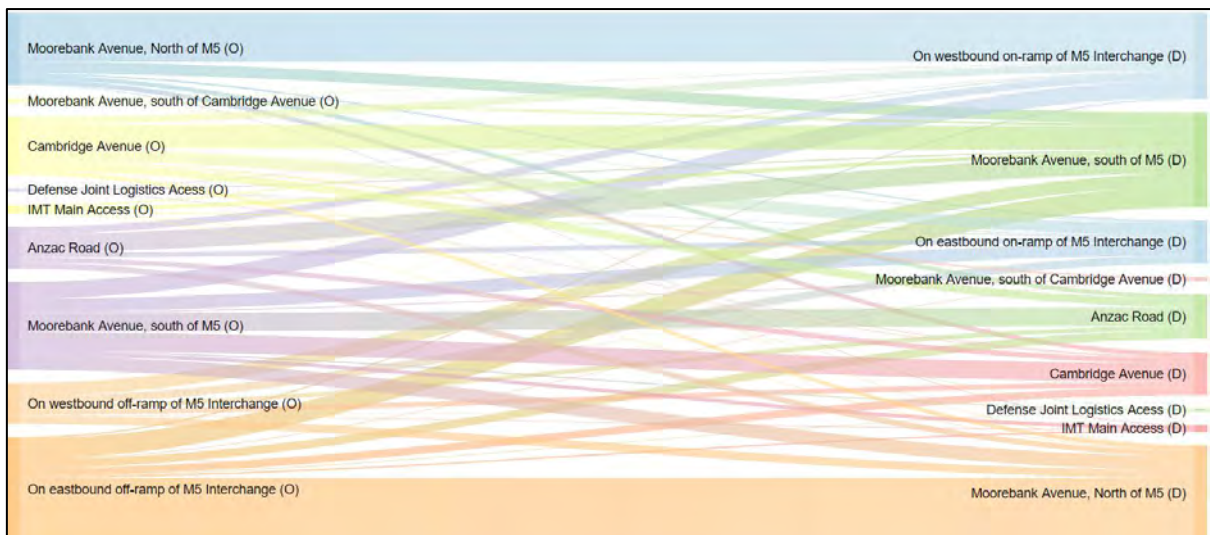


Figure 2: Visual of Average OD Movements - All Vehicles (05:00AM – 11:00PM)

Table 11: Average OD Movements – Light Vehicles (05:00AM – 11:00PM)

From Station	To Station											Total
	1	2	3	4	5	6	7	8	9	10	11	
1	0	0	278	9,220	0	2,193	947	36	81	952	25	13,732
2	12,125	0	0	345	0	3,967	1,764	136	233	1,584	92	20,245
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	1,605	0	1,605	0	0	2,486	982	54	104	1,061	40	7,938
6	2,759	0	2,469	3,220	0	0	3,890	297	494	3,704	215	17,047
7	1,198	0	1,049	1,476	0	3,723	0	0	40	1,083	0	8,570
8	33	0	109	147	0	289	1	0	6	116	0	702
9	92	0	205	235	0	523	0	0	0	66	0	1,121
10	850	0	2,548	1,606	0	5,004	1,571	117	4	0	450	12,151
11	36	0	138	148	0	322	20	1	0	444	0	1,110
<b>Total</b>	18,699	0	8,402	16,397	0	18,506	9,176	641	962	9,011	822	82,616

Below is a visual representation of the OD Movements within Table 11.

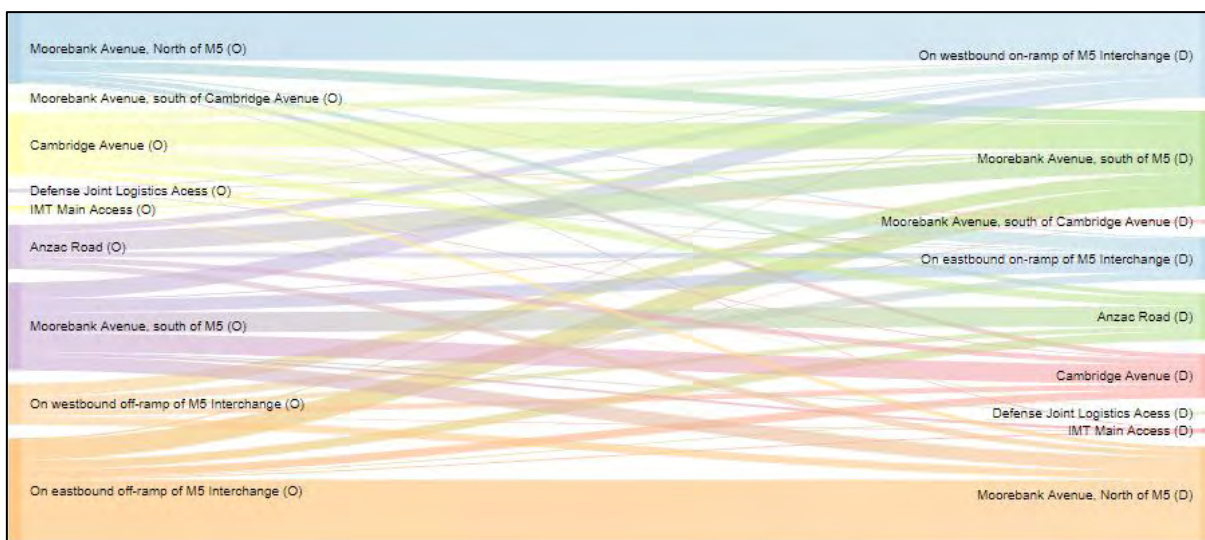


Figure 3: Visual of Average OD Movements - Light Vehicles (05:00AM – 11:00PM)

Table 12: Average OD Movements – Rigid Heavy Vehicles (05:00AM – 11:00PM)

From Station	To Station											Total
	1	2	3	4	5	6	7	8	9	10	11	
1	0	0	77	858	0	209	18	1	41	64	4	1,272
2	940	0	0	27	0	244	25	1	59	67	6	1,370
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	107	0	107	0	0	221	13	1	38	73	4	562
6	197	0	227	293	0	0	106	26	201	261	29	1,339
7	59	0	20	81	0	151	0	0	0	30	0	342
8	0	0	4	17	0	21	1	0	0	11	1	55
9	47	0	53	89	0	182	0	0	0	44	0	415
10	23	0	20	30	0	66	158	9	0	0	5	312
11	15	0	71	86	0	172	0	0	0	9	0	353
<b>Total</b>	<b>1,388</b>	<b>0</b>	<b>578</b>	<b>1,482</b>	<b>0</b>	<b>1,265</b>	<b>320</b>	<b>39</b>	<b>339</b>	<b>559</b>	<b>49</b>	<b>6,018</b>

Below is a visual representation of the OD Movements within Table 12.

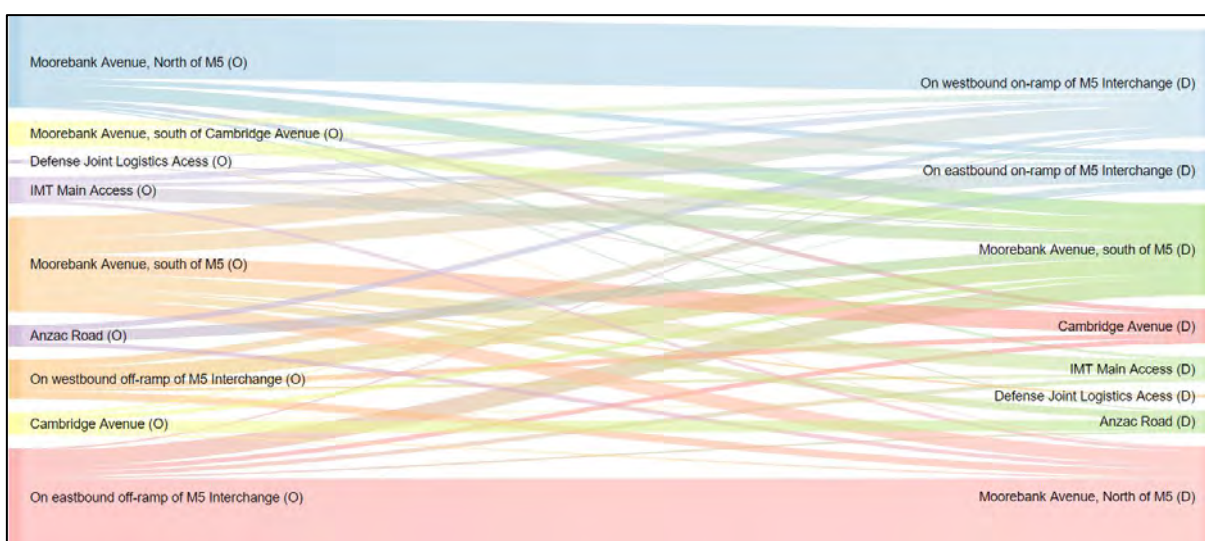


Figure 4: Visual of Average OD Movements – Rigid Heavy Vehicles (05:00AM – 11:00PM)

Table 13: Average OD Movements – Articulated Heavy Vehicles (05:00AM – 11:00PM)

From Station	To Station											Total
	1	2	3	4	5	6	7	8	9	10	11	
1	0	0	33	432	0	27	0	0	6	1	0	498
2	357	0	0	5	0	154	0	1	61	4	0	582
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	32	0	32	0	0	134	0	0	17	7	0	223
6	21	0	124	128	0	0	1	6	107	14	0	401
7	3	0	1	6	0	7	0	0	0	1	0	16
8	0	0	1	4	0	5	1	0	0	1	0	11
9	13	0	47	66	0	121	0	0	0	1	0	248
10	1	0	2	3	0	6	30	0	0	0	0	42
11	1	0	11	19	0	31	0	0	0	0	0	62
<b>Total</b>	<b>428</b>	<b>0</b>	<b>251</b>	<b>662</b>	<b>0</b>	<b>483</b>	<b>32</b>	<b>7</b>	<b>190</b>	<b>29</b>	<b>1</b>	<b>2,083</b>

Below is a visual representation of the OD Movements within Table 13.

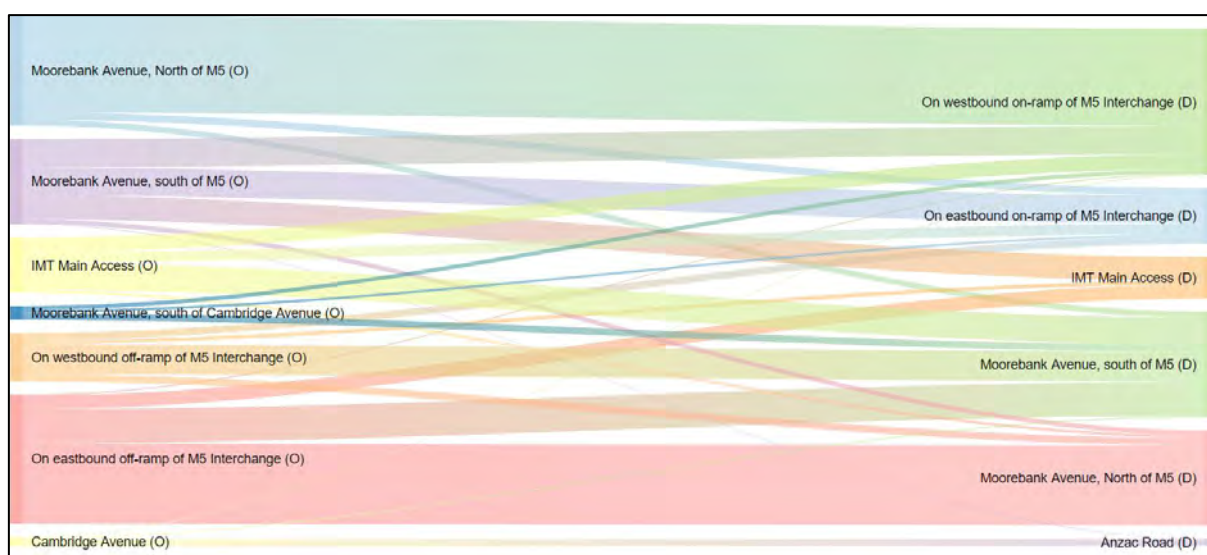


Figure 5: Visual of Average OD Movements – Articulated Heavy Vehicles (05:00AM – 11:00PM)

## 6 Employee Numbers

To corroborate data provided within the Workplace Travel Plan and minimise the need for additional reporting, **Table 14** presents relevant information on employee numbers for each of the sub-area's within MPE.

**Table 14: Employee Numbers**

Reporting Period	Month	IMEX	Rail Link	Tenanted Area	
Period 1 (2020)	01-May-20 to 31-Oct-20	5	33	WH 1	129
				WH 3A	26
				WH 4B	26
				WH 49	-
				WH 51/52	18
				WH 53	12
				WH54	3

Note: No response received regarding Warehouse 49

## 7 Summary

The data provided within this report has been collected in accordance with the BTODR Framework report and enables a comparative assessment of traffic accessing the Site and future growth in operational activities.

All data is a fair and accurate representation of the operational traffic for MPE and its surrounding road network. This data has been collected for the reporting period between 1 May 2020 and 31 October 2020.

## Appendix A

### BTODR Framework Report

# MOOREBANK PRECINCT EAST - BIANNUAL TRIP ORIGIN DESTINATION REPORT

Framework for Data Collection and Reporting

27 AUGUST 2019





## CONTACT



**NICOLE VUKIC**  
Manager Transport Planning  
and Traffic Engineering

T +61 2 8907 3932

M +61 417 233 935

E [Nicole.Vukic@arcadis.com](mailto:Nicole.Vukic@arcadis.com)

Arcadis

Level 16, 580 George Street  
Sydney NSW 2000

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# QUBE

## MOOREBANK PRECINCT EAST - BIENNIAL TRIP ORIGIN DESTINATION REPORT

Framework for Data Collection and Reporting

**Author** Jerry Xiang

**Checker** Nicole Vukic

**Approver** Ketan Patel

**Report No** PREC-ARC-TR-RPT-0001

**Date** 27/08/2019

**Revision Text** 008

This report has been prepared for Qube in accordance with the terms and conditions of appointment for Moorebank Precinct East dated 7 October 2016. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

### REVISIONS

Revision	Date	Description	Prepared by	Approved by
001	28/11/18	Issued for client review	JX	NV
002	13/03/19	Revised and issued for client review	NV	KP
003	5/06/19	Revised to address agency comment	NV	NV
004	14/06/19	Revised to address further agency comment	MWR	KP
005	28/06/19	Revised to address further agency comments	KP	NV
006	29/07/19	Revised to address further agency comments	NV	KP
007	15/08/19	Consultation table updated to close out agency comments	MWR	JC

Revision	Date	Description	Prepared by	Approved by
008	27/08/19	Updated to close out RMS consultation	NV	AL

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# CONTENTS

<b>1 INTRODUCTION</b> .....	<b>1</b>
1.1 Background.....	1
1.1 Scope and Purpose.....	1
1.2 Consultation.....	3
<b>2 PROJECT DESCRIPTION</b> .....	<b>6</b>
2.1 Site Location.....	6
2.2 Site Operations.....	6
2.3 Heavy Vehicle Access Routes.....	6
<b>3 REPORTING FRAMEWORK</b> .....	<b>9</b>
3.1 Frequency of Reporting.....	9
3.2 Report Structure.....	9
3.3 Process.....	11
<b>4 ROLES AND RESPONSIBILITIES</b> .....	<b>12</b>
<b>5 DATA COLLECTION FRAMEWORK</b> .....	<b>14</b>
5.1 Data Collection Scope and Methodology.....	14
5.2 Using the Data in the Report.....	18
<b>APPENDIX A REPORTING TABLE TEMPLATES</b> .....	<b>1</b>
<b>APPENDIX B EVIDENCE OF CONSULTATION</b> .....	<b>1</b>

## LIST OF TABLES

Table 1-1: CoCs of SSD 7628 (MPE Stage 2).....	1
Table 1-2: CoCs of SSD 6766 (MPE Stage 1).....	2
Table 1-3: Consultation Summary.....	3
Table 3-1: Report Outline and Structure.....	9
Table 4-1: Key roles and responsibilities.....	12

## LIST OF FIGURES

Figure 2-1: Site location and local context.....	7
Figure 2-2: Heavy vehicle access routes to MPE site.....	8
Figure 3-1: Biannual trip origin destination reporting process.....	11
Figure 4-1: Key roles for MLP East Precinct.....	12
Figure 5-1 Survey locations.....	17

## ACRONYMS AND DEFINITIONS

Acronym	Meaning
CoC	Conditions of Consent
DJLU	Defence Joint Logistics Unit
DP&E	Department of Planning and Environment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
IMEX	Import-Export
MLP	Moorebank Logistics Park
MPE	Moorebank Precinct East
MPW	Moorebank Precinct West
RFID	Radio-Frequency Identification
RMS	Roads and Maritime Services
Secretary	Secretary under the EP&A Act, or nominee
SIMTA	Sydney Intermodal Terminal Alliance
SSD	State Significant Development
TfNSW	Transport for New South Wales
the Moorebank Precinct	Moorebank Intermodal Precinct

# 1 INTRODUCTION

## 1.1 Background.

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 2 of the MPE Project (SSD 7628), which together comprises the second stage of development under the MPE Concept Consent (MP10\_0193). Operations are due to commence in April 2018.

This Biannual Trip Origin and Destination Report addresses the relevant requirements of the Project Approvals, including the Environmental Impact Statement (EIS), Revised Statement of Commitments (RSoC), Response to Submissions (RtS) and Minister’s Conditions of Consent (CoC), and guidelines and standards applicable during operations of the MLP East Precinct.

## 1.1 Scope and Purpose

Condition of Consent (CoC) B28 of SSD 7628 requires that a *Biannual Trip Origin and Destination Report* is prepared. Table 1-1 and Table 1-2 details the applicable CoC.

Table 1-1: CoCs of SSD 7628 (MPE Stage 2)

CoC	Requirement	Document Reference
<b>Primary Conditions</b>		
B28	The Applicant is to prepare a Biannual Trip Origin and Destination Report each six months following the commencement of any operation (in a format agreed with TfNSW and RMS) that advises:	
	a. the number of actual and standard twenty-foot equivalent shipping containers despatched and received during the period;	Section 3 Section 5
	b. the number of days in the period that the truck gate was open for despatching trucks 24 hours a day, 7 days a week and detail and exceptions to this and advise actual hours of operation;	Section 3 Section 5 Note that there is no truck gate at the warehouse entrance however a truck gate is in operation at the IMEX entrance where truck numbers will be monitored.
	c. records of vehicle numbers accessing the site; and	Section 5
	d. representative vehicle origin and destinations, based on a cordon in the surrounding network.	Section 5
	<b>A framework for recording and reporting on the data required for the report, prepared to the satisfaction of TfNSW and RMS, is to be submitted to the Secretary three months prior to the commencement of operation.</b>	This document provides a framework for recording and reporting on the data required for the <i>Biannual Trip Origin and Destination Report</i>

CoC	Requirement	Document Reference
	<p>The report is to be submitted within one month of its preparation throughout operation of the project, starting six months from the commencement of operation, unless otherwise agreed by the Secretary, TfNSW and RMS.</p> <p>The cordon count at (d) above will:</p> <ul style="list-style-type: none"> <li>• apply to all classes of vehicles; and</li> <li>• cover the intermodal terminal, the warehousing facility and any other uses such as the freight village.</li> </ul>	Section 3.1
<b>Secondary Conditions</b>		
B89	<p>Heavy road freight vehicles are not permitted to use Moorebank Avenue south of the East Hills Railway corridor. A main gate monitoring system (eg CCTV) shall be installed to identify heavy vehicles turning left from the terminal site onto Moorebank Avenue, or turning right from Moorebank Avenue to the terminal site. The Secretary may at any time request the Applicant to provide a heavy vehicle monitoring report for the prior 12 month period.</p>	Section 2.3

Table 1-2: CoCs of SSD 6766 (MPE Stage 1)

CoC	Requirement	Document Reference
<b>Secondary Conditions</b>		
	<p>The Applicant shall prepare a six-monthly report to the Secretary with the results of container and vehicle monitoring for a period of 3 years, or as otherwise agreed with the Secretary, from the commencement of operation of the IMEX terminal. The Secretary shall consider the need for further reporting following a review of the results for year 3. The report shall include:</p>	Section 3.1
G11	a) The number of twenty foot equivalent units dispatched and received during the period	Section 3 Section 5
	b) A record of heavy vehicle entry by date and approximate time; and	Section 5
	c) The number of light vehicles turning right into the terminal site from Moorebank Avenue and turning left from the terminal site onto Moorebank Avenue for a representative day	Section 5
G14	<p>Heavy road freight vehicles are not permitted to use Moorebank Avenue south of the East Hills Railway corridor. A main gate monitoring system (eg CCTV) shall be installed to identify heavy vehicles turning left from the terminal site onto Moorebank Avenue, or turning right from Moorebank Avenue to the terminal site. The Secretary may at any time request the Applicant to provide a heavy vehicle monitoring report for the prior 12 month period.</p>	Section 2.3

This report has been prepared to provide a framework for recording and reporting on the data required for the *Biannual Trip Origin and Destination Report*, which will be used to agree a format for the six-month reports with TfNSW and RMS. This report assumes that the condition is related to the impact of 20-foot equivalent shipping containers and does not address other heavy vehicles associated with operations, such as garbage trucks and maintenance vehicles.

## 1.2 Consultation

The Framework for Biannual Trip Origin Destination Report has been prepared to the satisfaction of Transport for NSW (TfNSW) and Roads and Maritime Services (RMS). Following the development of this draft framework, the document will be issued to the Secretary for review and comment.

Table 1-3: Consultation Summary

Agency	Date	Person Contacted	Comment	Status
Transport for NSW (TfNSW)	26/3/19	TfNSW Representative	Draft report emailed for review and comment	Open
	11/4/19	TfNSW Representative	Email to follow up on progress of review	Open
	18/4/19	TfNSW Representative	Email to follow up on progress of review	Open
	29/4/19	TfNSW Representative	Email to follow up on progress of review	Open
	3/5/19	TfNSW Representative	Email to follow up on progress of review	Open
	4/5/19	TfNSW Representative	Email to follow up on progress of review	Open
	9/5/19	TfNSW Representative	Email to follow up on progress of review	Open
	10/5/19	MLP Representative	Email noting that TfNSW is to provide comments early next week	Open
	15/5/19	MLP Representative	Email noting that TfNSW is drafting a letter including comments on the report	Open
	16/5/19	MLP Representative	Letter from TfNSW including comments on the report	Open
	26/5/19	TfNSW Representative	Email with attachment provided in response to TfNSW's comments	Open
	30/5/19	TfNSW Representative	Email to follow up on progress of review	Open
	6/6/19	TfNSW Representative	Email to follow up on progress of review	Open
6/6/19	MLP Representative	Email noting that TfNSW is to provide further comments early next week	Open	

	7/6/19	TfNSW Representative	Email to confirm satisfaction of timeframe for comment review	Open
	7/6/19	MLP Representative	Email with attachment provided in response to TfNSW's comments	Open
	13/06/19	TfNSW Representative	Meeting to discuss final comments	Open
	17/06/19	TfNSW Representative	Minutes of meeting submitted for review	Open
	28/06/19	TfNSW Representative	Updated document submitted demonstrating comments incorporated	Open
	12/07/19	MLP Representative	Email with further comments	Open
	7/08/19	TfNSW Representative	Updated document submitted demonstrating comments incorporated	Open
	13/08/19	MLP Representative	Email with further comments	Open
	15/08/19	TfNSW Representative	Updated document submitted demonstrating comments incorporated	Open
	16/08/19	TfNSW Representative	Email with final RMS comments	Closed
Roads and Maritime Service (RMS)	26/3/19	RMS representative	Draft plan emailed for review and comment	Open
	4/4/19	RMS representative	Email to follow up on progress of review	Open
	11/4/19	RMS representative	Email to follow up on progress of review	Open
	18/4/19	RMS representative	Email to follow up on progress of review	Open
	26/4/19	RMS representative	Email to follow up on progress of review	Open
	2/5/19	RMS representative	Email to follow up on progress of review	Open
	3/5/19	MLP representative	Email advising that a new contact point for RMS	Open
	9/5/19	RMS representative	Email to follow up on progress of review	Open
	14/5/19	RMS representative	Email to follow up on progress of review	Open
	15/5/19	MLP representative	Email from RMS providing comments on the report	Open
	26/5/19	RMS representative	Email noting that response to RMS review would be provided in the coming days	Open

3/6/19	RMS representative	Email noting that response to RMS review would be provided in the coming days	Open
3/6/19	MLP representative	Email to confirm satisfaction of timeframe for response	Open
4/6/19	RMS representative	Email with attachment provided in response to RMS's comments	Open
12/6/19	MLP representative	Email providing comments to previous responses	Open
13/06/19	MLP representative	Email providing additional comments to previous responses	Open
29/06/19	RMS representative	Response to comments and updated document submitted demonstrating comments incorporated	Open
22/07/19	MLP representative	Email providing comments on updated document	Open
07/08/19	RMS representative	Email providing updated document to confirm close out of comments	Open
09/08/19	RMS representative	Email and phone call to follow up on progress of close out.	Open
16/08/19	TfNSW Representative	Email with final RMS comments	Closed

## 2 PROJECT DESCRIPTION

### 2.1 Site Location

The MPE Project site, is located approximately 27 kilometres south-west of the Sydney Central Business District (CBD) and approximately 26 kilometres west of Port Botany and includes the former Defence National Storage and Distribution Centre (DNSDC) site. The MPE site is situated within the Liverpool Local Government Area, in Sydney's south west subregion, approximately 2.5 kilometres from the Liverpool city centre.

Figure 2-1 illustrates the MPE site location and local context.

### 2.2 Site Operations

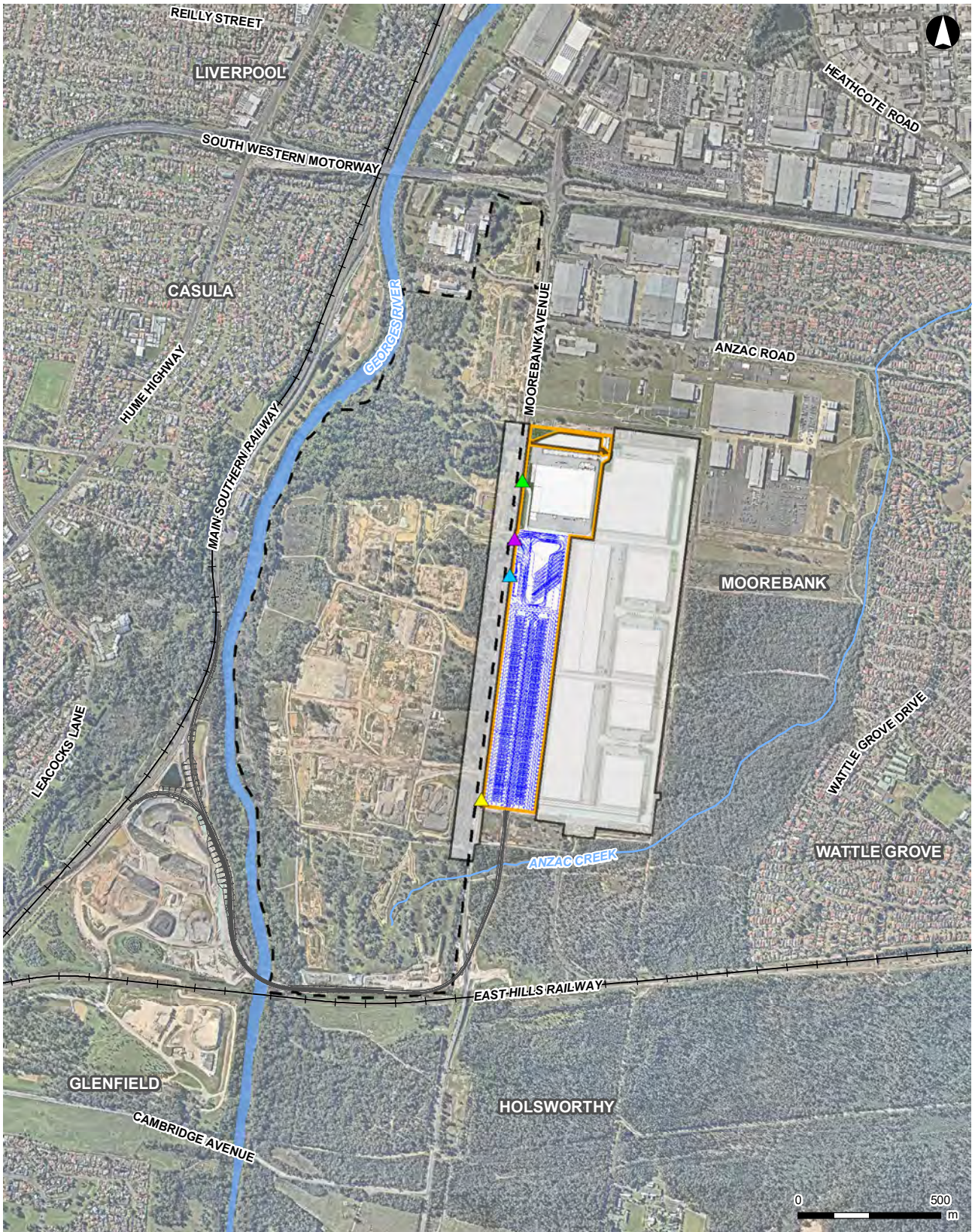
The operational activities associated with the MLP East Precinct site, which are likely to result in vehicle movements into and out of the site are detailed as follows:

- Import Export (IMEX) Terminal, operating 24 hours, seven days per week:
  - Rail loading/ unloading and container processing
  - Truck processing and holding
  - Maintenance activities, such as vegetation management, electrical infrastructure, civil and drainage work, signalling and track maintenance
- Rail link, operating 24 hours, seven days per week to support the IMEX terminal activities:
  - Maintenance activities, such as vegetation management, electrical infrastructure, civil and drainage work, signalling and track maintenance
- Common or non-tenanted areas:
  - An internal road network to enable efficient movement of vehicles, dispatch of freight from the warehouses and transport of containers between the IMEX Terminal and warehouse and distribution facilities
  - Maintenance activities, such as internal roads, utilities services, fire protection systems, drainage, fencing and signage, bush fire hazard reduction and pest and vegetation control
  - Waste management
- Warehousing operational activities (24 hours, seven days per week), which will be dependent on the individual tenant and will be detailed in the respective Warehouse Operational Environmental Management Plans.

### 2.3 Heavy Vehicle Access Routes

Figure 2-2 illustrates the heavy vehicle access routes to/ from the MPE site during the operation of the proposed facilities.

# Biannual Trip Origin Destination Report Framework



## LEGEND

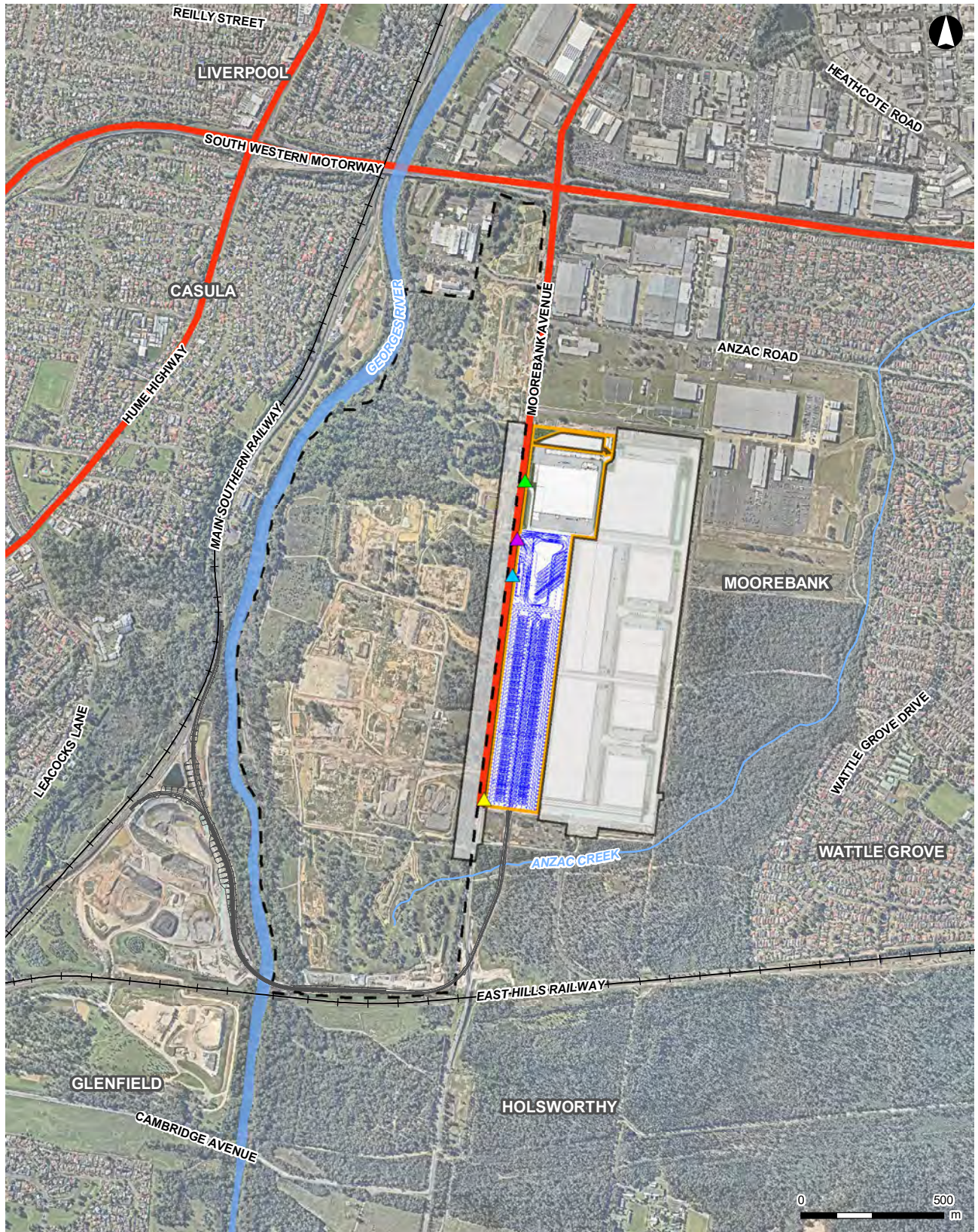
- |                                     |                       |
|-------------------------------------|-----------------------|
| MLP East Precinct construction area | MPW site              |
| MLP East Precinct operational area  | Existing railway      |
| Warehouse access                    | Watercourse           |
| IMEX truck access                   | Operational rail link |
| IMEX office access                  |                       |
| Emergency access                    |                       |

ARCADIS AUSTRALIA PACIFIC PTY LTD  
 ABN 76 104 485 289  
 Level 16, 500 George St | Sydney NSW 2000  
 P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001  
 Coordinate System: GDA 1994 MGA Zone 56  
 Date issued: June 26, 2019  
 Aerial imagery supplied by Neormap (Mar, 2019)



Figure 2-1: Site Location and Local Context

# Biannual Trip Origin Destination Report Framework



## LEGEND

- |                                     |                            |
|-------------------------------------|----------------------------|
| MLP East Precinct construction area | MPW site                   |
| MLP East Precinct operational area  | Heavy vehicle access route |
| Warehouse access                    | Existing railway           |
| IMEX truck access                   | Watercourse                |
| IMEX office access                  | Operational rail link      |
| Emergency access                    |                            |

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 Coordinate System: GDA 1994 MGA Zone 56  
 Date issued: June 26, 2019  
 Aerial imagery supplied by Neormap (Mar, 2019)



Figure 2-2: Heavy Vehicle Access Routes to MPE site

## 3 REPORTING FRAMEWORK

### 3.1 Frequency of Reporting

The Biannual Trip Origin and Destination Report is to be prepared every six months, starting six months from the commencement of operation. The report will be submitted within one month of its preparation throughout the operation of the MLP East Precinct, unless otherwise agreed by the Secretary, TfNSW and RMS.

### 3.2 Report Structure

The outline and structure of the *Biannual Trip Origin Destination Report* is provided in Table 3-1.

Appendix A provides templates for presenting the data analysis required for each section within the report.

Table 3-1: Report Outline and Structure

Section	Description
Introduction	<p>This section will include the following subsections:</p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Purpose</li> <li>• Scope</li> <li>• Period of Reporting.</li> </ul>
Shipping container transport	<p>This section provides the total number of actual and standard 20-foot equivalent shipping containers dispatched and received during the period. This analysis will be primarily based on the operational data from logistical schedules.</p> <p>This section will include the following subsections:</p> <ul style="list-style-type: none"> <li>• Shipping containers received</li> <li>• Shipping containers dispatched.</li> </ul> <p>This data will be presented using a combination of tables (refer to template in Appendix A) and graphs.</p>
Truck gate opening periods	<p>This section will detail the number of days in the period that the truck gate was open for dispatching trucks 24 hours a day, seven days a week and detail and exceptions to this and advise actual hours of operation. This analysis will be based on the operational data from logistical schedules and on-site monitoring (refer to Section 5.1.1).</p> <p>This section will include the following subsections:</p> <ul style="list-style-type: none"> <li>• Period of opening</li> <li>• Exceptions to full time opening</li> <li>• Actual hours of opening.</li> </ul> <p>This data will be presented in a table (refer to template in Appendix A) with commentary of the results under each subsection.</p>

Section	Description
Traffic volumes	<p>This section will record the number of vehicles (split by Austroads light and heavy vehicle classification) accessing the site. This analysis will be based on logistical schedules, on-site monitoring and gate data (for the IMEX). Vehicles accessing the warehouse will be required to be recorded.</p> <p>This section will include the following subsections:</p> <ul style="list-style-type: none"> <li>• Total vehicles accessing the site for reporting period.</li> </ul> <p>The total vehicles accessing the site will be presented in tables (refer to template in Appendix A) and graphs. The mid-block traffic volume profiles will be presented in graphs.</p>
Origin-destination results	<p>This section will provide representative vehicle origins and destinations (split by Austroads light and heavy vehicle classification), based on the cordon identified for the site.</p> <p>This section will include the following subsections:</p> <ul style="list-style-type: none"> <li>• Approach distribution (origin)</li> <li>• Departure distribution (destination).</li> </ul> <p>The data will be presented on plans indicating approach/ departure routes with the proportion of the total vehicles arriving/ leaving the MPE site.</p>
Employee numbers	<p>The Workplace Travel Plan requires Annual reporting of employee numbers to DP&amp;E, TfNSW and RMS. To minimise the requirement for an additional report, employee numbers will be also included in <i>Biannual Trip Origin Destination Report</i></p>
Summary	<p>Provides an overview of the findings reported above</p>

### 3.3 Process

The process for preparing the *Biannual Trip Origin Destination Report* is illustrated in Figure 3-1.

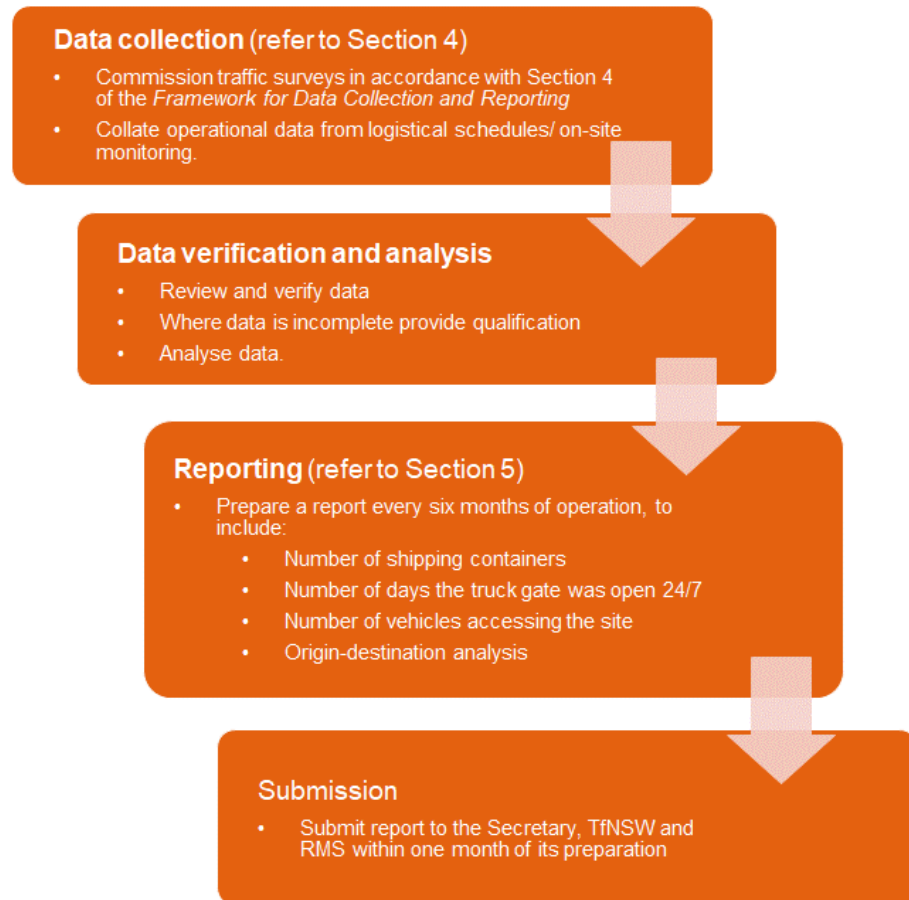


Figure 3-1: Biannual trip origin destination reporting process

## 4 ROLES AND RESPONSIBILITIES

An overview of the key roles for the MLP East Precinct are provided in Figure 4-1. The responsibilities for the preparation and submission of the *Biannual Trip Origin Destination Report* and implementation of this framework for each of the key roles are outlined in Table 4-1.

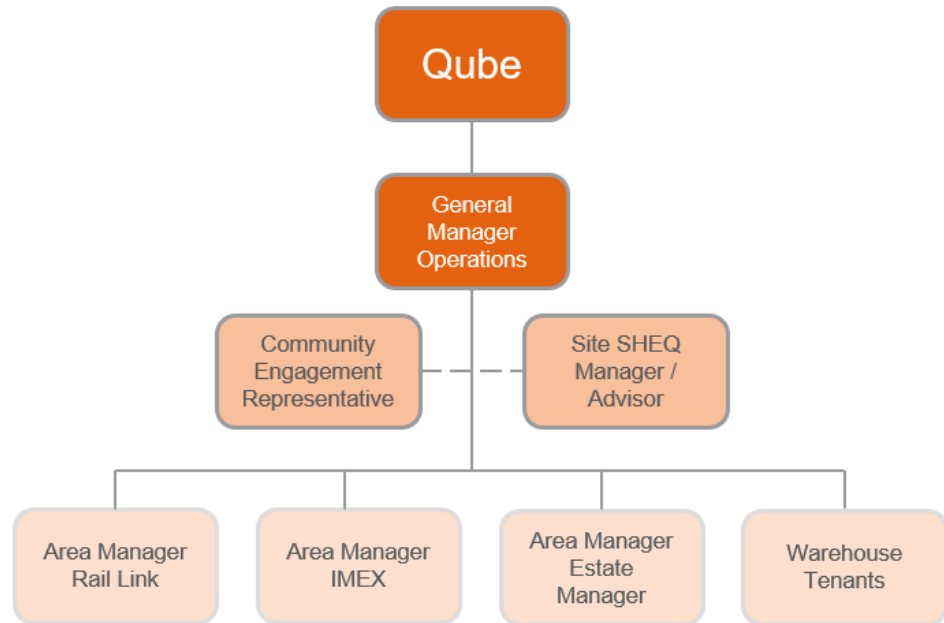


Figure 4-1: Key roles for MLP East Precinct

Table 4-1: Key roles and responsibilities

Role	Responsibility
<b>General Manager Operations</b>	<ul style="list-style-type: none"> <li>Accountable for the operational activities and performance of the MLP East Precinct</li> <li>Provide sufficient resources to implement, develop and maintain the <i>Biannual Trip Origin Destination Report</i> and framework throughout the operating life of the MLP East Precinct</li> <li>Define, document and communicate roles, responsibilities and authorities of all personnel to facilitate data collection, analysis and reporting</li> <li>Review and approve changes to the framework and <i>Biannual Trip Origin Destination Report</i></li> <li>Based on the outcome of the review and validation of the data collected to support the development of the <i>Biannual Trip Origin Destination Report</i>, endorse the data as fit for purpose.</li> </ul>
<b>Area Managers:</b> <ul style="list-style-type: none"> <li>IMEX</li> <li>Rail Link</li> <li>Estate Manager</li> </ul>	<ul style="list-style-type: none"> <li>Responsible for the implementation of the <i>Biannual Trip Origin Destination Report</i> and framework within the areas of responsibility</li> <li>Provide operational data to support the <i>Biannual Trip Origin Destination Report</i>, including logistical schedules and on-site monitoring data</li> </ul>

Role	Responsibility
	<ul style="list-style-type: none"> <li>• Communicate the requirements of the <i>Biannual Trip Origin Destination Report</i> and framework and obligations to the operational team</li> <li>• Monitor operations against the requirements of the CoC, collect data and maintain records required to inform the <i>Biannual Trip Origin Destination Report</i></li> <li>• Where required, implement changes to activities to manage ongoing operation to the satisfaction of TfNSW and RMS</li> <li>• Report issues pertaining to the preparation of the <i>Biannual Trip Origin Destination Report</i> to the General Manager Operations.</li> </ul>
<p><b>Site Safety, Health, Environment and Quality Manager / Advisor</b> (Site HSEQ Manager / Advisor)</p>	<ul style="list-style-type: none"> <li>• Act as the primary contact point for TfNSW and RMS in relation to the <i>Biannual Trip Origin Destination Report</i></li> <li>• Provide advice on matters specified in the CoC relating to the IMEX, Rail Link and Estate operations</li> <li>• Review and implement <i>Biannual Trip Origin Destination Report</i> and framework and monitoring programs required under the CoC</li> <li>• Monitor operations against the <i>Biannual Trip Origin Destination Report</i> and framework to evaluate compliance with the CoC</li> <li>• Commission surveys and collate data required to carry out analysis and produce the <i>Biannual Trip Origin Destination Report</i></li> <li>• Commission (if required), coordinate and manage resources to carry out the data collection, analysis and preparation of the <i>Biannual Trip Origin Destination Report</i></li> <li>• Maintain the register of data collection and reports issued.</li> </ul>
<p><b>Community Engagement Representative</b></p>	<ul style="list-style-type: none"> <li>• Act as the 'control tower' for all public communications and be the central contact to keep nearby residential receivers informed of monitoring/ surveys</li> <li>• Communicate community concerns to the Qube Environmental Representative in relation to vehicle movements within the surrounding road network.</li> </ul>
<p><b>Individual Tenants</b></p>	<ul style="list-style-type: none"> <li>• Support the compliance with the CoC and provide data and information to Qube to inform the development of the <i>Biannual Trip Origin Destination Report</i> as required.</li> </ul>

## 5 DATA COLLECTION FRAMEWORK

### 5.1 Data Collection Scope and Methodology

The following intersection, mid-block and origin-destination (OD) surveys should be carried out concurrently.

#### 5.1.1 Operational Data Collection

##### Other Operational Data

The following operational data will be obtained from the logistical schedules or via on-site monitoring:

- Total vehicles accessing the site (B28 [c])
- Number of shipping containers (20-foot equivalent) dispatched and received by the site (B28 [a])
- Truck gate opening periods (B28 [b]).

##### IMEX Gate Data Collection

The IMEX accesses will be gated and data will be recorded to determine the number of vehicles entering and exiting the site (classified in accordance with Austroads vehicle classifications). In accordance with MPE Stage 1 (SSD 6766) CoC F6, a vehicle booking system will be implemented with all trucks fitted with Radio-Frequency Identification (RFID) readers. Road Operators will pre-book the Truck Visit with IMEX using 1-Stop, and data on road operator, container, truck details, and arrival and departure time(s). This data will be rechecked again on exit from the terminal to confirm load manifests.

Further detail on this process will be included within the Operational Traffic Management Plan developed in consultation with the Cargo Movement Coordination Centre.

The gate data will also be used to determine the periods during which the gates were open for the reporting period. The Area Managers will be responsible for recording the reasons for any potential periods of gate closure.

##### Warehouse Access Data Collection

The warehouse access will not be gated. Therefore, data will need to be collected to record the number of vehicles entering and exiting the site (classified in accordance with Austroads vehicle classifications) through the installation of permanent tube counters or detector loops.

##### Logistical Schedules

Logistical schedules maintained by the Area Managers will need to record the total number of 20-foot equivalent shipping containers that are received and dispatched by the MPE site for the reporting period.

#### 5.1.2 Traffic Surveys

Traffic surveys will be commissioned to provide representative vehicle origins and destinations for the MPE site for a cordon area (see Figure 5-1) of the surrounding road network (B28 [d]). This requires collection of:

- Origin-destination (OD) surveys
- Intersection surveys at access points and key intersections.

## OD Surveys

OD surveys will be undertaken to understand the traffic distribution of the MPE site on Moorebank Avenue, the M5 South Western Motorway, Anzac Road, Cambridge Avenue as well as all the access points of the MPE site. This data will be collected on the same day as the intersection surveys and will be analysed to provide representative vehicle origins and destinations for the site for a cordon area of the surrounding road network. This will be combined with classification counts in accordance with Austroads vehicle classifications and an hourly and daily summary.

OD surveys will be required as follows:

- During the following network peak periods on a typical weekday (not within two weeks before or after school holidays):
  - Peak morning period (7am to 9am)
  - Evening period (4pm to 6pm)
- During the following expected traffic peak periods for facility operations based on shift patterns and peak heavy vehicle movements Monday to Sunday:
  - 4:30am to 6:30am
  - 8am to 10am
  - 1pm to 3pm
  - 8pm to 11pm

Therefore, the OD surveys will be undertaken during the following times on weekdays:

- 4:30am to 6:30am
- 7am to 10am
- 1pm to 3pm
- 4pm to 6pm
- 8pm to 11pm.

The survey company commissioned to carry out the OD surveys is required to capture all vehicles passing the OD stations. A detailed report will be prepared by the survey company to summarise:

- The data collection process
- Data processing and analysis approach
- Outputs
- Data errors and expansion factors adopted to address incomplete data sets.

## Intersection Surveys

Intersection turn counts are to be surveyed at the key MPE accesses along Moorebank Avenue. This data will be used to analyse the general network peak period volumes captured by the OD surveys, which will be undertaken concurrently to provide representative vehicle origins and destinations for the site. This data will also be used to confirm the data recorded at the gates and accesses of the facility during the peak periods.

Intersection surveys will be required for:

- Network peak morning period (7am to 9am) and evening period (4pm to 6pm) on a typical weekday (not within two weeks before or after school holidays)
- Expected facility peak periods of 4:30am to 6:30am, 8am to 10am, 1pm to 3pm, and 8pm to 10pm Monday to Sunday

- Classification counts in accordance with Austroads vehicle classifications
- 15-minute intervals
- Peak hour identified and reported.

The survey at the Moorebank Avenue/ M5 South Western Motorway is a full interchange survey with the through lanes on the M5 South Western Motorway recorded as well as the movements at the traffic signals.

### 5.1.3 Survey Locations

The suggested locations of the survey are provided in Figure 5-1, including:

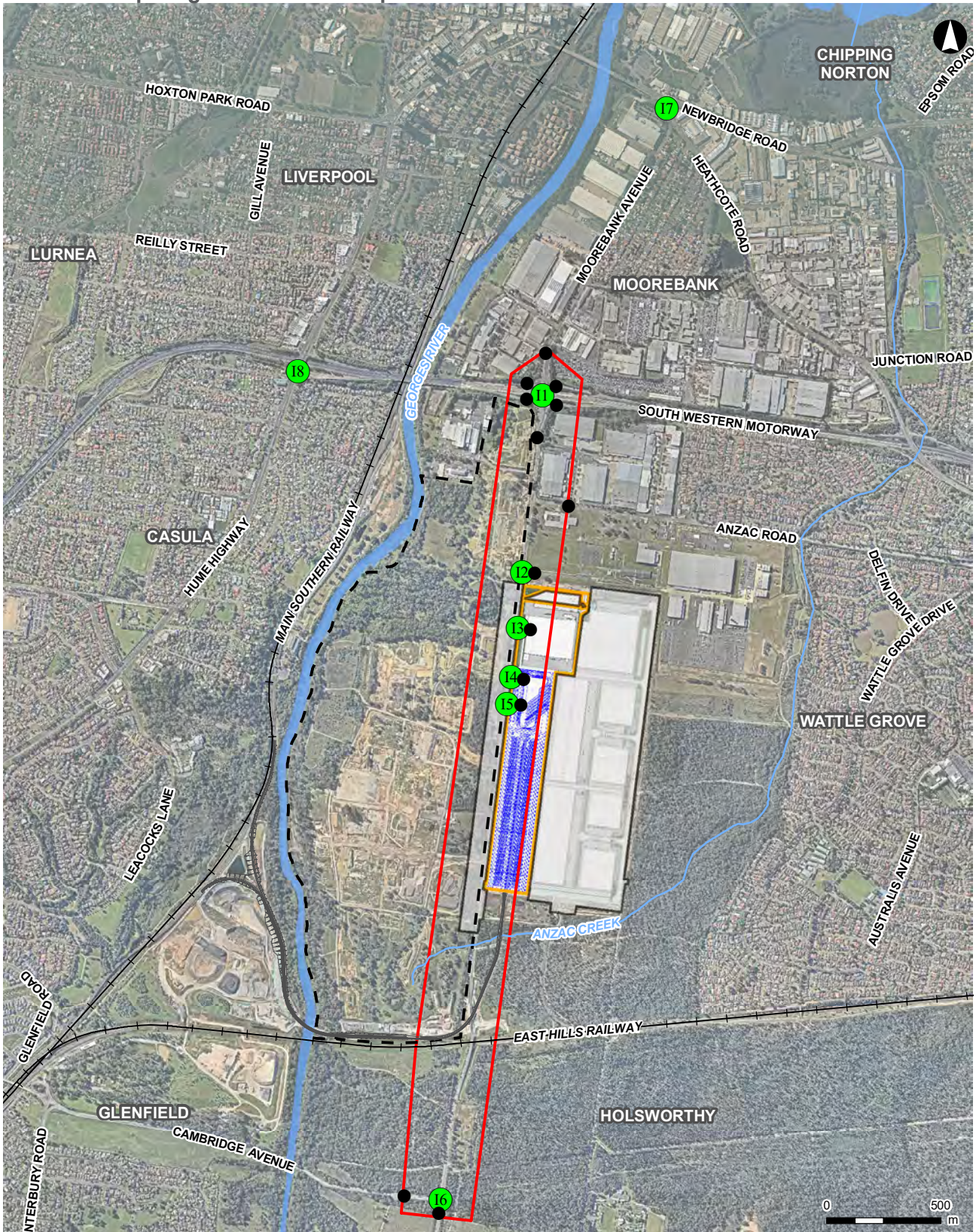
- OD surveys at the following stations:
  - Moorebank Avenue, about 350 metres north of the M5 South Western Motorway
  - Moorebank Avenue, about 300 metres south of the M5 South Western Motorway
  - Moorebank Avenue, south of Cambridge Avenue
  - M5 South Western Motorway on and off ramps to and from Moorebank Avenue
  - Cambridge Avenue
  - Anzac Road
  - Site accesses at MPE warehouse access, MPE IMT truck access and MPE IMT staff access.
- Intersection surveys:
  - I1 - Moorebank Avenue/ M5 South Western Motorway interchange (full interchange survey to include M5 South Western Motorway through lanes)
  - I2 - Moorebank Avenue/ Defence Joint Logistics Unit (DJLU) access
  - I3 - Moorebank Avenue/ MPE warehouse access
  - I4 - Moorebank Avenue/ MPE IMT truck access
  - I5 - Moorebank Avenue/ MPE IMT staff access
  - I6 - Moorebank Avenue/ Cambridge Avenue
  - I7 – Moorebank Avenue/ Newbridge Road
  - I8 – M5 South Western Motorway/ Hume Highway.

The OD survey locations were determined in consultation with a survey company to adequately capture the vehicle movements generated by the site for a recommended survey cordon, which includes the M5 South Western Motorway as well as RMS and TfNSW. The recommended cordon is considered appropriate to provide a representative OD pattern for the site.










Given that the Hume Highway is designed to accommodate substantial heavy vehicle movements, it is considered too far for the recommended cordon and heavy vehicles generated by the site would be absorbed in the existing traffic volumes on this part of the network.

OD stations have been included on Cambridge Avenue and Anzac Road to capture the travel patterns of all vehicles generated by the site. These stations would also identify any heavy vehicles using these routes, which are not designated heavy vehicle routes.

# Biannual Trip Origin Destination Report Framework



## LEGEND

- |   |  |
|---|--|
|  MLP East Precinct construction area |  Intersection ID and location |
|  MLP East Precinct operational area  |  OD station                   |
|  MPW site                            |  Existing railway             |
|  Cordon area                         |  Watercourse                  |
|   |  Operational rail link        |

ARCADIS AUSTRALIA PACIFIC PTY LTD  
 ABN 76 104 485 289  
 Level 16, 500 George St | Sydney NSW 2000  
 P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001  
 Coordinate System: GDA 1994 MGA Zone 56  
 Date issued: July 29, 2019  
 Aerial imagery supplied by Nearmap (Mar, 2019)

1:25,000 at A4



Figure 5-1: Survey Locations

## 5.2 Using the Data in the Report

### Providing Comparable Data

Data collection in accordance with this framework and carrying out surveys using methodology specified in Section 5.1 enables a comparative assessment of traffic accessing the site and growth in operational activities for the MPE facility.

Within the report, the data should be presented to provide a comparison between the current six-month period and preceding period. Table templates are provided in Appendix A, which will be used to present the data collected for each reporting period to satisfy CoC B28.

### Data Completeness

Where data is incomplete, or data collection is flawed, the report will provide qualifying commentary, including:

- Reason for missing/ erroneous data
- Impact on the analysis of the data
- Mitigation implemented for addressing the shortfall in data collection (if any).

### Data Validation

All data collected will be reviewed and validated to confirm it is fit for purpose in addressing the requirements of the CoC.

### Data Provision

All traffic survey data files will be provided to Transport for NSW and RMS, in addition to the summaries documented in the reporting tables.

## **APPENDIX A REPORTING TABLE TEMPLATES**

## Shipping Container Transport

Total number of shipping containers received/ dispatched by month

Reporting period	Month	Total containers received/ dispatched	Cumulative total for period
Period 1 2019	January		
	February		
	March		
	April		
	May		
	June		

## Truck Gate Opening Period

Truck gate closure record

Date	Period of closure	Reason for closure

## Traffic Volumes

Traffic volumes accessing site by month

Reporting period	Month	Vehicles in		Vehicles out	
		Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
Period 1 2019	January				
	February				
	March				
	April				

Reporting period	Month	Vehicles in		Vehicles out	
		Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
	May				
	June				

*Traffic volumes accessing site by week*

Reporting period	Week	Vehicles in		Vehicles out	
		Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
Period 1 2019	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				

Reporting period	Week	Vehicles in		Vehicles out	
		Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
	22				
	23				
	24				
	25				
	26				

OD Surveys All Vehicles (count of matched plates)

	To station						
From station	OD1	OD2	OD3	OD4	OD5	OD6	Total
OD1							
OD2							
OD3							
OD4							
OD5							
OD6							
<b>Total</b>							

OD Surveys Light Vehicles (count of matched plates)

	To station						
From station	OD1	OD2	OD3	OD4	OD5	OD6	Total
OD1							
OD2							
OD3							
OD4							
OD5							

	To station
OD6	
<b>Total</b>	

OD Surveys Rigid Heavy Vehicles (count of matched plates)

	To station						
From station	OD1	OD2	OD3	OD4	OD5	OD6	Total
OD1							
OD2							
OD3							
OD4							
OD5							
OD6							
<b>Total</b>							

OD Surveys Articulated Heavy Vehicles (count of matched plates)

	To station						
From station	OD1	OD2	OD3	OD4	OD5	OD6	Total
OD1							
OD2							
OD3							
OD4							
OD5							
OD6							
<b>Total</b>							

## Employee Numbers

*Employee numbers per area of the site*

Reporting period	Month	IMEX	Rail Link	Tenanted area
Period 1 2019	January			
	February			
	March			
	April			
	May			
	June			

## MPE Operations

## Incidents Report Register 2020

Date	Event Type	Workgroup	Description	Actions
30-Sep-20	Near Hit	MLP - Operations	Vehicle incident	Closed
5-Sep-20	Property Damage/Loss	MLP - Operations	Truck struck jersey barriers at the MPE entry southbound	Closed
26-Aug-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed
21-Aug-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed
13-Aug-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed
8-Jul-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed
29-Jun-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed
27-Jun-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed
19-Jun-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed
12-Jun-20	Near Hit	MLP - Operations	Truck struck poles mounted on a roundabout on western site	Closed
10-Jun-20	Property Damage/Loss	MLP - Operations	Vehicle struck a boom gate support post at the western site exit	Closed
20-May-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed
19-May-20	Disruption	MLP - Operations	False fire alarms in the buildings	Closed



# APPENDIX D - COMPLIANCE REPORT DECLARATION FORM

## COMPLIANCE REPORT DECLARATION


<b>Project Name</b>	Moorebank Logistics Park (MLP) – East Precinct
<b>Project Application Number</b>	SSD 7628
<b>Description of Project</b>	Moorebank Logistics Park aims to streamline the freight logistics supply chain from port to store, deliver savings to businesses and consumers, and help service the rapidly growing demand for imported goods in south-west Sydney. It is located approximately 27 kilometres (km) south-west of the Sydney Central Business District and approximately 26 km west of Port Botany within the Liverpool Local Government Area. The MLP is divided into an East Precinct and a West Precinct, located east and west of Moorebank Avenue respectively. The East Precinct includes the 24/7 operation of an import-export terminal (IMEX), rail link connecting to the South Sydney Freight Line (SSFL), warehousing and distribution facilities and freight village.
<b>Project Address</b>	Moorebank Logistics Park, Moorebank, NSW, 2170
<b>Proponent</b>	Qube Holdings Limited (ACN: 149 723 053)
<b>Title of Compliance Report</b>	Moorebank Logistics Park East Precinct – Pre-operation Compliance Report
<b>Date</b>	Thursday, 1 April 2021

I declare that I have reviewed relevant evidence and prepared the contents of the attached Compliance Report and to the best of my knowledge:

- the Compliance Report has been prepared in accordance with all relevant conditions of consent;
- the Compliance Report has been prepared in accordance with the Compliance Reporting Post Approval Requirements;
- the findings of the Compliance Report are reported truthfully, accurately and completely;
- due diligence and professional judgement have been exercised in preparing the Compliance Report; and
- the Compliance Report is an accurate summary of the compliance status of the development.

### Notes:

- Under section 10.6 of the Environmental Planning and Assessment Act 1979 a person must not include false or misleading information (or provide information for inclusion in) a report of monitoring data or an audit report produced to the Minister in connection with an audit if the person knows that the information is false or misleading in a material respect. The proponent of an approved project must not fail to include information in (or provide information for inclusion in) a report of monitoring data or an audit report produced to the Minister in connection with an audit if the person knows that the information is materially relevant to the monitoring or audit. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000; and
- The Crimes Act 1900 contains other offences relating to false and misleading information: section 307B (giving false or misleading information – maximum penalty 2 years' imprisonment or 200 penalty units, or both).

<b>Name of Authorised Reporting Officer</b>	Richard Mason
<b>Title</b>	MD Possum Environmental Consulting
<b>Signature</b>	
<b>Qualification</b>	Bachelor of Science – Environmental Science
<b>Company</b>	Possum Environmental Consulting
<b>Company Address</b>	2 Carole Avenue, Baulkham Hills NSW 2153