



Western Sydney Airport

**Noise and Vibration
Construction Environmental Management Plan
May 2024**



**Western
Sydney
Airport**

Document Control

File Name	Document Name	Revision
WSA00-WSA-00400-EN-PLN-000002	WSA Noise and Vibration CEMP	5E

Revision History

Revision	Date	Description	Author	Reviewer
0	24/09/2018	Approved for Early Earthworks	WSA Co	S Reynolds
1	14/12/2018	Revision update to include additional scope including Experience centre, Site Office and Material Importation	WSA Co	S Reynolds
2	18/12/2019	Approved for Bulk Earthworks	WSA	S Reynolds
3	26/10/2021	Approved for Terminal Works and SM, M12 and utilities works on WSA land.	WSA	L Laughton
4	27/07/2022	Approved for Use	WSA Co	L Laughton
5E	22/05/2024	Updated to include Stage 1 Cargo Works, Standalone facilities and Testing and Commissioning. Update to address Commonwealth Comments	WSA Co	L.Laughton

Plan Authorisation

Position	Name	Signature	Date
Environment Manager	L Laughton		22/05/2024

Terms and Definitions

Item	Definition
ABC	Airport Building Controller
ABC Regulations	<i>Airports (Building Control) Regulations 1996 (Cth)</i>
ABL	Assessment Background Level. The single figure background level representing each assessment period (Daytime, Evening and Night-time) for each day. The ABL is determined by calculating the 10 th percentile (lowest 10 th per cent) background level (LA ₉₀) for each period.
ACP	Airside Civil and Pavements
AEO	Airport Environment Officer (person appointed under the AEPR 2.01)
AEPR	<i>Airports (Environment Protection) Regulations 1997 (Cth)</i>
AHD	Australian Height Datum
Airport	Western Sydney International (Nancy-Bird Walton) Airport (WSI). NB: The Airport is referred to in the Airports Act as Sydney West Airport and is also commonly known as Western Sydney Airport
Airport Lease	A lease for the Airport granted under section 13 of the Airports Act
Airport Plan	Means the Airport Plan for the Airport Site as determined by the Infrastructure Minister under section 96B of the Airports Act. The latest Airport Plan was determined in September 2021 and authorises Rail Development on the Airport Site.
Airport Site	The site for Sydney West Airport as defined by the Airports Act
Airports Act (or 'the Act')	<i>Airports Act 1996 (Cth)</i>
ALC	Airport Lessee Company (the Company granted a lease over the Airport Site)
Ancillary Development	An 'ancillary development' as set out in section 96L of the Airports Act
Approved Plan	A Plan approved in accordance with the Airport Plan Conditions of Approval
Approver	For Condition 30 of the Airport Plan (Biodiversity Offset Delivery Plan) and any matter relating to the Biodiversity Offset Delivery Plan – the Environment Minister or an SES employee in the Environment Department For other matters – the Infrastructure Minister or an SES employee in the Infrastructure Department
Apron	The part of an airport used for: <ul style="list-style-type: none"> a. the purposes of enabling passengers to embark/disembark an aircraft; b. loading cargo onto, or unloading cargo from, aircraft; and/or c. refuelling, parking or carrying out maintenance on aircraft
ARFFS	Aviation Rescue and Firefighting Service
AS/NZS	Australian Standard / New Zealand Standard
Associated Site	An 'associated site for Sydney West Airport' as set out in section 96L of the Airports Act
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
BEC	Bulk Earthworks Contract
Bulk Earthworks	The large-scale earthworks required to flatten the Stage 1 Airport Development Area in preparation for further construction works as described in section 6 of the Construction Plan
CASA	Civil Aviation Safety Authority
CASR	<i>Civil Aviation Safety Regulations 1998 (Cth)</i>

Item	Definition
CEMF	Contractor Environmental Management Framework
CEMP	Construction Environmental Management Plan (required under Section 3.11.2 of the Airport Plan)
CIP	Cumulative Impacts Plan
CIZ	Construction Impact Zone. The part or parts of the Airport Site or an Associated Site on which Main Construction Works are planned to occur, as detailed in the Construction Plan
Condition	A condition set out in Part 3 of the Airport Plan in accordance with section 96C of the Airports Act
Construction Period	The period from the date of commencement of Main Construction Works in any part of the Airport Site until the date of commencement of Airport Operations
CSEP	Community and Stakeholder Engagement Plan (required under Condition 15 in Section 3.11.2 of the Airport Plan)
CSR	Combined Services Route
D&C	Design and Construct
DAWE	Department of Agriculture, Water and the Environment (Cth)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCJ	Department of Communities and Justice
DCS	Department of Customer Service
dBA	The value representing the loudness of a sound at a specific time, allowing for the differential response of the human ear to different sound frequencies
DFSI	Department of Finance, Services and Innovation (Cth)
DIPNR	NSW Department of Infrastructure, Planning and Natural Resources (now DPE)
DITRDCA	Department of Infrastructure, Transport Regional Development, Communications and the Arts (Infrastructure Department) (Cth)
DPC	NSW Department of Premier and Cabinet
DPE	NSW Department of Planning, Industry and Environment (now split into DCCEEW and DPHI)
DPHI	Department of Planning Housing and Infrastructure (formerly part of DPE)
DPI	Department of Primary Industries (including Agriculture NSW, Fisheries NSW and NSW Office of Water) (now DPE)
ECM	Environmental Control Map
Ecologically Sustainable Development	Using, conserving and enhancing the community's resources so that the ecological processes on which life depends are maintained and the total quality of life now and in the future, can be increased (Council of Australian Governments, 1992)
ECZ	Environmental Conservation Zone
EES	The Environment, Energy and Science (EES) group within the Department of Planning, Industry and Environment, formerly known as Office of Environment and Heritage
EEW	Early Earthworks
EIS	Environmental Impact Statement prepared for WSI under the EPBC Act
EMS	Environmental Management System
Environment Minister	The Minister responsible for the EPBC Act
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
EPA	NSW Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)

Item	Definition
ESA	Environmentally Sensitive Area
ESCP	Erosion and Sediment Control Plan
ETC	Enterprise Technology Contract
EWMS	Environmental Work Method Statement
FASL	Final Airport Site Layout
GSE	Ground Support Equipment
Ha	Hectares
ICNG	Interim Construction Noise Guideline
Infrastructure Department	The Department responsible for administering the Airports Act, currently the Australian Government Department of Infrastructure, Transport Regional Development, Communications and the Arts (DITRDCA)
Infrastructure Minister	The Minister responsible for the Airports Act from time to time
ISO 14001	AS/NZS ISO 14001:2016 Environmental Management Systems
Km	Kilometres
LA_(max)	The A-weighted maximum noise level only from the construction works under consideration, measured using the fast time weighting on a sound level meter.
LA₁₀	The LA ₁₀ level is the A-weighted noise level which is exceeded 10% of the sample period. During the sample period, the noise level is below the LA ₁₀ level for 90% of the time. The LA ₁₀ is a noise descriptor for environmental noise and road traffic.
LA₉₀	The LA ₉₀ level is the A-weighted noise level which is exceeded 90% of the sample period. During the sample period, the noise level is below the LA ₉₀ level for 10% of the time. This measure is commonly referred to as the background noise level.
LA_{eq}	The equivalent continuous A-weighted sound level (LA _{eq}) is the energy average of the varying noise over the sample period and is equivalent to the level of constant noise which contains the same energy as the varying noise environment. The measure is also a common measure of environmental noise and road traffic noise.
LCB	Landside Civil and Buildings
LDP	Land Disturbance Permit
LEP	Local Environmental Plan
M12 on Airport Works	The physical works and infrastructure, including temporary works and infrastructure which the M12 Authority, its contractors and nominees plan, investigate, design, construct, install, commission, test, accept, complete, maintain, operate or repair within the Airport Site
Main Construction Works (MWC)	Substantial physical works on a particular part of the Airport Site (including large scale vegetation clearance, bulk earthworks and the carrying out of other physical works, and the erection of buildings and structures) described in Part 3 of the Airport Plan, other than TransGrid Relocation Works or Preparatory Activities
MI	Material Importation
MTIP	Major Transport and Infrastructure Projects (Cth) - a Division of DITRDCA
NMLs	Noise Management Levels. The <i>Interim Construction Noise Guidelines</i> (NSW EPA) recommends Noise Management Levels (NMLs) to manage construction noise at sensitive receivers. Where construction noise levels are predicted to be above the NMLs, all feasible and reasonable mitigation measures are to be applied to meet the NMLs.
Non-conformance	Failure to conform to the requirements of the Airport Plan including Approved Plans
NSWRA	NSW Reconstruction Authority
POEO Act	<i>Protection of the Environment Operations Act 1997</i> (NSW)

Item	Definition
Preparatory Activities	<ul style="list-style-type: none"> a. day to day site and property management activities; b. site investigations, surveys (including dilapidation surveys), monitoring, and related works (e.g. geotechnical or other investigative drilling, excavation, or salvage); c. establishing construction work sites, site offices, plant and equipment, and related site mobilisation activities (including access points, access tracks and other minor access works, and safety and security measures such as fencing but excluding bulk earthworks); d. enabling preparatory activities such as: <ul style="list-style-type: none"> i. demolition or relocation of existing structures (including buildings, services, utilities and roads); ii. the disinterment of human remains located in grave sites identified in the European and other heritage technical report in volume 4 of the EIS; and iii. application of environmental impact mitigation measures; and e. any other activities which an Approver determines are Preparatory Activities for this definition
RAP	Remediation Action Plan
RBL	Rating Background Level. The RBL for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – Daytime, Evening and Night-time.
RNP	Road Noise Policy (NSW)
SEMF	Site Environmental Management Framework (Construction Plan, Appendix 2)
SEPP	State Environmental Planning Policy
SES	Senior Executive Service
SES Officer	An SES employee under the <i>Public Service Act 1999</i> (Cth)
Stage 1 Airport Development	The Airport development described in Part 3 of the Airport Plan
Stage 1 Cargo Works	The physical things and works which the Stage 1 Cargo Works Contractor will design, supply, construct, install, produce, or complete for WSA
Standalone Facilities	The physical things and works which include Commonwealth standalone facilities which Contractors will design, supply, construct, install, produce or complete for WSA and any other associated works required by agencies or for the Stage 1 Airport Development.
Sustainability Plan	Plan required by Condition 29, Section 3.11.5 of the Airport Plan
SWL	Sound Power Level
Sydney West Airport	The Airport. NB: this is the name used in the Act. The Airport is known as Western Sydney International (Nancy-Bird Walton) Airport, or, more commonly, Western Sydney International
TfNSW	Transport for New South Wales
the Project	Western Sydney Airport – Stage 1 Airport Development
TSS	Terminal and Specialty Services
WSA	WSA Co Limited (ACN 618 989 272), the entity responsible for constructing and operating the Airport in accordance with the Airport Plan. For the purposes of the Airports Act, WSA is the “Airport Lessee Company” for WSI.
WSI	Western Sydney International (Nancy Bird Walton) Airport. The Airport. NB: Under the Airports Act, the Airport is referred to as Sydney West Airport

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1. Introduction

1.1 Background/Context

This Noise and Vibration Construction Environmental Management Plan (Noise and Vibration CEMP) (this Plan) has been prepared to satisfy the requirements of the Noise and Vibration CEMP set out in the Conditions for the Stage 1 Development of the Western Sydney International (Nancy-Bird Walton) (WSI) Airport detailed in Section 3.11.2 of the Airport Plan. Specifically, Section 3.11.2 Condition 6(1) of the Airport Plan requires that a Noise and Vibration CEMP be approved under the Airport Plan prior to the commencement of Main Construction Works.

This Noise and Vibration CEMP provides the management approach and requirements (including environmental mitigation measures, controls, monitoring and reporting) for managing noise and vibration during construction of the Stage 1 Airport Development. This Plan forms one of nine CEMPs which are collectively covered by the WSA Site Environmental Management Framework (SEMF). To ensure the environmental resources, responsibilities and management measures are implemented during the construction activities, the SEMF is contained within the Construction Plan (included as Appendix 2). The implementation of the Construction Plan, including the SEMF, sit adjacent to other Project level management plans including the Community and Stakeholder Engagement Plan (CSEP) and the Sustainability Plan as illustrated in Figure 1.

The Construction Plan, including the SEMF, and nine CEMPs provide the environmental management approach and requirements and therefore should not be read in isolation to each other due to interconnecting management outcomes and objectives. For the Noise and Vibration CEMP, it is considered that the following management plan linkages can be made:

- Traffic and Access CEMP – Construction traffic will be a contributor to noise.
- Biodiversity CEMP – Noise impacts on fauna will be a management consideration.
- Community and Stakeholder Engagement Plan (CSEP) – Similar to visual and landscape impacts, it is anticipated that the surrounding community and stakeholders will be sensitive to noise and vibration impacts, particularly during works undertaken outside of the normal construction hours and / or prolonged noisy activities.
- Sustainability Plan – Management and reduction of noise and vibration impacts about quality of life for surrounding communities. This linkage with the WSA Sustainability Plan extends to IS Rating discharge credit Noise Discharge Dis-2 and Vibration Discharge Dis-3, where compliance with this CEMP will ensure the project will meet credit requirements.

Where relevant, linkages to other CEMPs and management objectives have been included in the risk assessment and the environmental control measures (Section 7.6 and Section 9 respectively).

Table 1 highlights relationships and linkages of this Noise and Vibration CEMP with other CEMPs within the environmental management framework including key cross-referencing to Airport Plan and Environmental Impact Statement (EIS) requirements.

Table 1: Noise and Vibration CEMP Relationship with other Plans

CEMP or Plan	Airport Plan Condition (3.11.2)	EIS Chapter Table 20: Management area	EIS Chapter Table 20: Mitigation measures
Aboriginal Cultural Heritage	11	28-12	28-13
Air Quality	10	28-10	28-11
Biodiversity	7	28-04	28-05
Community and Stakeholder	15	28-20	28-21
European and other Heritage	12	28-14	28-15
Noise and Vibration (this Plan)	6	28-02	28-03
Soil and Water	8	28-06	28-07
Sustainability Plan	29	28-37	28-38
Traffic and Access	9	28-08	28-09

CEMP or Plan	Airport Plan Condition (3.11.2)	EIS Chapter Table 20: Management area	EIS Chapter Table 20: Mitigation measures
Visual and Landscape	14	28-18	28-19
Waste and Resources	13	28-16	28-17

Key
Moderate to high relevance to this CEMP
Some relevance to this CEMP

The review and document control process for this Plan are described further in Section 10 of the SEMF.

The context of this Plan in relation to the WSA Environmental Management System (EMS) is presented in Figure 1.

1.2 Document Purpose

The purpose of this Plan is to avoid/mitigate noise and vibration impacts and provide the foundation for the management of all noise and vibration impacts for all construction activities as per the approved Construction Plan; in accordance with best practice and legal requirements (including environmental mitigation measures, controls, monitoring and reporting). Objectives, targets and performance criteria are set out in Section 3 of this CEMP.

This Plan details the noise and vibration management requirements that must be satisfied to demonstrate compliance with Condition 6 of Section 3.11.2 of the Airport Plan for the construction of the Stage 1 Airport Development.

Legal and other requirements are identified and maintained in a register within the SEMF (refer SEMF Appendix L). Specific noise and vibration mitigation measures are included within this CEMP (refer Section 9), are derived from the EIS (refer Section 4.6) and required to be satisfied as well as assessed through risk assessment processes (refer to Section 7.6).

Section 9 outlines how mitigation measures will be implemented and by who and at which phase of construction. Implementation of these measures is ensured through a program of work activities, monitoring, training and competence, inspection, auditing and reporting actions (refer Sections 12 and 13), with the responsibilities for implementation identified in Section 11. Continual improvement processes in relation to environmental management and compliance with regulatory requirements are detailed in the SEMF Section 9.2.

In summary, this plan sets out to achieve the following:

- Provision of details for the management and mitigation measures to be implemented, including timing and responsibilities;
- Ensuring the commitments of the Conditions (as set out in the Airport Plan) and regulatory requirements are met and satisfied by both WSA and contractors;
- Provision of process for monitoring implementation, reporting, and auditing of noise and vibration related management and compliance related issues;
- Commitment to meeting the requirements of AS/NZS ISO 14001: 2016 Environmental Management Systems including the need for continual improvement;
- Provision of a process to be implemented for the management of complaints, for stakeholder engagement, and for the management of emerging environmental issues as they arise; and
- Provision of a system including procedures, plans and documentation for implementation by WSA personnel and contractors to enable Project completion in accordance with the environmental requirements.

Effective implementation of this Plan will assist WSA and relevant contractors to achieve compliance with necessary environmental regulatory and policy requirements in a systematic manner with an outcome of continual environmental management performance.

1.3 WSA EMS Overview

WSA operates in general accordance with AS/NZS ISO 14001 – 2016 Environmental management systems. A copy of the WSA Environmental Policy is provided in Appendix H of the SEMF.

The Stage 1 Airport Development will be undertaken in accordance with the Construction Plan including the SEMF and the associated CEMPs (including this Plan).

The SEMF forms an appendix to the Construction Plan and is the overarching management plan for the implementation of the nine CEMPs. It provides a structured and systematic approach to environmental management and provides an expectation and guidance with regards to environmental management for the construction of the Stage 1 Airport Development.

The structure of the EMS for the Project is shown in Figure 1.

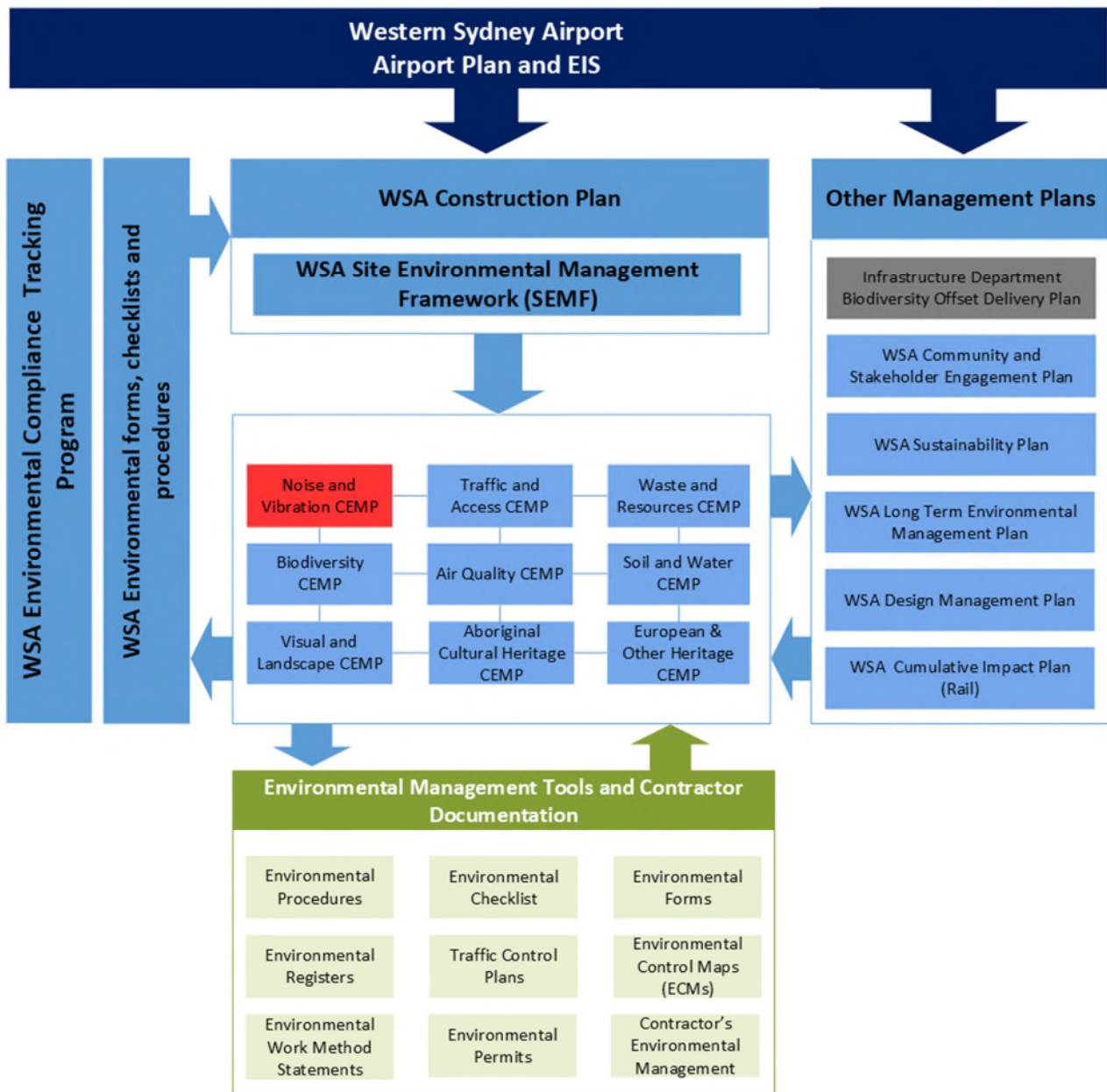


Figure 1: WSA EMS and CEMP Context

1.4 Consultation Requirements of this Plan

Airport Plan Condition 35 outlines the consultation requirements during the preparation of the CEMP documentation and requires consultation with any NSW Government agencies as specified by the NSW Department of Premier and Cabinet (DPC) as well as the NSW Department for Planning and Environment (DPE) for specific CEMPs, including this CEMP. NSW Government agencies specified by DPC for consultation for this CEMP, include DPE, Penrith and Liverpool City Councils.

Further, Airport Plan Condition 6(3) requires that this CEMP to consider Table 28-2 of the EIS which states the CEMP should also be prepared in consultation with the NSW Environment Protection Authority (EPA) and relevant local councils.

Consultation has been completed during the development of this CEMP during the review and update of Revision 0 and 1 in 2018, Revision 2 in 2019, Revision 3 in 2021, Revision 4 in 2022 and this Revision 5 in 2024. A summary of the stakeholder and government authority consultation completed and used to inform the review and finalisation of Revision 5 is presented in **Table 2**.

Consultation will continue with government agencies and other relevant stakeholders throughout the Project where there is a change to a CEMP. The outcomes of this consultation will be documented in subsequent revisions of the relevant CEMPs, with details of such consultation included in the applicable document.

1.4.1 Consultation to Inform Revision 5

A Community and Stakeholder Engagement Plan (CSEP) outlining the process for engaging with stakeholders was prepared by the WSA Community and Engagement team. The CSEP and a scoping document outlining the works in the Construction Plan and potential modification of the CEMPs was provided to the stakeholders as required by the Airport Plan Conditions.

Details of the construction phases were described in the correspondence to provide context to stakeholders on the level of impact that would result from the next phase of construction activities. Upcoming Commercial and Commonwealth Development phase of construction captured in Revision 5 of the CEMPs include a Cargo facility and standalone facilities.

On 04 March 2024, stakeholders were provided with the draft Construction Plan, the nine draft CEMPs and the CSEP to review and were invited to provide comment. A summary of the consultation is provided in **Table 2**.

Table 2: Noise and Vibration CEMP Consultation

Activity	Date	Invitees	Summary
Consultation Summary			
Briefing presentation for stakeholders	20 February 2024	<ul style="list-style-type: none"> Aboriginal Affairs NSW Aerotropolis Community Commissioner Department of Infrastructure, Transport, Regional Development, Communications and the Arts NSW Department of Climate Change, Energy, the Environment and Water Commonwealth Department of Climate Change, Energy, the Environment and Water Department of Communities and Justice NSW Department of Customer Service (Building Commission, Fair Trading, Safework) Department of Planning Housing and Infrastructure (Valuer General, Property, Western Parkland City Authority) Liverpool City Council NSW Health (Health Infrastructure, South Western Sydney and Nepean Blue Mountains Local Health District) NSW Reconstruction Authority (NSWRA) NSW Rural Fire Services Penrith City Council The Cabinet Office (NSW Department of Premier and Cabinet) Transport for NSW 	Stakeholders who joined the meeting were taken through a presentation outlining updates to the Construction Plan, CEMPs and CSEP.
CEMPs provided to stakeholders for comment	04 March 2024	<ul style="list-style-type: none"> NSW Health (Health Infrastructure, South Western Sydney and Nepean Blue Mountains Local Health District) NSW Reconstruction Authority (NSWRA) NSW Rural Fire Services Penrith City Council The Cabinet Office (NSW Department of Premier and Cabinet) Transport for NSW 	

1.5 Certification and Approval

This Noise and Vibration CEMP has been reviewed and approved for issue by the WSA Environment Manager prior to submission to the Commonwealth Department of Infrastructure, Transport, Regional Development, Communications and the Arts (Infrastructure Department) for approval, in accordance with EIS requirement 28-2 (refer **Table 8**).

1.6 Distribution

All WSA personnel and contractors will have access to this Noise and Vibration CEMP via the Project document control management system. Unless otherwise agreed by the Approver, the Approved Plan must be published on WSA's website within one month of being approved and be available until the end of the Construction Period. An electronic copy can be found on the Project website <https://westernsydney.com.au>.

This document is uncontrolled when printed. One controlled hard copy will be maintained by the Quality Manager at the Project office.

2. Scope of Works

The Construction Plan details the construction staging of the Stage 1 Airport Development.

The delivery of the Stage 1 Airport Development will be through a packaging strategy with a wide variety of package sizes, risk profiles and contracting entities detailed in Section 2 of the Construction Plan. Each package (scope of work allocated to one contractor) will have different levels of environmental risk and environmental obligations, depending on the scope of works, location of works and sensitivity of the receiving environment and cultural heritage issues and relevant statutory requirements and obligations.

Stage 1 Airport Development of the Project comprises the following key features:

- Site preparation
- Utilities
- Ancillary developments
- Terminal
- Airside precinct
- Ground transport
- Other building activities
- Aviation support facilities

Details of the Project construction packages, activities, staging and programming including the phases of works for each package are described in Section 6 of the Construction Plan (WSA00-WSA-00000-CN-PLN-000001) as required by the Airport Plan Condition 1(5).

This Plan applies to all phases of works as described in Section 3 and Section 6 of the Construction Plan.

A variation to this Plan will be submitted before work other than Preparatory Activities is undertaken on any other phases of the Project.

3. Objectives and Targets

3.1 Objectives

The key objective of this Plan is to ensure that impacts from noise and vibration are managed to within permitted criteria as far as practicable and best practice mitigation practices are implemented to ensure construction phase emissions do not unduly affect the amenity of surrounding receivers.

To achieve this objective, the following will be undertaken:

- Ensure appropriate measures are implemented to address the mitigation measures detailed in Table 28-2 and Table 28-3 in Chapter 28 the EIS;
- Identifying sensitive receivers and ensure appropriate environmental controls and procedures are implemented during construction activities;
- Minimising potential adverse noise and vibration impacts to the environment and community;
- Identify a process for monitoring implementation, reporting and auditing;
- Describe the process for managing complaints, stakeholder engagement and emerging environmental management issues as they arise; and
- Ensure appropriate measures are implemented to comply with all relevant legislation, licences and other requirements.

3.2 Targets and Performance Criteria

Targets and performance criteria have been established for the management of noise and vibration impacts during the Project which have been derived from the framework and performance criteria identified in the EIS Table 28-2, as presented below in **Table 3**.

Table 3: Noise and Vibration Objectives, Targets and Performance Criteria

Objective	Target	Performance Criteria	Document Reference
Managing noise emissions to within permitted noise level criteria as far as practicable	<ul style="list-style-type: none"> • Nil instances of non-compliance with environmental statutory requirements (e.g. infringement notices, clean-up notices, etc.) 	<ul style="list-style-type: none"> • Weekly Environmental Inspections completed • All Environmental Audits completed • All incidents and non-conformances closed out in a timely manner • Implementation of feasible and reasonable noise mitigation measures with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (ICNG) (DEC, 2009) • Fully compliant monitoring results • Compliance with criteria provided for in the AEPR and any other criteria established for constructions work. • Compliance with vibration criteria set out in German Standard DIM 4150-3: Structural Vibration: Effects of Vibration on Structures. 	<ul style="list-style-type: none"> • Weekly environmental inspection reports • monthly reporting • Infringement notices • Incident and non-conformance reporting • Audit reporting • Annual Compliance Report

Objective	Target	Performance Criteria	Document Reference
		<ul style="list-style-type: none"> Compliance with residential criteria for overpressure from blasting activities (ANZECC, 1990) 	
Implementing best practices noise mitigation practices to ensure noise emissions associated with construction works and associated activities do not unduly affect the amenity of surrounding receivers.	<ul style="list-style-type: none"> Noise or vibration-related complaints associated with the project are addressed within compliant response times Full compliance with this CEMP 	<ul style="list-style-type: none"> All works are to be undertaken within the designated construction hours or with an Out-of-Hours Work Approval Proper community management All plant and equipment maintained in accordance with manufacturers' requirements Conduct pre operational machinery checks according to environmental and safety requirements 	<ul style="list-style-type: none"> Complaints database (CSEP) Out-of-hour work approval register Plant and equipment log books Vehicles checklists

The above targets in **Table 3** have been set to provide a benchmark performance objective to which WSA will endeavour to achieve. Failure to achieve the targets will not be considered a non-conformance, however, will prompt internal review of environmental management and assessment of potential improvement opportunities.

4. Legal and Other Requirements

Relevant environmental legislation and other requirements are identified below.

4.1 Relevant Legislation and Guidelines

As the Western Sydney Airport is to be developed under the Airport Plan determined under the Commonwealth *Airports Act 1996* (Airports Act), some state laws will not be applicable to the Project (refer s112 Airports Act). Where state law is applicable, this Plan will set out the relevant applicable state legislation and requirements and demonstrate how compliance with those laws including obtaining relevant permits will be achieved. Where state laws are not applicable, there may nonetheless be a requirement to have regard to those laws, for example, through mitigation measures to be incorporated in CEMPs to satisfy conditions under the Airport Plan.

4.1.1 Legislation

Relevant environmental legislation and regulations to noise and vibration and this Plan are summarised in **Table 4**. Further legislative details can be found in Section 3.2 of the SEMF and its Appendix L – Legal and other Requirements Register.

Table 4: Principal Environmental Legislation and Relevance

Legislation or Regulation	Relevance	CEMP Compliance Provisions
Commonwealth		
Airports Act 1996 (Airports Act)	<p>The Act and AEPRs set out the framework for the regulation and management of activities at airports that could have potential to cause environmental harm.</p> <p>This includes offences related to environmental harm, environmental management standards, monitoring and incident response requirements.</p> <p>The Airport Plan prepared under the Airports Act covers a number of environmental matters and, in particular, details specific measures to be carried out for the purposes of preventing, controlling or reducing the environmental impact associated with the airport.</p> <p>Criminal offences may be applicable if these measures are not complied with.</p>	<p>This CEMP forms part of the overall WSA EMS which has as a target of full compliance with the Airport Plan.</p> <p>Relevant mechanisms within this CEMP that will contribute to this include but are not limited to:</p> <ul style="list-style-type: none"> • Section 3.1 – Objectives • Section 4.5 – Airport Plan Conditions • Section 4.6 – EIS Requirements • Section 7.6 – Risk assessment • Section 9 – Environmental control measures • Section 11 – Roles and responsibilities • Section 12 – Inspection, Monitoring, Auditing & Reporting • Section 12.5 – Review of approved plans • Section 12.6 – Environmental Incidents and complaints management
Airports (Building Control) Regulations 1997 (1996)	Any conditions imposed on the ABC and ALC on their consents must be satisfied by the Applicant. These conditions are additional to any requirements identified under the CEMPs	This CEMP

Legislation or Regulation	Relevance	CEMP Compliance Provisions
Airports (Environment Protection) Regulations 1997 (AEPRs)	<p>Imposes a general duty to prevent or minimise environmental pollution (including noise pollution) once an airport lease is granted.</p> <p>Promotes improved environmental management practices at airports.</p> <p>Includes provisions setting out definitions, acceptable limits and objectives for noise impacts, as well as monitoring and reporting requirements.</p> <ul style="list-style-type: none"> • Section 2.04 What is offensive noise • Section 4.06 General duty to prevent offensive noise • Section 4.08 Duty - noisy, or potentially noisy, equipment; and • Section 4.09 Duty-noise control equipment. 	<ul style="list-style-type: none"> • Section 3 – Objectives and targets • Section 6 – Noise and vibration criteria • Section 9 – Environmental control measures
NSW		
Environmental Planning and Assessment Act 1979 (EP&A Act)	<p>Objects of the Act include the encouragement of proper management and conservation of natural and artificial resources and the promotion of the orderly and economic use and development of land in NSW. The EP&A Act also provides for the making of environmental planning instruments including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs), which include land use controls, such as development standards applicable to the land within the area covered by each instrument.</p>	<p>This Project has been authorised under the Airports Act; however, a range of matters arising from the EP&A Act have been considered.</p> <p>Section 9 – Environmental Control Measures</p> <p>Section 11 – Roles and Responsibilities</p>
Liverpool Local Environmental Plan 2008 (Liverpool LEP)	<p>The Liverpool LEP provides local environmental planning controls and standards for land in the Liverpool LGA in accordance with the standard environmental planning instrument under the EPA Act.</p>	<p>Section 9 – Environmental Control Measures</p> <p>Section 11 – Roles and Responsibilities</p>
Penrith Local Environmental Plan 2010 (Penrith LEP)	<p>The Penrith LEP provides local environmental planning controls and standards for land in the Penrith LGA in accordance with the standard environmental planning instrument under section 3.20 of the EPA Act.</p>	<p>Section 9 – Environmental Control Measures</p> <p>Section 11 – Roles and Responsibilities</p>
Protection of the Environment Operations Act 1997 (POEO Act), and the Protection of the Environment Operations (General) Regulation 2022	<p>The POEO Act provides a range of controls about noise and vibration management. The object of the Act is to achieve the protection, restoration, and enhancement of the quality of the NSW environment.</p>	<p>Section 9 – Environmental Control Measures</p>
State Environmental Planning Policy Precincts – Western Parkland City) 2021	<p>The SEPP was made in accordance with Division 3.3 of the EP&A Act. Chapter 4 provides planning controls for development within the Western Sydney Aerotropolis (the land immediately surrounding WSI). The SEPP overrides any LEP provisions that apply to that land.</p>	<p>Section 9 – Environmental Control Measures</p>
Work Health and Safety Act 2011 & Work Health and Safety Regulation 2017	<p>The Work Health and Safety Act 2011 provides a framework to protect the health, safety and welfare of all workers and others in relation to NSW workplaces and work activities.</p> <p>The Work Health and Safety Regulation 2017 set out specific requirements for particular hazards and risks, such as noise, machinery, and manual handling.</p>	<p>Work Health & Safety (WHS) Plan</p>

4.1.2 Guidelines and Standards

Guidelines and standards that are relevant to noise and vibration management and this plan are summarised in **Table 5**.

Table 5: Relevant Guidelines and Standards

Guidelines and Standards	Relevance to this CEMP
The Australian and New Zealand Environment Conservation Council (ANZECC) guideline – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZECC, 1990)	Section 6 - Noise and vibration criteria Section 6.5 – Blasting Criteria
Australian Standard AS 2187.2-2006: Explosives - Storage and use - Use of explosives	Section 6.5 - Blasting Criteria
Australian Standard AS 2436:2010 Guide to noise and vibration control on construction, demolition and maintenance sites	Section 6 - Noise and vibration criteria Section 6.1 - Construction noise and assessment objectives Appendix A - AS2436-2010, 'Guide to noise and vibration control on construction, demolition and maintenance sites'
AS/NZS ISO 14001:2016 – Environmental Management Systems	This CEMP
German DIN 4150-3: Structural Vibration: Effects of Vibration on Structures	Section 6 - Noise and vibration criteria Section 6.1 - Construction noise and assessment objectives Section 6.4 - Vibration criteria Section 7.3 - Construction vibration Section 12.2 - Noise and vibration monitoring
NSW Interim Construction Noise Guideline (ICNG) (DEC 2009)	Section 6.1 - Construction noise and assessment objectives Section 6.2 - Quantitative noise assessment criteria
Noise Policy for Industry (2017)	Section 5.2 - Ambient noise Section 6 - Noise and vibration criteria
NSW Assessing Vibration: A Technical Guideline (DEC 2006)	Section 12.2 - Noise and vibration monitoring
Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (1990) Australian and New Zealand Environment and Conservation Council (ANZECC)	Section 6 - Noise and vibration criteria Section 6.5 – Blasting Criteria
Western Sydney Aerotropolis Development Control Plan 2022 Phase 2	Section 4.1.1 - Legislation

4.2 Approvals and other Specifications

Approvals that are relevant to noise and vibration management and this plan are summarised in **Table 6**.

Table 6: Approvals Relevant to Noise and Vibration Management

Approvals	Relevance to this CEMP
Western Sydney Airport Plan	Provides the Conditions of Approval relevant to noise and vibration management during construction.
Western Sydney Airport Environmental Impact Statement	The requirements of noise and vibration management to be taken into account and addressed during the construction phase of the Stage specifically EIS Table 28-2.

In addition to the above approvals, the following specifications are relevant to noise and vibration management and this CEMP:

- WSA Functional Specifications;
- WSA Sustainability Plan;
- WSA CESP; and
- WSA Construction Plan, including the SEMF.

4.3 Airport Plan Conditions

Conditions relevant to noise and vibration management during construction of the Stage 1 Airport Development are documented in Section 3.11.2 of the Airport Plan and summarised in **Table 7**. Compliance with the Airport Plan conditions is a statutory requirement and as such, failure to comply may constitute a criminal offence liable to criminal prosecution under the Airports Act.

Table 7: Conditions Relevant to Noise and Vibration Management

Condition No.	Condition	Timing	Responsibility	Document Reference
1.4	The Site Occupier must ensure that no CEMP is inconsistent with the approved Construction Plan.	Ongoing	WSA	This CEMP
1.5	The approved Construction Plan may provide for Main Construction Works to be carried out in phases that commence at different times for different parts of the Airport Site or an Associated Site. If it does, the Site Occupier may prepare a CEMP in relation to one or more phases, and the criteria for approval of such a CEMP are taken to exclude any matter irrelevant to the phases for which approval is sought. A variation of the CEMP must be submitted for approval in accordance with condition 49 (Variation of Approved Plans) prior to commencement of any new phase.	Ongoing	WSA	This CEMP and the Construction Plan
5.3	In carrying out a Preparatory Activity for the Airport Stage 1 Development, the Site Occupier must: <ul style="list-style-type: none"> a) implement any plan approved in accordance with sub condition (1) or (2), except to the extent that the plan is inconsistent with any subsequently approved CEMP or the approved Construction Plan; and b) not act inconsistently with any approved CEMP or the approved Construction Plan. 	Construction Works	WSA	SEMF

Condition No.	Condition	Timing	Responsibility	Document Reference
6.1	The Site Occupier must not: a) Commence Main Construction Works until a Noise and Vibration CEMP has been prepared and approved in accordance with this condition; or b) Carry out any development described in Part 3 of the Airport Plan inconsistently with the approved Noise and Vibration CEMP	Prior to Main Construction Works	WSA	This CEMP
6.2	The Site Occupier must: a) Prepare, and b) Submit to an Approver for approval; a Noise and Vibration CEMP in relation to the carrying out of the developments which are part of the Airport Stage 1 Development.	Prior to Main Construction Works	WSA	This CEMP
6.3	The criteria for approval of the Noise and Vibration CEMP are that an Approver is satisfied that: a) in preparing the Noise and Vibration CEMP, the Site Occupier has taken into account Table 28-2 in Chapter 28 of the EIS; and b) the Noise and Vibration CEMP complies with Table 28-3 in Chapter 28 of the EIS and is otherwise appropriate.	Prior to Main Construction Works	Approver	This CEMP
6.4	The Noise and Vibration CEMP must: a) provide for respite periods for Sensitive Receptors from noise and vibration associated with construction activities; and b) not permit blasting activity during the hours of 5 pm to 9 am on weekdays, on weekends (other than 9 am to 1 pm Saturdays) and on public holidays.	Prior to Main Construction Works	WSA	Section 9: Environmental Control Measures Section 10: Working outside of standard construction hours
35	An Approver must not approve a plan referred to in Chapter 28 of the EIS unless he or she is satisfied that the Plan Owner: a) in preparing the plan, has consulted with any NSW Government agencies specified by the NSW Department of Premier and Cabinet; and b) has provided: (i) the Approver; and (ii) each consulted agency; with an explanation of how any responses have been addressed.	Ongoing	Approver	Section 1.4: Consultation Requirements for this Plan
42	Cumulative Impacts Plan (1) The Rail Authority must not commence Rail Construction Works until a Cumulative Impacts Plan has been approved in accordance with this condition. (2) The ALC must: a) prepare; and b) submit to an Approver for approval;	Prior to rail construction works occurring	WSA and the Approver	Cumulative Impacts Plan (Rail) - WSA00-WSA-00400-EN-PLN-000013

Condition No.	Condition	Timing	Responsibility	Document Reference
	<p>a Cumulative Impacts Plan in relation to cumulative impacts arising from the concurrent construction of the Airport Stage 1 Development and the Rail Development.</p> <p>(3) The criteria for approval of the Cumulative Impacts Plan are that an Approver is satisfied that the Cumulative Impacts Plan:</p> <ul style="list-style-type: none"> a) sets out: <ul style="list-style-type: none"> (i) co-ordination and consultation requirements between the following stakeholders as relevant to manage the interface of projects under construction at the same time: the ALC, the Rail Authority, Transport for NSW, Western Parkland City Authority, Sydney Water, emergency service providers and utility providers; (ii) the responsibility for management of the impacts set out in the Cumulative Impacts Plan; (iii) the relevant environmental management framework relating to construction of the Airport Stage 1 Development and the Rail Development; and (iv) the process for proactively identifying and managing cumulative impacts; b) has been prepared in consultation with the Rail Authority; and c) is otherwise appropriate. <p>(4) Each of the Rail Authority and the ALC must not act inconsistently with the approved Cumulative Impacts Plan.</p>			
45 to 50	Set out requirements in relation to informing other parties of conditions, keeping records, publishing reports, independent audits, variation to approved plans and publication of approved plans.	Ongoing	WSA and Approver	This CEMP

4.4 EIS Requirements

The requirements of noise and vibration management to be taken into account and addressed during the construction phase of the Stage 1 Airport Development are included in the EIS, specifically Table 28-2 and 28-3.

A summary of these requirements and how they have been addressed in this Noise and Vibration CEMP is presented in **Table 8**.

Table 8: Summary of Noise and Vibration Management Requirements

EIS Reference	Topic	Summary	Noise and Vibration CEMP Reference
Table 28-2	Performance criteria	<p>Performance criteria for managing construction noise and vibration are:</p> <ul style="list-style-type: none"> • Compliance with the approved Noise and Vibration CEMP; • Compliance with criteria provided for in the AEPR and any other criteria established for construction works in the approved Noise and Vibration CEMP; • Compliance with vibration criteria set out in German Standard DIN 4150-3: Structural Vibration: Effects of Vibration on Structures; and • Compliance with residential criteria for overpressure from blasting activities (ANZECC, 1990). 	Section 3 – Objectives and targets
Table 28-2	Implementation framework	A Noise and Vibration CEMP will be approved prior to commencement of Main Construction Works for the proposed airport. The Noise and Vibration CEMP will collate measures to mitigate and manage potential noise and vibration impacts, including cross-references to other environmental management plans where they are relevant.	Section 9 – Environmental control measures
		The Noise and Vibration CEMP will as a minimum:	-
		Detail the management and mitigation measures to be implemented, including those outlined in Table 28-3;	4.4 - EIS requirements
		Describe the process for managing complaints, stakeholder engagement, and emerging environmental management issues as they arise;	Section 12.6 – Environmental Incidents and complaints management Section 10 - Working outside standard construction hours
		Specify the process for monitoring implementation, reporting, and auditing; and	Section 12– Environmental inspection, monitoring, auditing and reporting
		Identify the party responsible for implementing the Noise and Vibration CEMP.	Section 11– Environmental roles and responsibilities
Table 28-2	Monitoring	<p>General monitoring requirements are set out under the AEPR. These include that:</p> <ul style="list-style-type: none"> • Monitoring must take place under direction of an appropriately qualified person; • Monitoring for construction and road traffic noise for sensitive receptors; and • The results for the monitoring must be kept in a written record. 	Section 12.2 – Noise and Vibration Monitoring
		Additional monitoring requirements include that:	-
		Noise and vibration monitoring locations will be determined in consultation with the NSW Environment Protection Authority;	Section 12.2.1 - Stage 1 Airport Development Noise monitoring program

EIS Reference	Topic	Summary	Noise and Vibration CEMP Reference
		Regular site inspections will be undertaken to monitor compliance with the Noise and Vibration CEMP and record inspection results;	Section 12.1 - Environmental inspections
		An inspection log will be made available to the Infrastructure Department upon request; and	Section 12.1 - Environmental inspections
		The frequency of site inspections will be increased by the person accountable for onsite noise and vibration issues when activities with a high potential to result in elevated noise emissions are undertaken in close proximity to residential receptors.	Section 12.1 - Environmental inspections
Table 28-2	Auditing and reporting	General reporting requirements are set out under AEPR	-
		In addition, an annual report will be prepared and submitted to the Secretary of the Department of Infrastructure and Regional Development in relation to compliance with Noise and Vibration CEMP.	Section 12.4 - Environmental reporting
		The Community and Stakeholder Engagement Plan provides for the development of a complaints log and includes specific measures for how complaints will be managed.	Section 12.6 - Environmental Incidents and complaints management
Table 28-2	Responsibility	Responsibilities include:	-
		The Noise and Vibration CEMP will be prepared in consultation with the NSW Environment Protection Authority and NSW Health;	Section 1.4 – Consultation requirements of this Plan
		The Noise and Vibration CEMP will be submitted for approval to the Infrastructure Minister or an SES Officer in the Department of Infrastructure and Regional Development;	Section 1.5 – Certification and approval
		The design and construct (D&C) contractor will be responsible for implementing site specific environmental procedures and work method statements applicable to the proposed works in accordance with the requirements of the Noise and Vibration CEMP; and	Section 1.2 – Document Purpose SEMF Section 4 – Roles and Responsibilities
		The airport environment officer will be responsible for day-to-day regulatory oversight of the AEPR compliance at the airport after an airport lease is granted.	Section 1.4 - Consultation requirements of this Plan SEMF Section 4 – Roles and Responsibilities
Table 28-3	Construction Noise and Vibration CEMP	Ensure, where feasible, the noise emissions comply with the construction noise guidelines in Schedule 4 of the AEPR	Section 6.1 - Construction noise and assessment objectives Section 6.3 - Adopted project Noise Management Levels
Table 28-3	Construction Noise and Vibration CEMP	Identify construction activities which are predicted to exceed any noise management levels set for the proposed airport and develop proposed actions, such as notification of affected receivers.	Section 8.1 - Construction activities

EIS Reference	Topic	Summary	Noise and Vibration CEMP Reference
Table 28-3	Construction Noise and Vibration CEMP	Ensure that vibration and airblast from rock blasting and other construction activities comply with relevant vibration damage guideline values in German Standard DNI 4105-3 and vibration and airblast criteria in ANZECC 1990, to protect the amenity of local residents and avoid building damage.	Section 6 - Noise and vibration criteria Section 6.1 - Construction noise and assessment objectives Section 6.4 - Vibration criteria Section 6.5 – Blasting Criteria Section 7.3 - Construction vibration Section 12.2 - Noise and vibration monitoring
Table 28-3	Construction Noise and Vibration CEMP	Determine noise and vibration monitoring, reporting and response procedures.	Section 12 - Environmental inspection, monitoring, auditing and reporting
Table 28-3	Construction Noise and Vibration CEMP	Describe specific mitigation treatments, management methods and procedures to be implemented to control noise and vibration during construction.	Section 6 - Noise and vibration criteria Section 9 - Environmental control measures Section 10 - Working outside of standard construction hours
Table 28-3	Construction Noise and Vibration CEMP	Describe construction timetabling to minimise noise impacts, including time and duration restrictions, respite periods and frequency.	Section 10.1 - Standard Construction Hours Section 10.2 - Out of hours works Figure 11: Respite periods
Table 28-3	Construction Noise and Vibration CEMP	Describe procedures for notifying residents of construction activities likely to affect their amenity through noise and vibration	Section 10.3 - Community notification
Table 28-3	Construction Noise and Vibration CEMP	Define contingency procedures to be implemented in the event of non-compliance and /or noise complaints.	Section 12.6 - Environmental Incidents and complaints management SEMF

5. Existing Environment

The following information is summarised from the EIS and refers to the Airport Site and surrounding environment. Refer to Chapter 11 of EIS Volume 2A for the noise and vibration assessment.

For the phase of Main Construction Works covered by this CEMP, the existing environment described herein is considered consistent and acceptable for consideration in the risk assessment process and the identification of suitable environmental mitigation measures and controls - for details with regards to environmental mitigation measures and controls for management of noise and vibration impacts refer to Section 9.

5.1 Sensitive Receptors

Sensitive receptors were identified within about five kilometres of the Airport Site for the purpose of assessing the potential impacts of noise and vibration at these locations. These sensitive receptor types include residences, schools, churches, and other community infrastructure.

The location of the sensitive receivers in relation to the Airport Site in general, and specifically to the phase of Main Construction Works covered by this CEMP is included in Appendix B.

5.2 Ambient Noise

Ambient noise levels in the vicinity of the Airport Site are reflective of the mostly rural residential character of the area, with dominant existing noise sources including road traffic and industry as described in the EIS. Background noise measurements were carried out at 11 locations selected to represent potentially noise affected areas. Refer Section 12.5 for more information.

From the measurement data, the Rating Background Level (RBL) as defined in the NSW Industrial Noise Policy was determined for the selected locations as presented in **Table 9**.

Table 9: Measured Background Noise Levels (LA₉₀)

Location	Rating background level (dBA)*		
	Day (7am – 6pm)	Evening (6pm – 10pm)	Night (10pm – 7am)
9 Harold Bentley Way, Glenmore Park	39	42	38
16 Park Avenue, Springwood	29 ¹	32	24 ¹
17 Blue Ridge Place, Orchard Hills	34	38	36
25 Peter Pan Avenue, Wallacia	37	34	28 ¹
27 Dwyer Road, Bringelly	33	38	35
35 Ramsay Road, Rossmore	35	37	35
54 Ridgehaven Road, Silverdale	36	36	31
114 Mount Vernon Road, Mount Vernon	34	35	33
120 Vincent Avenue, Mulgoa	38	42	35
Twin Creeks Golf Club, 2 Twin Creeks Drive, Luddenham	34	38	33
8 Wade Close, Luddenham	35	36	34

*data provided is from the EIS

¹ According to the NSW Industrial Noise Policy, where the RBL has been measured as less than 30 dBA, it should be assumed to be 30 dBA for the purpose of setting noise criteria. This applies to the RBL at the Springwood and Wallacia locations.

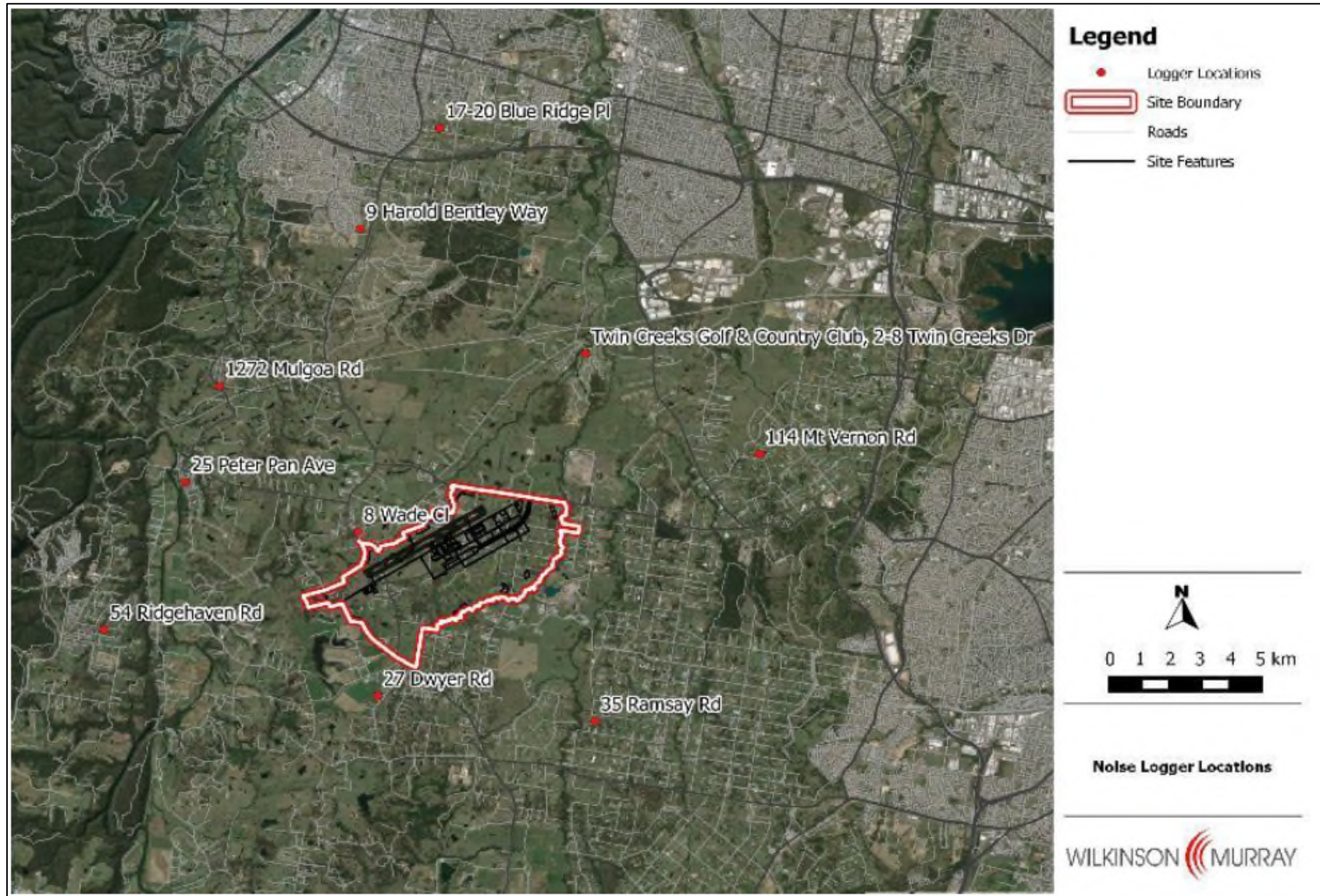


Figure 2: Background Noise Measurement Locations (WSA EIS, 2016)

6. Noise and Vibration Criteria

Management levels and goals used in assessing construction noise and vibration are outlined in:

- *Airports (Environment Protection) Regulations 1997* (AEPR);
- ANZECC Guideline, Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC, 1990);
- Australian Standard AS2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites;
- German Standard DIN 4150-3: Structural Vibration: Effects of Vibration on Structures;
- Interim Construction Noise Guideline (ICNG) (DEC, 2009);
- Noise Policy for Industry (EPA, 2017); and
- NSW Road Noise Policy (RNP) (DEC, 2011).

Relevant elements of these documents are summarised and discussed in this section.

6.1 Construction Noise and Assessment Objectives

6.1.1 AEPR

The *Airports (Environmental Protection) Regulations 1997* (AEPRs) include provisions setting out definitions, acceptable limits and objectives for noise impacts, as well as monitoring and reporting requirements for the operation of Airports.

Part 1: The objectives of the AEPR are:

- (a) To establish, in conjunction with national environment protection measures made under section 14 of the *National Environment Protection Council Act 1994*, a Commonwealth system of regulation of, and accountability for, activities at airports that generate, or have potential to generate:
 - (i) pollution; or
 - (ii) excessive noise.
- (b) to promote improving environmental management practices for activities carried out at airport sites.

Regulation 4.06 of the AEPR sets out a general duty to take reasonable and practicable measures to prevent the generation of offensive noise or if prevention is not reasonable or practicable, to minimise the generation of offensive noise.

Under regulation 4.07, an operator of an undertaking at an airport is complying with the duty in Reg 4.06 if noise levels are under the guidelines in Schedule 4 of the AEPR.

Part 2 of the AEPR includes the Guidelines that are relevant to the construction of the Stage 1 Airport Development and include:

2.02 Noise from Construction, etc:

- (a) Noise generated from construction, maintenance or demolition of a building or other structure at an airport should not exceed 75 dB(A), calculated in accordance with subclause (2), at the site of a sensitive receptor; and
- (b) For sub regulation (1), the sound pressure level of a noise is the sound pressure level that is exceeded for 10 per cent of a period of at least 15 minutes, adjusted to take account of tonal character and impulsiveness (if any) of the noise.

2.03 Noise from road traffic

Noise generated from road traffic on the site of an operator of an undertaking at an airport should not exceed:

- (a) 60 dB(A), calculated as the equivalent continuous A-weighted sound pressure level for a 24-hour period of measurement; and
- (b) 55 dB(A), calculated as the equivalent continuous A-weighted sound pressure level for an 8-hour period of measurement from 22:00 hours on a day to 06:00 hours on the following day.

The AEPRs has additional criteria in relation to commercial receptors (see reg 3.02 of Sch 4).

Part 4 of Schedule 4 also provides procedures and standards for measuring construction noise (AS 1055) and Road traffic noise (AS 2702). In addition, AS2436 provides guidance for the Typical Sound Levels of Construction Plant and Equipment.

6.1.2 Interim Construction Noise Guideline (ICNG)

Interim Construction Noise Guideline (ICNG) 2009 provides guidelines for the assessment and management of construction noise. The ICNG focuses on applying a range of work practices to minimise construction noise impacts rather than focusing on achieving numeric noise levels.

The main objectives of the ICNG are to:

- Identify and minimise noise from construction works;
- Focus on applying all 'feasible' and 'reasonable' work practices to minimise construction noise impacts;
- Encourage construction during the recommended standard hours only, unless approval is given for works that cannot be undertaken during these hours;
- Reduce time spent dealing with complaints at the project implementation stage;
- Provide flexibility in selecting site-specific feasible and reasonable work practices to minimise noise impacts;

Performance criteria for managing construction noise and vibration are;

- Ensure general compliance with the ICNG;
- Compliance with vibration criteria set out in German Standard DIN 4150-3: Structural Vibration: Effects of Vibration on Structures; and
- Compliance with residential criteria for overpressure from blasting activities (ANZECC, 1990).

6.2 Quantitative Noise Assessment Criteria

ICNG recommends noise management levels (NMLs) to assist the management of noise on construction sites both during and outside standard construction hours (Monday to Friday, 7.00am to 6.00pm and Saturday 8.00am to 1.00pm). Where noise at sensitive receptors is expected to exceed NMLs, implementation of reasonable and feasible noise mitigation is recommended and consultation with affected people encouraged.

For works during standard construction hours, the NML is background plus 10 dBA for residential locations. For works outside of normal construction hours, the NML is background plus 5 dBA.

Where construction would be undertaken during the night-time period the potential for sleep disturbance should be assessed. The current approach to identifying potential sleep disturbance impacts is to set a screening criterion 15 dB above the RBL during the night-time period (10.00pm to 7.00am).

The term 'screening criterion' indicates a noise level that is intended as a guide to identify the likelihood of sleep disturbance. It is not a firm criterion to be met, however where the criterion is met sleep disturbance is unlikely. When the screening criterion is not met, a more detailed analysis is required.

The detailed analysis should assess the maximum noise level or LA1 (one minute), the extent that the maximum noise level exceeds the background noise level and the number of times any exceedance occurs during the night-time period.

The NSW Road Noise Policy contains a section on sleep disturbance that includes a summary of current literature; concluding that:

- Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions; and

- One or two events per night, with maximum internal noise levels of 65 dB to 70 dB, are not likely to affect health and wellbeing significantly.

6.3 Adopted Project Noise Management Levels

Based on the daytime RBLs shown in Table 9, the residential NML for standard construction hours will be between 39 dBA and 49 dBA. As stated in the EIS Section 11.4.2, for assessment of construction noise, a noise management level of 45 dBA (average RBL plus 10 dBA) may reasonably be adopted for all residential receptors. A NML of 40 dBA (average RBL plus 5 dBA) has been adopted for weekend works, early morning works, and nightworks (outside standard construction hours). The out of hours NML is used to assess potential predicted exceedances to determine mitigation measures. Where monitoring indicates that the predicted level has been exceeded to an extent that the mitigation measures are not appropriate, this will trigger a review to determine if the noise was the result of Project construction activities. If this is confirmed, then the non-conformance process detailed in the SEMF Section 8 will be enacted.

The NMLs set for all residential receptors are below criteria for construction at airports of 75 dBA outlined in Schedule 4 of the AEPR in Section 6.1. Any occurrence where noise monitoring stations record noise in exceedance of this noise level will trigger a review to determine if the noise generated would be above the 75 dBA threshold at a residential receptor and was the result of Project construction activities. If this is confirmed, then the non-conformance process detailed in the SEMF Section 8 will be enacted.

6.4 Vibration Criteria

The German Standard DIN 4150-3: Structural Vibration: Effects of Vibration on Structures is the most stringent vibration standard typically used to protect buildings from vibration damage. The standard recommends frequency-based vibration damage guideline values (DIN 41503) summarised in **Table 10**.

Table 10: Vibration Damage Guideline Values (DIN 41503)

Type of Structure	Guideline Value, Peak Particle Velocity (mm/s)
Dwellings and buildings of similar design	5
Vibration sensitive buildings (heritage)	3

6.5 Blasting Criteria

During construction, it is possible that blasting may be carried out at locations where hard rock is encountered. The Australian and New Zealand Environment Conservation Council's (ANZECC) Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC, 1990) recommends residential criteria for the assessment of vibration and air blast from blasting. These criteria are designed to protect the comfort of occupants of residential buildings and are summarised in **Table 11**.

Table 11: ANZECC Vibration and Air Blast Criteria

Issue	Measure	Criterion for 95% of blasts	Criterion for 100% of blasts
Vibration	mm/s PPV	5	10
Air blast	dBL Peak	115	120

7. Noise and Vibration Aspects and Impacts

The potential for noise and vibration impacts was considered in Chapter 11 of the EIS. An assessment was undertaken of the potential sources detailed in Section 6.1. The findings are summarised in the sections below. A more detailed construction noise and vibration assessment, specific to each phase in the Construction Plan has been prepared and the results and findings of the assessments are presented in Section 8.

7.1 Construction Noise Impacts

The EIS identified that under worst case conditions, noise emissions arising from construction activities will be predominantly limited to the Airport Site and immediate surrounds. The adopted construction noise management criteria, as detailed in Section 6.3, has been set to ensure noise and vibration impacts on sensitive receivers are managed and to ensure that the guideline level of 75 dBA set in the AEPR is met at all surrounding receptors. A range of mitigation and management measures listed in Section 9 are to be adopted to mitigate disturbance to nearby receptors, particularly for construction activity outside of standard construction hours.

The estimated population likely to be affected by noise levels above the adopted NML during standard hours as assessed in the EIS is summarised in **Table 12**. The sections referred to in the first column are based on the indicative sections shown in Figure 3.

Table 12: Estimated Residential Population Affected by Levels above NML - Standard Construction Hours

Location*	NML	Estimated residential population affected above criterion
East section	45 dBA	0
North section	45 dBA	103
North-west section	45 dBA	199
South-west section	45 dBA	14

* Refer to Figure 3

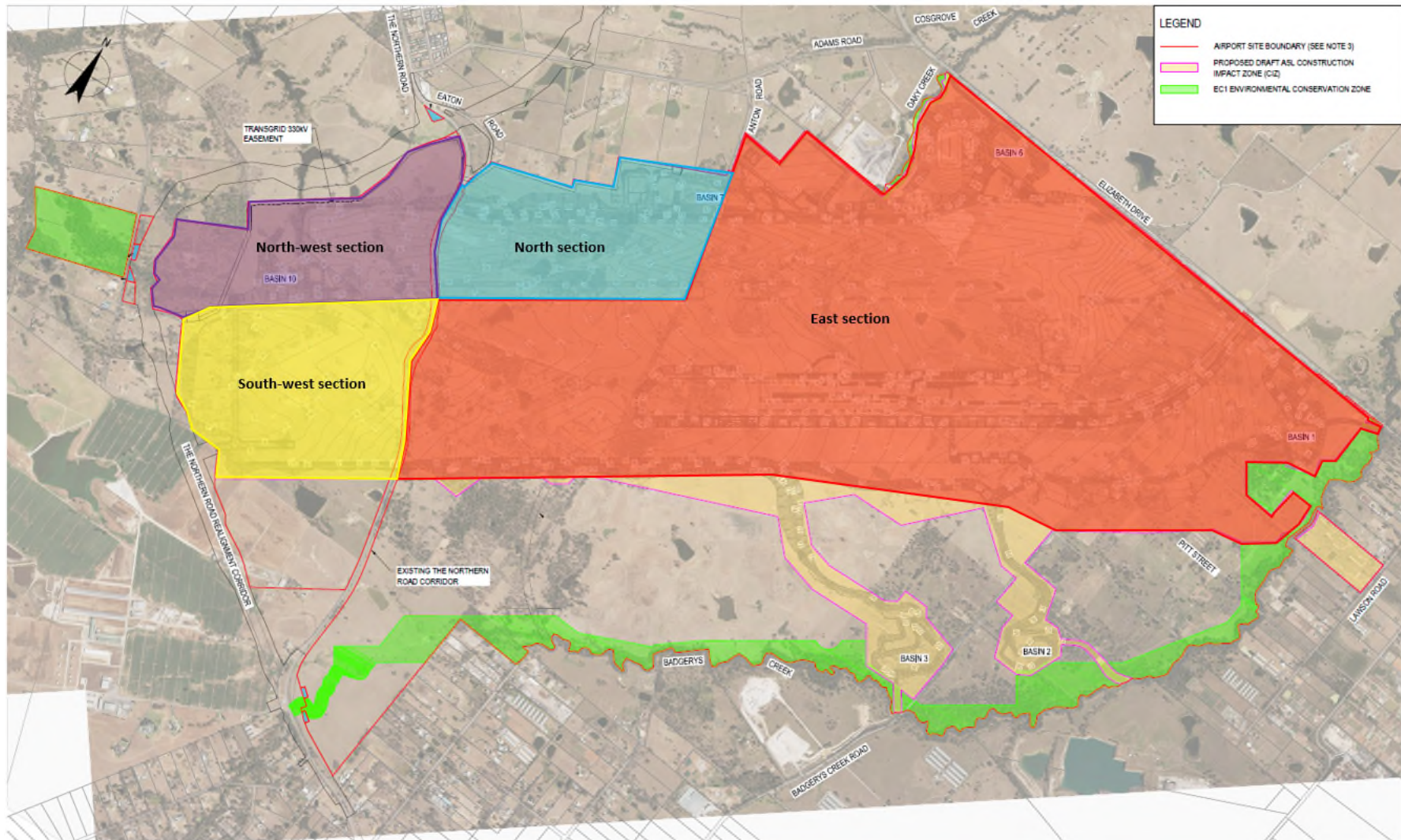


Figure 3: Indicative Airport Site Sections Used for Noise Assessment (WSA EIS, 2016)

The estimated population likely to be affected by noise levels above the adopted NML outside standard hours is shown in **Table 13**.

Table 13: Estimated Residential Population Affected by Levels above NML– Outside Standard Construction Hours

Location*	NML	Estimated residential population affected above criterion
East section	40 dB(A)	48
North section	40 dB(A)	527
North-west section	40 dB(A)	531
South-west section	40 dB(A)	140

*Refer to Figure 3

7.2 Construction Traffic Noise

Construction traffic will access the Airport Site via the following roads Elizabeth Drive, Adams and Anton Roads, The Northern Road, and Badgerys Creek Road. Details on predicted volumes of increased traffic are outlined in the EIS and the Traffic and Access CEMP. The predicted increase in noise from construction traffic is less than 2 dB(A).

The cumulative impacts associated with traffic noise and construction noise on a whole of site basis is included in the Traffic and Access CEMP.

7.3 Construction Vibration

Vibration will be generated by specific construction plant as part of the construction works. In the absence of an applicable Australian Standard, the most stringent vibration standard, the German Standard DIN 4150-3:1999 was used to assess building vibration damage. A lower guideline value applying to vibration sensitive buildings of 3 mm/s was adopted as a threshold of damage from construction vibration.

Vibration during construction may be generated by the ripping of rock; however, the 3 mm/s guideline value is not expected to be exceeded therefore there is no risk of damage outside the airport boundary.

Attended vibration monitoring or vibration trials will be undertaken when proposed works are within the safe working distances to ensure that levels remain below the criterion. Building condition surveys will also be completed both before and after the works at any potentially affected properties to identify existing damage and any Project related damage.

7.4 Blast Vibration and Air-blast

To date, the Bringelly shale and Luddenham dyke at the airport has been excavated using surface miners.. In the event that blasting was required, a detailed blasting vibration and overpressure assessment would be conducted as part of any potential blast design A Blast Management Plan prepared by the Contractor, reviewed by the WSA Environment Team and approved by the WSA Environment Manager prior to the works being undertaken would also be required.

Section 9 provides a suite of mitigation measures that will be implemented to avoid or minimise the potential noise and vibration impacts.

7.5 Cross-Packages Impacts

WSA's ongoing works will include the delivery of an increasing number of concurrent works packages. Accordingly, and with respect to noise and vibration, it is necessary to consider the cumulative impact of interfacing construction packages to ensure that effective mitigation measures are identified and implemented.

To achieve this, WSA will facilitate regular cross package planning meetings to identify potential noisy works with a focus on proposed Out of Hours activities or works where two or more work packages are located close to a receptor. The purpose of these forums will be to identify when and where concurrent Out of Hours works or high-risk works will occur such that the cumulative impact of these works can be appropriately mitigated and where possible avoided.

These mitigation measures may include:

- Selection of alternate methods or machinery
- Targeted community consultation
- Respite periods
- Alternating OOHW programs between packages
- Attended monitoring to allow real time assessment of noise impacts and targeted mitigation

The WSA Out of Hours Work Procedure (Appendix S of the WSA SEMF) and Permit (Appendix D of the WSA SEMF) prescribes that Permit applicants must consider the nature and timing of interfacing works and discuss with WSA accordingly. This permit also allows for focussed attended noise monitoring at source and receivers to be a condition of permit approval.

WSA will also undertake consolidated noise modelling of combined package works to aid in assessment of out of hours approvals and verify potential impacts, this may include development of a predictive noise assessment tool to supplement the current approach of combining contractor modelled noise estimates using $L = 10 \log_{10}(\sum_{i=1}^n 10^{(L_i/10)})$ to confirm combined noise does not exceed the mitigation and notifications already in place (based on the highest category permit).

A targeted WSA and Contractor inspection program will also be scheduled to assess the effectiveness of controls and the potential need to increase or augment mitigations measures to manage potential cumulative impacts.

For SMWSA works, a separate Cumulative Impact Plan (CIP) has been developed to allow for effective planning and management of noise and vibration impacts from rail and airport construction activities. Refer to the CIP (WSA00-WSA-00400-EN-PLN-000013) for more details. Additionally, a specific intent of out of hours work form has been developed for use by Sydney Metro.

7.6 Risk Assessment

A risk assessment has been undertaken as part of the review and development of this CEMP and in accordance with Environmental Aspects, Impacts and Risk Procedure (Appendix G of the SEMF). The parts of the overall risk assessment relevant to noise and vibration have been extracted and summarised in **Table 14**, and apply to all phases of works that the Construction Plan authorises.

The identification of construction activities and associated impacts that could eventuate during construction of the Project is central to the selection of appropriate environmental safeguards.

The risk management process involved an assessment of all specific Project activities/aspects in or near environmentally sensitive areas and resulted in the development of a list of environmental risks (effects and impacts) and a corresponding risk mitigation strategy and risk ranking.

The identification of risks included a review of the works, and review of the environmental risks identified by the EIS. The mitigations in the risk assessment are in line with the EIS mitigation measures.

Table 14: Noise and Vibration Risk Assessment

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
1.	Site Establishment	Delivery of materials to compound	Noise generation	Community and local road disturbance	Medium (18)	NV_01 NV_07 NV_10 NV_16 NV_17 NV_20	Medium (14)	Noise and Vibration CEMP Biodiversity CEMP Traffic and Access CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
2.	Site Establishment	Operation of site compound	Noise generation	Community and local road disturbance	High (22)	NV_01 NV_02 NV_06 NV_07 NV_21 NV_25 NV_28	Medium (15)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
3.	Utility works	Potholing and trenching	Noise generation	Community and local road disturbance	Low (9)	NV_01 NV_07 NV_15 NV_18 NV_28	Low (6)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
4.	Earthworks	Topsoil stripping	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_18 NV_19 NV_28	Low (9)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
5.	Earthworks	Vegetation clearing	Noise generation	Community disturbance	Medium (18)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_18 NV_19 NV_28	Low (9)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
6.	Earthworks	Embankment creation and stabilisation	Noise generation	Community disturbance	Medium (18)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_18 NV_19 NV_28	Medium (14)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
7.	Earthworks	Compaction of materials	Vibration	Community disturbance and building damage	Medium (14)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_18 NV_19 NV_28	Low (10)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
8.	Earthworks	Material stockpiling	Noise generation	Community disturbance	High (19)	NV_01 NV_07 NV_09 NV_10 NV_11 NV_14 NV_15 NV_17 NV_18 NV_19 NV_28	Medium (15)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
9.	Material Import	Import and export of materials from site	Noise generation	Community and local road disturbance	Medium (14)	NV_01 NV_07 NV_10 NV_11 NV_16 NV_17 NV_20 NV_28	Medium (15)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
10.	Culvert construction	Culvert excavation	Noise generation	Community disturbance	Medium (14)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_18 NV_19 NV_28	Low (10)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
11.	Culvert construction	Culvert compaction	Vibration	Community disturbance	Low (9)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_18 NV_19 NV_28	Low (6)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
12.	Road construction	Milling and excavation of road surface	Noise generation	Community disturbance	High (21)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_18 NV_19 NV_28	Medium (18)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
13.	Road construction	Compacting materials	Vibration	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_18	Low (6)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM)

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
						NV_19 NV_28		Complaints Procedure Community and Stakeholder Engagement Plan
14.	Out of hours works	Works on site border closest to residents	Noise generation	Disturbance to sensitive receivers on Overett Avenue, Kemps Ck, Eaton Road	Medium (17)	NV_01 NV_06 NV_09 NV_10 NV_11 NV_12 NV_13 NV_15 NV_16 NV_17 NV_18 NV_20 NV_21 NV_22 NV_23 NV_25 NV_26 NV_27 NV_28 NV_32	Medium (13)	Noise and Vibration CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
15.	Out of hours works	General works	Noise generation	Disturbance to sensitive receivers in Adams Rd, Luddenham	Medium (17)	NV_01 NV_06 NV_09 NV_10 NV_11 NV_12	Medium (13)	Noise and Vibration CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
						NV_13 NV_15 NV_16 NV_17 NV_18 NV_20 NV_21 NV_22 NV_23 NV_25 NV_26 NV_27 NV_28 NV_32		
16.	Out of hours works	General works	Noise generation	Disturbance to sensitive receivers on Badgerys Rd South and Eaton Road.	Medium (17)	NV_01 NV_06 NV_09 NV_10 NV_11 NV_12 NV_13 NV_15 NV_16 NV_17 NV_18 NV_20 NV_21 NV_22 NV_23 NV_25 NV_26 NV_27 NV_28	Medium (13)	Noise and Vibration CEMP Soil and Water CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
17.	Out of hours works	Road closures	Noise generation	Community and local road disturbance	Medium (17)	NV_01 NV_07 NV_09 NV_11 NV_12 NV_15 NV_21 NV_22 NV_23 NV_24 NV_25 NV_26 NV_27 NV_28 NV_32	Medium (13)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
18.	Out of hours works	Excavation	Noise generation	Community and local road disturbance	Medium (17)	NV_01 NV_07 NV_09 NV_11 NV_12 NV_13 NV_14 NV_15 NV_18 NV_19 NV_28 NV_32	Medium (13)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
19.	Out of hours work	Compaction	Vibration	Damage to residential structures	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_18 NV_19 NV_28	Low (9)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
20.	Dewatering	Using diesel pumps	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_21 NV_28	Low (9)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
21.	Construction Works – Typical	General education	Site requirements	Failure to follow site protocols	Low (9)	NV_01 NV_06 NV_07	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
22.	Construction Works - Typical	Construction of compound buildings, parking and amenities	Noise Generation	Community disturbance	Low (9)	NV_01 NV_04 NV_05	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
23.	Construction Works - Typical	Subcontractor engagement / Commencement not following procedures	Noise Generation	Community and local road disturbance	Low (9)	NV_01 NV_06 NV_07	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
24.	Construction Works - Typical	Operation of Mobile Plant and Equipment	Noise Generation	Community and local road disturbance	Low (9)	NV_10 NV_12 NV_16	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
25.	Site Establishment	Installation of site shed & ablution blocks	Noise Generation	Community disturbance	Low (9)	NV_01 NV_06 NV_07	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
26.	Site Establishment	Minor investigation geotechnical test pits	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
27.	Site Establishment	Temporary Roads and bridges	Noise Generation	Community disturbance	Low (9)	NV_01 NV_06 NV_07 NV_15 NV_18	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
28.	Site Establishment	Compaction of materials	Vibration	Community disturbance	Low (9)	NV_01 NV_06 NV_07 NV_15 NV_18	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
29.	Detailed Civil works	Detailed excavation including Trenching, footings and in ground tanks	Noise Generation	Community disturbance	Low (9)	NV_01 NV_06 NV_07 NV_09 NV_15 NV_18	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
30.	Detailed Civil works	Piling Works	Noise Generation	Community disturbance	Low (9)	NV_01 NV_06 NV_07 NV_30 NV_31	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
31.	Detailed Civil works	Compaction of materials	Vibration	Community disturbance	Low (9)	NV_01 NV_06 NV_07 NV_09 NV_15 NV_18 NV_19	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
32.	Detailed Civil works	Material stockpiling	Noise Generation	Community disturbance	Low (9)	NV_01 NV_17	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
33.	Detailed Civil works	Concrete pumps/trucks	Noise Generation	Community disturbance	Low (9)	NV_01 NV_17	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
34.	Detailed Civil works	Utility Works	Noise Generation	Community and local road disturbance	Low (9)	NV_01 NV_06 NV_07 NV_09 NV_15 NV_18 NV_19	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
35.	Installation of Aviation Fuel Ring Main	Detailed excavation	Noise Generation	Community disturbance	Medium (17)	NV_01 NV_06 NV_07 NV_09 NV_15 NV_18	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
36.	Installation of Aviation Fuel Ring Main	Potholing and trenching	Noise Generation	Community and local road disturbance	Medium (17)	NV_01 NV_06 NV_07 NV_09 NV_15 NV_18	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
37.	Installation of Aviation Fuel Ring Main	Compaction of materials	Vibration	Community disturbance	Medium (17)	NV_01 NV_06 NV_07 NV_30 NV_31	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
38.	Installation of Aviation Fuel Ring Main	Material Storage / stockpiling activities	Noise Generation	Community disturbance	Low (9)	NV_01 NV_17	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
39.	Structure	Steel and concrete cutting	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
40.	Structure	Use of percussion tools	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
41.	Structure	Installation of formwork, Structural steel, and precast works	Noise Generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
42.	Structure	Concrete pumps/trucks	Noise Generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_19	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
43.	Structure	Use of concrete Static Line	Noise Generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_19	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
44.	Structure	Brick / Block Work - Cutting activities	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09 NV_15	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
45.	Structure	Installation of Façade	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
46.	Fit out works	Concrete Cutting, drilling and grinding works	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
47.	Fit out works	Undertaking Brick / Block Work cutting	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09 NV_15	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
48.	External Works	Asphalt Road / Carpark Works	Vibration and Noise Generation	Community and local road disturbance	Low (9)	NV_01 NV_06 NV_07 NV_09 NV_18 NV_19	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
49.	External Works	Operation of the concrete batching plant	Noise Generation	Community and local road disturbance	Medium (13)	NV_01 NV_06 NV_07 NV_09 NV_18	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
50.	External Works	Installation of the apron works	Noise Generation	Community disturbance	Low (9)	NV_01 NV_06 NV_07 NV_09 NV_18	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
51.	External Works	Landscaping works	Noise Generation	Community and local road disturbance	Low (9)	NV_01 NV_06 NV_07 NV_09 NV_18 NV_19	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
52.	Out of Hours Cumulative Impacts	OOH activities	Noise generation	Community disturbance	Medium (18)	NV_01 NV_06 NV_07 NV_09 NV_18 NV_19 NV_32	Low (12)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs Out of hours procedure and review of sitewide activities
53.	Cumulative noise	Concurrent sitewide activities	Noise generation	Community disturbance	Low (9)	NV_01 NV_06 NV_07 NV_09 NV_18 NV_19 NV_32	Low (5)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs Real time monitoring program with trigger alert levels
54.	Use of site compound / installation of pre-fabricated structures	Earthworks to construct compound footprint	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_28	Low (9)	Noise and Vibration CEMP Soil and Water CEMP Biodiversity CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
55.	Use of site compound / installation of pre-fabricated structures	Construction of compound buildings, parking and amenities	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_28	Low (9)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
56.	Out of hours works (continued)	General works	Noise generation	Disturbance to sensitive receivers in Adams Rd, Luddenham	Medium (17)	NV_01 NV_06 NV_09 NV_10 NV_11 NV_12 NV_13 NV_15 NV_16 NV_17 NV_18 NV_20 NV_21 NV_22 NV_23 NV_25 NV_26 NV_27 NV_28 NV_32	Medium (13)	Noise and Vibration CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
57.	Concrete and asphalt paving	Operation of paver, deliveries and green cutting	Noise generation	Community and local road disturbance	Medium (13)	NV_01 NV_06 NV_07 NV_09 NV_15 NV_18	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
58.	Site Establishment	Installation of ERSED controls	Noise Generation	Community disturbance	Low (9)	NV_01 NV_06 NV_07 NV_09 NV_18	Low (6)	Noise and Vibration CEMP Visual and Landscape CEMP Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
59.	Site Establishment	Installation of construction/ permanent fencing (if required)	Noise generation	Community disturbance	Medium (13)	NV_01 NV_06 NV_08 NV_09 NV_10 NV_11 NV_12 NV_13 NV_14 NV_15 NV_16 NV_17 NV_18 NV_19 NV_26	Low (8)	Noise and Vibration CEMP Soil and Water CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
60.	Site Establishment	Contamination investigations (if required)	Noise generation	Community disturbance	Medium (13)	NV_01 NV_06 NV_10 NV_11 NV_12 NV_13 NV_14 NV_15	Low (8)	Noise and Vibration CEMP Waste and Resource CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
						NV_16 NV_17 NV_26		
61.	Site Establishment	Earthworks to construct area for temporary buildings	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_28	Low (9)	Noise and Vibration CEMP Air Quality CEMP Soil and Water CEMP Biodiversity CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
62.	Site Establishment	Installation of temporary buildings for compound, parking and amenities	Noise generation	Community disturbance	Medium (13)	NV_01 NV_03 NV_04 NV_05 NV_07 NV_09 NV_11 NV_15 NV_28	Low (9)	Noise and Vibration CEMP Soil and Water CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
63.	Earthworks and Drainage	Topsoil stripping	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_18 NV_19 NV_28	Low (9)	Noise and Vibration CEMP Waste and Resource CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
64.	Earthworks and Drainage	Compaction	Vibration	Community disturbance and infrastructure damage	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_18 NV_19 NV_28	Low (10)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
65.	Bridge Works	Piling	Noise and vibration	Community disturbance and infrastructure damage	Low (9)	NV_01 NV_07 NV_09 NV_11 NV_15 NV_18 NV_28	Low (6)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
66.	Bridge Works	Abutment earthworks	Noise and vibration	Community disturbance and infrastructure damage	Medium (18)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_18 NV_19 NV_28	Medium (14)	Noise and Vibration CEMP Air Quality CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
67.	Bridge Works	Bridge deck installation including installation for form work, structural steel, pre-cast sections	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_17 NV_18 NV_19 NV_28	Low (9)	Noise and Vibration CEMP EWMS Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
68.	Bridge Works	Steel and concrete cuttings	Noise generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Noise and Vibration CEMP Visual and Landscape CEMP Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
69.	Bridge Works	Concreting, including trucks and pumps	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_19	Low (9)	EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
70.	Road Construction	General earthworks	Vibration	Community disturbance and infrastructure damage	Medium (13)	NV_01 NV_07 NV_09 NV_11 NV_14 NV_15 NV_18 NV_19 NV_28	Low (10)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
71.	Road Construction	Pavement, including paving machine, trucks and pumps	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_19	Low (9)	EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
72.	Road Construction	Concrete cutting, drilling and grinding works	Noise generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Noise and Vibration CEMP Visual and Landscape CEMP Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
73.	Road Construction	Line marking, installation of ITS and lighting	Noise generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Noise and Vibration CEMP Visual and Landscape CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
74.	Shared User Path Construction	Concreting, including trucks and pumps	Noise generation	Community disturbance	Medium (13)	NV_01 NV_07 NV_09 NV_19	Low (9)	Noise and Vibration CEMP Visual and Landscape CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
75.	Landscaping and Stabilisation	Installation of permanent fencing (if required)	Noise generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Noise and Vibration CEMP Visual and Landscape CEMP Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
76.	Landscaping and Stabilisation	Planting	Noise generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Noise and Vibration CEMP Visual and Landscape CEMP Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
77.	Landscaping	Maintenance and rectification of defects (where required)	Noise generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Noise and Vibration CEMP Visual and Landscape CEMP Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
78.	Out of Hours Works	Bridge lifts, including road closures	Noise generation	Community and local road disturbance	Medium (17)	NV_01 NV_02 NV_07 NV_08 NV_09 NV_11 NV_12 NV_13 NV_14 NV_15 NV_18 NV_19 NV_27 NV_28	Medium (13)	Noise and Vibration CEMP Biodiversity CEMP EWMS Soil and Water CEMP Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan
79.	General Construction	Detailed Excavation	Vibration	Community Disturbance	Medium (13)	NV_01, NV_02, NV_04, NV_05, NV_06, NV_07, NV_08, NV_11, NV_13, NV_15, NV_16, NV_20, NV_21	Low (9)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedures Induction ESCPs ECMs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
80.	Earthworks, Building and Utility infrastructure construction	Use of concrete Static Line	Noise Generation	Community disturbance	Low (8)	NV_01 NV_07 NV_09 NV_19	Low (5)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
81.	Earthworks, Building and Utility infrastructure construction	Brick / Block Work - Cutting activities	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09 NV_15	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
82.	Earthworks, Building and Utility infrastructure construction	Concrete Cutting, drilling and grinding works	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
83.	Earthworks, Building and Utility infrastructure construction	Undertaking Brick / Block Work cutting	Noise Generation	Community disturbance	Low (9)	NV_01 NV_07 NV_09 NV_15	Low (6)	Air Quality CEMP EWMS Soil and Water CEMP Traffic and Access CEMP Complaints Procedure Induction ESCPs ECMs
84.	Commissioning	Commissioning	Noise Generation	Disturbance to sensitive receivers on Overett Avenue, Kemps Ck, Eaton Road	Medium (13)	NV_01 NV_06 NV_09 NV_10 NV_11 NV_12	Low (9)	Noise and Vibration CEMP EWMS for commissioning Induction Environmental Control Map (ECM) Complaints Procedure Community and Stakeholder Engagement Plan

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level pre-mitigation	Mitigation measure	Risk level post-mitigation	Management tools
						NV_13 NV_15 NV_16 NV_17 NV_18 NV_20 NV_21 NV_22 NV_23 NV_25 NV_26 NV_27 NV_28		

8. Construction Noise and Vibration Assessment

In order to quantify noise emissions and associated noise impacts from construction activities associated with the Stage 1 Airport Development, noise modelling will be carried out for works comprising key phases of the development as described in Section 2.

The noise predictions will be used to determine potential construction noise impacts on the surrounding community. An adaptive management approach will be applied to the implementation of mitigation measures to minimise impacts on the community.

Where required, guidance around modelling requirements/assumptions (as set out in Section 6) will be given to Contractors to ensure a consistent approach to assessing noise impacts and industry standard modelling is conducted. However, it is likely that different modelling software and therefore different outputs will be used and generated for the construction activities for the proposed Stage 1 Airport Development.

The construction noise guideline level of 75 dB(A) in the AEPRs is based on the sound pressure level that is exceeded for 10 per cent of a period of at least 15 minutes (LA_{10}), adjusted for the tonality and impulsiveness (if any) of the noise. Given the predicted noise levels, based on the LAeq (equivalent continuous sound level), the construction noise guideline of 75dB(A) LA_{10} is unlikely to be exceeded. A range of mitigation and management measures listed in Section 9 will be adopted to mitigate disturbance to nearby receptors.

Modelling of noise levels at nearby receivers resulting from construction activities should consider the following:

- Aim to predict LAeq(15 minute) noise level and in accordance with AEPR Schedule 4, Part 2.02;
- Consider typical-worst case construction noise levels based on locations of work and sound power levels (SWL) of the expected construction activities within each zone or work area.
- Consider the following:
 - Attenuation of noise source due to distance;
 - Barrier effects from buildings, and other man-made and topographical features;
 - Air absorption;
 - Ground effects; and
 - Meteorological conditions.

In order to determine worst-case predictions, the following assumptions should be applied:

- The construction works are occurring at the nearest point to each receiver and that the receiver is located at the most exposed position;
- The noisiest construction sources are operating simultaneously and continuously for the entire 15-minute period. Note, this may not always occur as equipment will regularly be stood down or idled while other activities are undertaken; and
- A worst-case meteorological Category 6 will be assumed, where the receiver is downwind of the source and the wind speed is >3 m/s.

8.1 Construction Activities

Construction of the Stage 1 Airport Development will result in the generation of noise and vibration. Specific to the works covered by this CEMP (as detailed in Section 2 and Construction Plan Section 6), the likely activities that have the potential to have impacts associated with noise and vibration include the following:

- General excavation activities expected to involve conventional road excavation equipment;
- Earthworks, including the importing of materials to stockpile on -site;
- Establishment of site compounds;
- Clearing and grubbing of vegetation;

- Construction traffic (heavy and light vehicles), including access to and from site and around the Airport Site;
- Slope stability works and landscaping activities;
- Construction of access roads and services;
- Erection and operation of tower cranes to facilitate construction of Terminal works;
- Installation and operation of temporary concrete site batching plant/equipment;
- Operation of concrete pumping and placing equipment;
- Construction of Terminal structure including associated façade, roof and finishes;
- Construction of airside aprons including Terminal fixed bridges and aerobridges;. and
- Construction of fuel ring main and fuel farm
- Construction of utility structures and connections, and ancillary developments/buildings, other building activities and aviation support facilities.

Airside:

- Construction of Flexible and ridged aircraft pavements;
- Rigid aircraft pavements;
- Airfield roads;
- Airfield drainage connecting to the trunk drainage system;
- Airfield facilities including airfield lighting equipment room (ALER) buildings and security restricted area facilities;
- Utility works;
- Installation of Airfield systems including aeronautical ground lighting, navigational aids and airfield security (including security cameras, lighting and fencing);
- Airfield infrastructure including services corridor trenching, ducts, conduits and pits within the site;
- Airfield landscaping including placement of final level topsoil across airfield;
- Fencing;
- Compound establishment and operation;
- Batch plant establishment;
Batch plant operation;
- Installation and operation of Pugmill for pavements ; and
- Pugmill plant operation.
- Construction and commissioning of buildings and structures including ALER, TERs, Utilities, Water Treatment, Air Traffic Control.
- Construction of road and pedestrian

Stage 1 Cargo Works:

- Earthworks
- Trunk Drainage
- Cargo apron, taxiway and taxi lane (including paving, lighting and pavement markings)
- Airside and landside roads (including drainage, road signs, lighting and road markings)
- Airside and landside staging areas
- Utility works
- Cargo Buildings
- Landscaping
- Fencing
- Compound establishment and operation
- Batch plant establishment
- Batch plant operation
- Pugmill plant operation
- Car parking (including associated lighting)

- Formwork and steel fixing
- Concrete placement

Other Activities

As the project progresses, additional works such as Standalone Facilities, other Commonwealth Agency buildings and Commercial developments will proceed.

Works will include three facilities for Commonwealth agencies intended to provide the required boarder control functions at the WSI for the Australian Federal Police (AFP), Australian Border Force (ABF) and the Department of Agriculture, Fisheries and Forestry (DAFF). These three facilities are command centre, intended to house administrative functions, canine facility, and cargo examination facility.

The final stage of works packages include activities associated with the testing and commissioning of elements and systems to form a fully functional integrated airport. This phase of works is termed Operational Readiness, Activation and Transition (ORAT) in the Construction Plan. ORAT requires extensive safety and security scenario testing.

8.2 Summary of Potential Noise Impacts

8.2.1 Material Importation

If required, prior to the commencement of out of hours work for material importation, the process set out in Section 10 will be completed, which will include detailed noise modelling. Initial modelling indicates that noise generated from unloading of material is unlikely to generate noise that is significantly over the NMLs at the closest receiver.

8.2.2 Bulk Earthworks

The Bulk Earthworks package was completed in early 2023.

8.2.3 TSS Works

The majority of TSS Works will be situated on the southern side of the Stage 1 Construction Impact Zone (CIZ), roughly central along alignment of the runway as shown in Figure 4, along with the fuel farm on the northern side of the site, as shown in Figure 5. A detailed description of the TSS Works is set out in the WSA Construction Plan and can be generally summarised as follows:

- Site establishment activities, including temporary site access roads, site accommodation facilities;
- Detailed excavation and trenching for inground services reticulation;
- Piled footings and substructure;
- Concrete and structural steel construction of Terminal Building;
- Concrete batching plant;
- Façade and roof construction of Terminal Building;
- Internal finishes and fit-out;
- Aviation fuel line trenching and installation;
- Construction of the fuel farm; and
- Soft and hard landscaping.

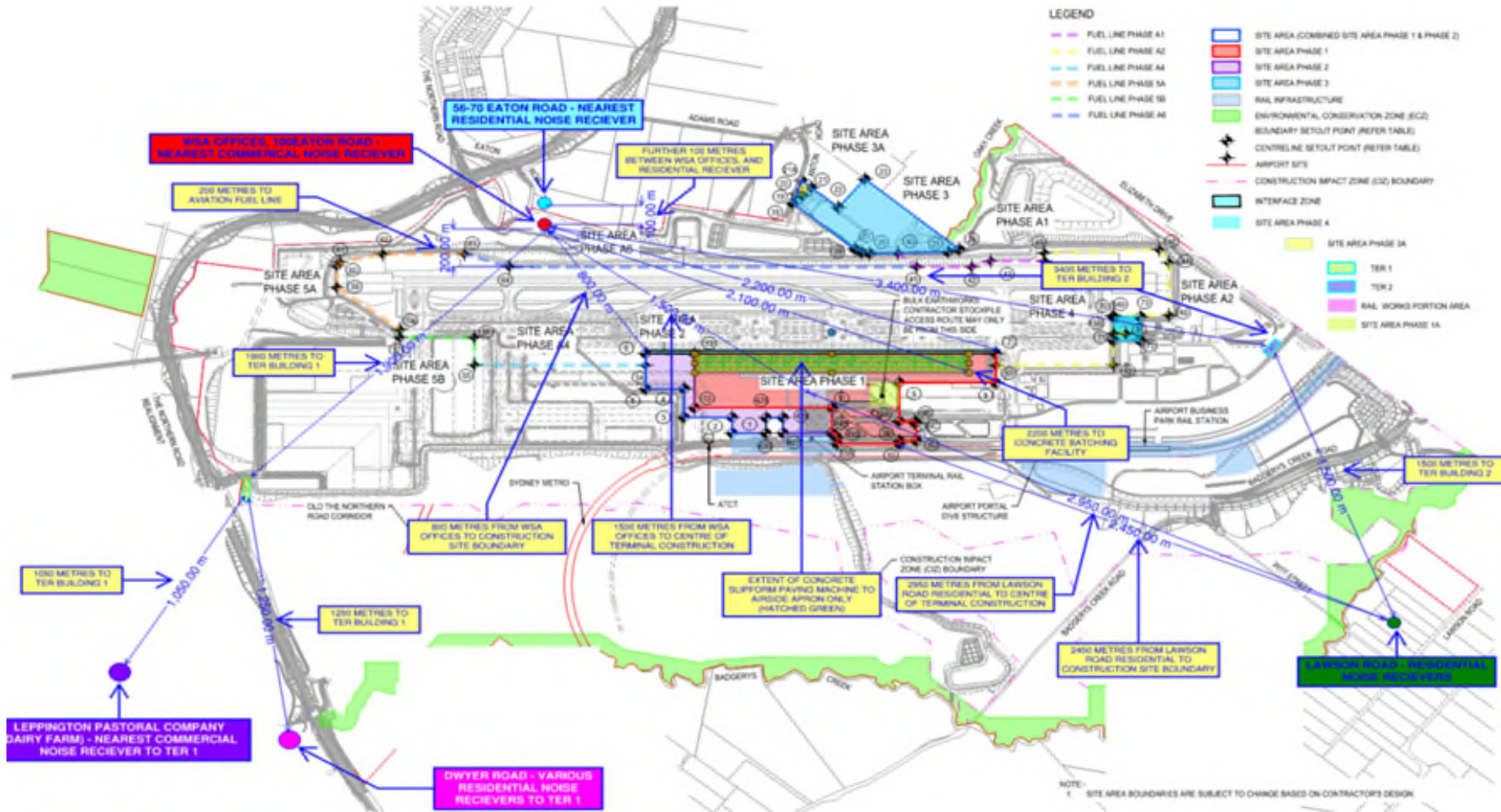


Figure 4: TSS Work Areas and Nearest Noise Receiver

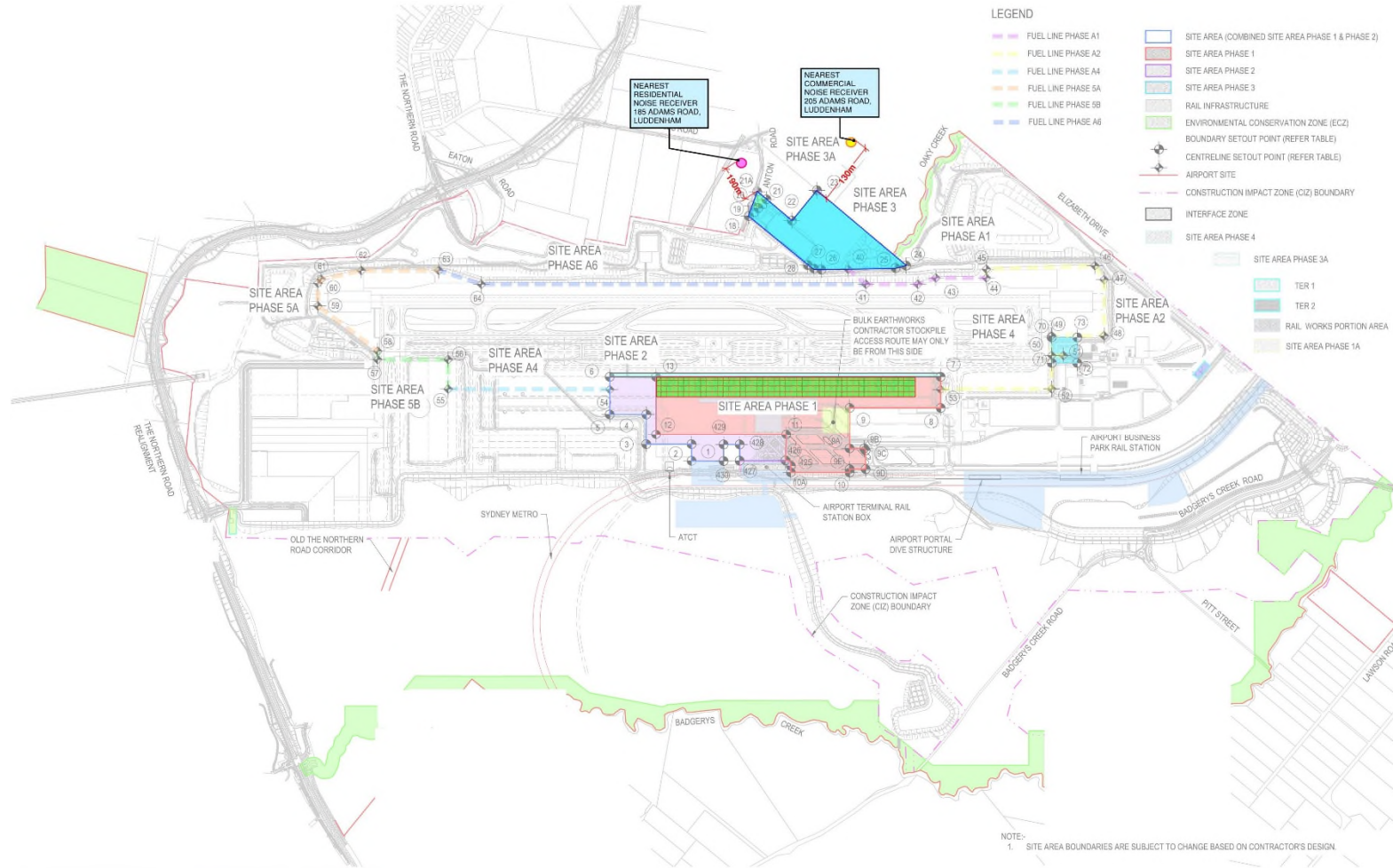


Figure 5: Fuel Farm Work Area and Nearest Noise Receiver

Construction noise impacts from the TSS Works are expected to be within NML screening criteria for the majority of phases. There is the potential for some exceedance of NMLs during Aviation Fuel Reticulation Works. The most significant impact from TSS Works is expected to occur during Phases A6, 3A and 5A (See Table 16). This is due to the minimal offset distances between these works and the nearest affected residential receivers at 56-70 Eaton Road and 185 Adams Road.

Given the separation distance between the adjoining noise receivers and the construction works zone, it is predicted that the construction activities associated with TSS Works will satisfy the construction noise guideline level of 75 dB(A), as per Section 6.3. Cumulative impacts have been assessed based on potential concurrency of different phases of works. It is noted that all works will not necessarily be undertaken concurrently, for example, Aviation Fuel Reticulation trenching (i.e. Phases A1, A2, A4, A6, 5A and 5B as per Table 16) will be undertaken consecutively but each phase is expected to be undertaken concurrently with either Phase 2 or Phase 3 works.

A summary of predicted noise levels for works during standard hours is provided in **Table 15**. It is also noted that the maximum noise impacts have been assessed to different receiver locations based on proximity to the closest location of works and therefore cumulative impacts would be expected to be lower than those quoted.

Table 15: Population Affected by TSS Works

Activity		Maximum Level	Predicted no. receivers with exceedance of standard hours NML			
		L _{Aeq} , 15 minute	Rec. >75	0-10	10-20	>20
Main Terminal/ Pier/ Apron Construction	Phase 1	46	0	0	0	0
	Phase 2	43	0	0	0	0
	Phase 3	69	0	0	0	0
	TER 1	44	0	0	0	0
	TER2	42	0	0	0	0
Aviation Fuel Reticulation	Phase A1	40	0	0	0	0
	Phase A2	39	0	0	0	0
	Phase A4	50	0	1	0	0
	Phase 5A	59	0	0	1	0
	Phase 5B	52	0	1	0	0
	Phase A6	64	0	0	1	0
Construction Traffic	Phase 1	32	0	0	0	0
	Phase 2	39	0	0	0	0
	Phase 3 and 3A	44	0	0	0	0
Cumulative	Phase 1	46	0	0	0	0
	Phase 2	66	0	0	1	0
	Phase 3 and 3A	69	0	1	0	0

These sound levels will be measured and monitored at locations to be agreed with WSA as per Section 12.2.2.

8.2.4 ACP Works

A summary of affected receiver impacts from the works is presented in the **Table 16**. Activities that have the greatest noise impact are generally where work occurs near or on the site boundary. In most instances, affected receivers are located to the north of the site on Eaton Road, Adams Road and Anton Road, with a few potential impacts to the west noted along Willowdene Avenue.

Works located close to the boundary include fencing, landscaping and road preparation. For road preparation, there are 36 affected receivers in the 0 -10 dBA range and two receivers in the 10 - 20 dBA range that exceed the project NML for standard hours, while for landscaping there are two receivers within the 10-20 dBA and one (non-residential) receiver modelled as being +20 dBA.

The predicted levels for all activities are based on a typical worst case where the bulk of the equipment is modelled at the closest location to each receiver. In practice the equipment for activities such as roadworks and landscaping are likely to be more spread out and would move closer to, and further away from, each receiver location over the duration of the activity.

As the predicted noise level exceedances of the NML are at the lower end of the impact range and are expected to be completed during standard hours, the risk profile for these works is in the low to moderate range during the most intrusive periods of the works. Refer to **Table 16** for a summary of the predicted noise levels for the ACP works. A map showing the ACP works areas and the nearest receivers is presented in Figure 6.

Table 16: Summary of Predicted Noise Levels (Standard Hours) – ACP

Activity			Maximum predicted noise level dB(A)			Predicted no. receivers with exceedance of NML		
						Standard hours		
			Residential	Non-residential	Receiver >75	0-10	10-20	20+
Flexible aircraft pavements	1a	FCR Paving	48	52	0	10	0	0
	1b	AGL	45	50	0	3	0	0
	1c	AC Paving	48	52	0	9	0	0
Rigid aircraft pavements	2a	CTB / Concrete Paving	43	49	0	2	0	0
	2b	AGL	32	37	0	0	0	0
Airfield roads	3a	Road Preparation	51	58	0	36	2	0
Airfield drainage	4a	Drainage installation	46	53	0	11	0	0
Airfield facilities	5a	Foundations and framework	32	36	0	0	0	0
Utilities	6a	HV LV and Communication conduits & cables	41	48	0	2	0	0
Landscaping	7a	Topsoil and Hydromulching	51	67	0	16	2	1
Fencing	8a	Install footings and fence construction	46	62	0	8	1	0
Compound	9a	Establishment of compound sites	41	56	0	0	1	0
Batch Plants	10a	Operation of batch plants	39	45	0	0	0	0

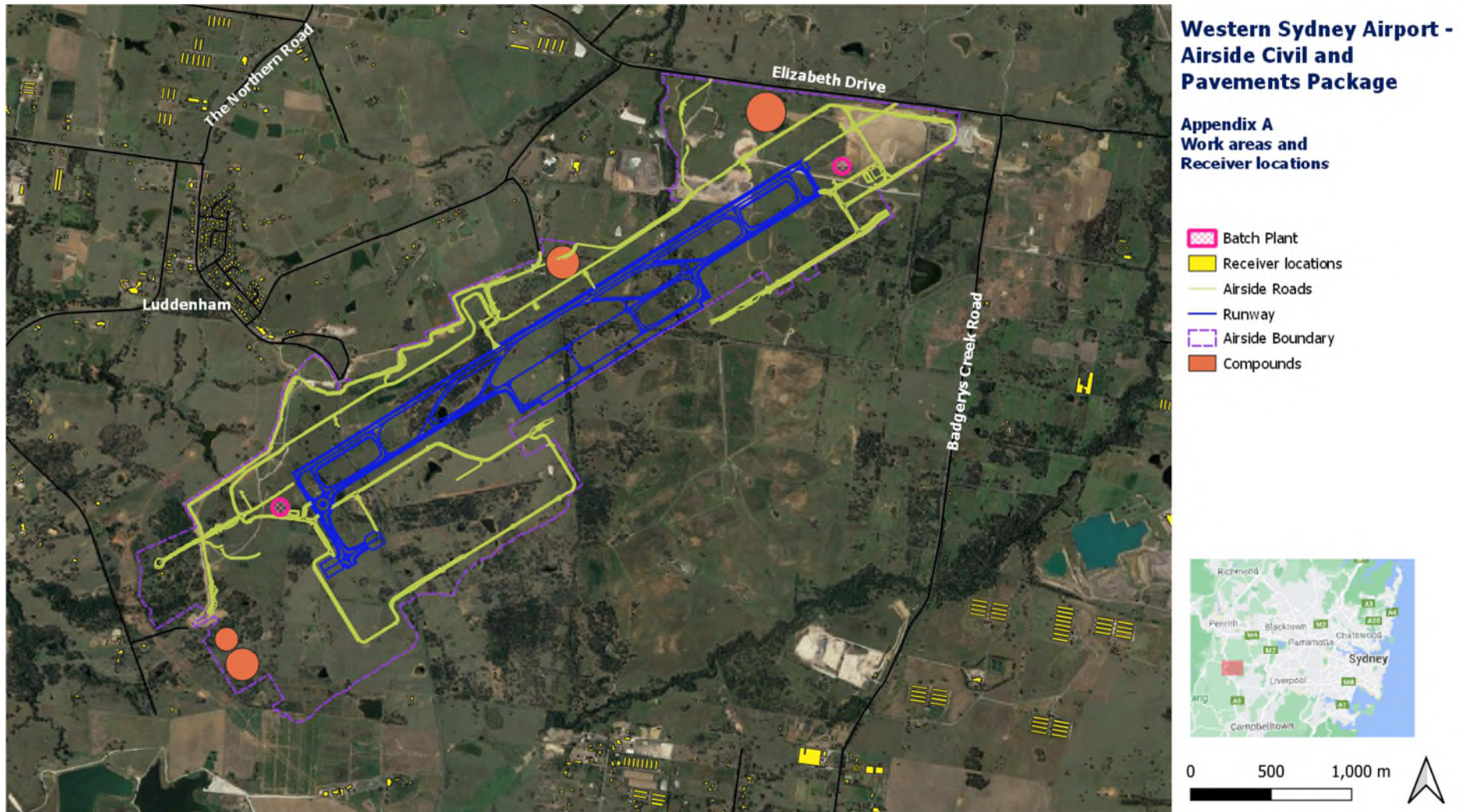


Figure 6: ACP Work Areas and Nearest Noise Receivers

8.2.5 LCB Works

SoundPlan noise modelling software was used to calculate noise impacts in accordance with the ISO9613 prediction method at all identified noise-sensitive receivers. The model included:

- Topography – 1 metre DEM based on LPI Lidar data.
- Individual buildings for facade calculations and to account for shielding and reflections.
- Individual sensitive receivers – One receiver location representing each residential dwelling and located 1.5 metres above most affected floor level (e.g. level 2) and most-affected facade at up to around 2000 metres radius.
- Construction noise sources – Activities and equipment included in the noise model as area sources in locations specified by Seymour White. SoundPlan takes the worst-case point within each area to perform its calculations, a conservative approach. Source is modelled at 1.5 metres above ground.
- Meteorology – worst-case conditions: gentle breeze (3-5 m/s) source to receiver and stable conditions (conducive of temperature inversion).
- Traffic noise was modelled using CoRTN noise methodology to account for increases in traffic volumes.

Refer to **Table 17** for a summary of the predicted noise levels for the LCB works. Due to location of LCB scope, earthworks is required close to the Project boundary and there is two receptors in the 0-10 dBA range that exceed the project NML for standard hours.

The predicted levels for all activities are based on a typical worst case where the bulk of the equipment is modelled at the closest location to each receiver. In practice the equipment for activities such as roadworks and landscaping are likely to be more spread out and would move closer to, and further away from, each receiver location over the duration of the activity.

Table 17: Summary of Predicted Noise Levels (Standard Hours) – LCB.

Activity			Maximum predicted noise level dB(A)			Predicted no. receivers with exceedance of NML		
						Standard hours		
			Residential	Non-residential	Receivers >75	0-10	10-20	20+
Roads & Carparks	1a	Earthworks	44	47	0	2	0	0
	1b	Granular pavement	39	42	0	0	0	0
	1c	AC Paving	43	46	0	1	0	0
Drainage	2a	Subsoil Drains	34	38	0	0	0	0
	2b	Pipe Drainage	39	43	0	0	0	0
Utilities	3a	Pipe and conduit installation	41	44	0	0	0	0
	3c	Utility identification	39	43	0	0	0	0
Bridges	4a	Piling	39	42	0	0	0	0
	4b	Substructure	31	34	0	0	0	0
	4c	Superstructure	37	40	0	0	0	0

Activity			Maximum predicted noise level dB(A)			Predicted no. receivers with exceedance of NML		
						Standard hours		
			Residential	Non-residential	Receivers >75	0-10	10-20	20+
Buildings & Water complex	5a	Foundation Earthworks	37	40	0	0	0	0
	5b	Foundation concreting	33	36	0	0	0	0
	5c	Structure / Fit-out	33	36	0	0	0	0

8.2.6 M12 on Airport

The M12 on Airport interfaces with WSA at Elizabeth Drive. The M12 Motorway will be a dual carriage way into WSA from a single point interchange at Elizabeth Drive as illustrated in Figure 7.

The key construction works phases to be undertaken by the M12 on Airport Contractor detailed in **Table 19 to 23** are as follows:

- Site establishment;
- Utility works;
- Earthworks;
- Bridge Works;
- Road construction;
- Shared user path construction;
- Landscaping; and
- Out of hours works.

Construction noise impacts associated with the M12 on Airport have been modelled in the following M12 on Airport Environmental Assessment Documents:

- M12 Motorway Project Environmental Impact Assessment (EIS) (October 2019)
- M12 Motorway Project Amendment Report (October 2020)
- M12 Motorway Project West Package Consistency Assessment (October 2020)

It is noted that construction impacts have not specifically been modelled on the Airport Site within the M12 on Airport Environmental Assessment Documents. However, it is noted that the works on the Airport Site will be an extension to the works to be undertaken on Elizabeth Drive. The M12 on Airport noise assessments identify WSA as being located within Noise Catchment Area (NCA) 08 as illustrated in Figure 8. Therefore, the impacts modelled for works off Airport land can be extrapolated for the works on the Airport Site.

The following assessment shows the predicted noise impacts based on the exceedance of the NML, as per the three categories in **Table 18**. The likely subjective response of people affected by the impacts is also shown.

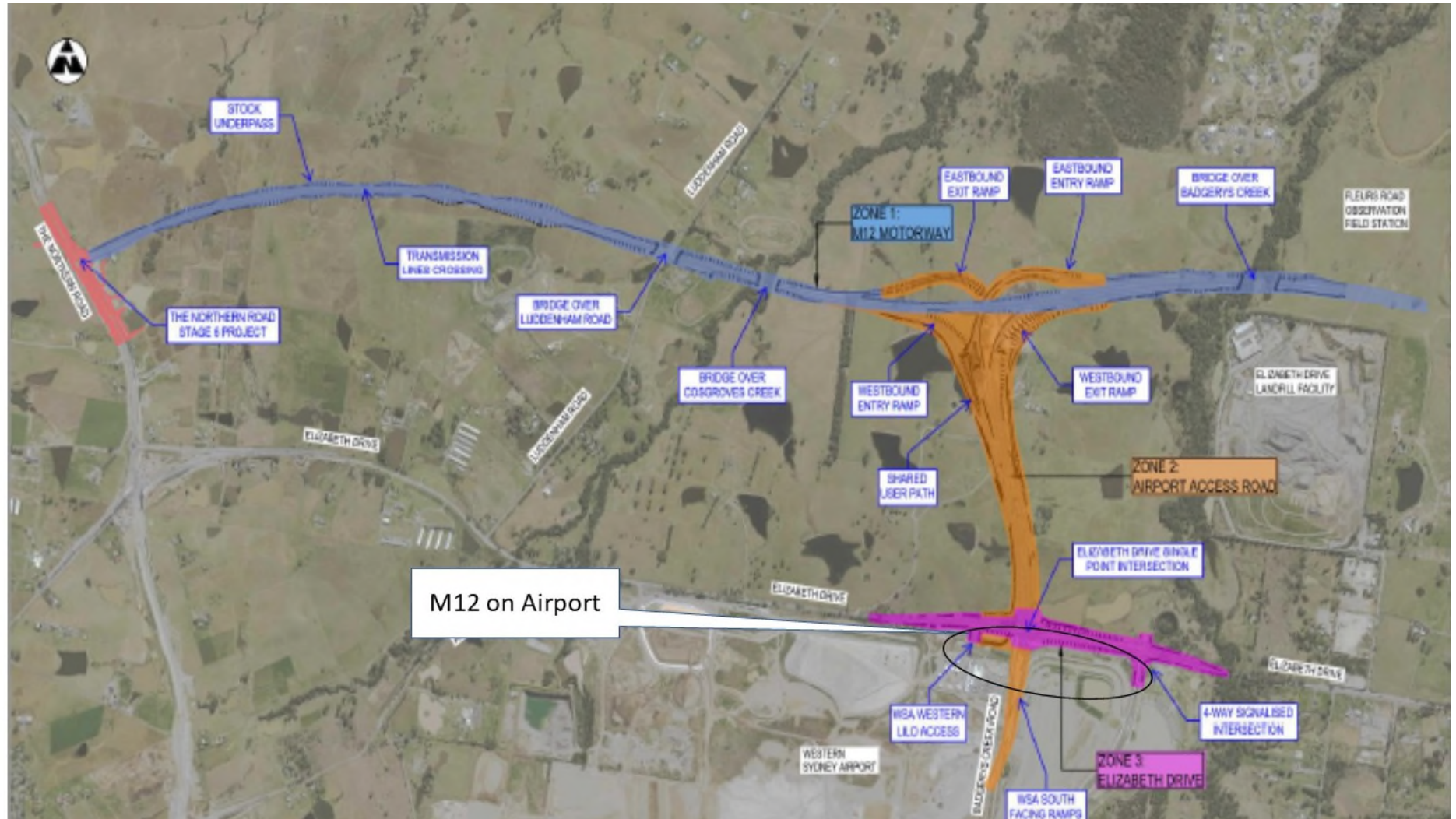


Figure 7: M12 Motorway West Package Overview Illustrating Interface with WSA



Figure 8: M12 Noise Catchment Categories around WSA Land (extract M12 Motorway Project EIS, Appendix K)

Table 18: M12 Exceedance Bands (extract from M12 Motorway EIS, Appendix K)

Exceedance of NML	Symbol	Likely subjective response
No exceedance	•	n/a
1 dB to 10 dB	●	Marginal to minor
11 dB to 20 dB	◆	Moderate
>20 dB	■	High

The predicted construction noise impacts are presented for the most affected receivers. Receivers which are further away from the works and/or shielded from view would have substantially lower noise impacts.

A summary of the predicted construction noise impacts in each NCA for residential receivers is shown in **Tables 19 to 23**.

Detailed noise level predictions and summaries of the number of receivers predicted to have 'minor', 'moderate' and 'high' impacts in each NCA are provided in Annexure C of the M12 Motorway Project EIS, Appendix K.

Table 19: M12 Predicted noise exceedances morning shoulder – residential receivers

Period	ID	Scenario	Activity	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	NCA08	NCA09	NCA10
Morning Shoulder	1a	Ancillary facility establishment	Peak impact	◆	●	●	●	•	●	■	•	•	◆
	1b		Typical impact	●	●	•	●	•	•	■	•	•	●
	2a	Ancillary facility operations	Operation	●	•	•	•	•	•	■	•	•	●
	2b		Stockpiling	●	●	•	●	•	•	■	•	•	●
	2c		Batching plant	•	•	•	•	•	•	◆	•	•	•
	3a	Utilities and drainage	Peak impact	■	◆	◆	◆	•	■	■	◆	■	◆
	3b		Typical impact	◆	●	•	●	•	■	■	●	●	●
	4a	Demolition	Peak impact	•	•	◆	◆	•	■	■	●	●	◆
	4b		Typical impact	•	•	•	●	•	◆	■	•	•	●
	5a	Clearing	Peak impact	■	◆	◆	◆	•	■	■	◆	◆	◆
	5b		Typical impact	◆	●	•	●	•	■	■	●	●	●
	6a	Earthworks	Peak impact	■	◆	◆	◆	•	■	■	◆	◆	◆
	6b		Typical impact	◆	●	•	●	•	■	■	●	●	●
	6c		Onsite truck haulage	•	•	•	•	•	•	●	•	•	•
	7a	Bridge works	Peak impact	•	●	●	●	•	●	◆	•	●	•
	7b		Typical impact	•	●	•	•	•	•	●	•	•	•
	7c		Concrete works	•	●	•	•	•	●	●	•	●	•
	7d		Girder lifts	•	●	•	•	•	•	•	•	•	•
	8a	Road works	Concrete works	◆	●	•	●	•	■	■	•	●	●
	8b		Typical works	◆	●	•	•	•	■	■	•	●	●
	8c		Tie-in works	■	◆	●	◆	•	●	◆	◆	◆	•
9a	Signage, lighting and landscaping		◆	●	●	●	•	■	■	●	◆	●	

Key to impacts: • No exceedance ● Marginal to minor (1 dB to 10 dB)
◆ Moderate (11 dB to 20 dB) ■ High (>20 dB)

Table 20: M12 Predicted construction noise exceedances standard daytime – residential receivers

Period	ID	Scenario	Activity	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	NCA08	NCA09	NCA10	
Standard Daytime	1a	Ancillary facility establishment	Peak impact	●	●	●	●	·	·	■	·	·	●	
	1b		Typical impact	●	·	·	·	·	·	■	·	·	●	
	2a	Ancillary facility operations	Operation	·	·	·	·	·	·	◆	·	·	·	
	2b		Stockpiling	●	·	·	·	·	·	■	·	·	●	
	2c		Batching plant	·	·	·	·	·	·	·	◆	·	·	·
	3a	Utilities and drainage	Peak impact	■	◆	●	◆	·	■	■	◆	◆	◆	
	3b		Typical impact	●	·	·	·	·	◆	■	·	●	·	
	4a	Demolition	Peak impact	·	·	●	●	·	■	■	·	·	◆	
	4b		Typical impact	·	·	·	·	·	●	◆	·	·	·	
	5a	Clearing	Peak impact	■	◆	●	◆	·	■	■	●	◆	●	
	5b		Typical impact	●	·	·	·	·	◆	■	·	●	·	
	6a	Earthworks	Peak impact	◆	◆	●	●	·	■	■	●	◆	●	
	6b		Typical impact	●	·	·	·	·	◆	■	·	●	·	
	6c		Onsite truck haulage	·	·	·	·	·	·	·	·	·	·	·
	7a	Bridge works	Peak impact	·	●	·	·	·	·	●	●	·	●	·
	7b		Typical impact	·	·	·	·	·	·	·	·	·	·	·
	7c		Concrete works	·	·	·	·	·	·	·	·	·	·	·
	7d		Girder lifts	·	·	·	·	·	·	·	·	·	·	·
	8a	Road works	Concrete works	●	●	·	·	·	·	◆	■	·	●	·
	8b		Typical works	●	●	·	·	·	·	◆	■	·	●	·
8c	Tie-in works		◆	●	●	◆	·	·	·	●	●	●	·	
9a	Signage, lighting and landscaping		◆	●	·	●	·	·	◆	■	·	●	·	

Key to impacts: · No exceedance ● Marginal to minor (1 dB to 10 dB)
 ◆ Moderate (11 dB to 20 dB) ■ High (>20 dB)

Table 21: M12 Predicted construction noise exceedances evening shoulder – residential receivers

Period	ID	Scenario	Activity	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	NCA08	NCA09	NCA10
Evening Shoulder	1a	Ancillary facility establishment	Peak impact	♦	♦	●	♦	•	●	■	●	●	♦
	1b		Typical impact	●	●	•	●	•	•	■	•	•	●
	2a	Ancillary facility operations	Operation	●	•	•	●	•	•	■	•	•	●
	2b		Stockpiling	●	●	•	●	•	•	■	•	•	●
	2c		Batching plant	•	•	•	•	•	•	♦	•	•	•
	3a	Utilities and drainage	Peak impact	■	■	♦	■	•	■	■	♦	■	♦
	3b		Typical impact	♦	●	•	●	•	■	■	●	♦	●
	4a	Demolition	Peak impact	•	•	♦	♦	•	■	■	●	●	♦
	4b		Typical impact	•	•	•	●	•	♦	■	•	•	●
	5a	Clearing	Peak impact	■	♦	♦	■	•	■	■	♦	■	♦
	5b		Typical impact	♦	●	•	●	•	■	■	●	♦	●
	6a	Earthworks	Peak impact	■	♦	♦	■	•	■	■	♦	■	♦
	6b		Typical impact	♦	●	•	●	•	■	■	●	♦	●
	6c		Onsite truck haulage	●	•	•	•	•	•	•	●	•	•
	7a	Bridge works	Peak impact	•	♦	●	●	•	●	♦	•	♦	•
	7b		Typical impact	•	●	•	•	•	•	●	•	●	•
	7c		Concrete works	•	●	•	●	•	●	●	•	●	•
	7d		Girder lifts	•	●	•	•	•	•	•	•	●	•
	8a	Road works	Concrete works	♦	●	•	●	•	■	■	●	♦	●
	8b		Typical works	♦	●	•	●	•	■	■	•	♦	●
	8c		Tie-in works	■	♦	●	■	•	●	♦	♦	♦	•
9a	Signage, lighting and landscaping		♦	♦	♦	●	♦	•	■	■	●	♦	

Key to impacts: • No exceedance ● Marginal to minor (1 dB to 10 dB)
♦ Moderate (11 dB to 20 dB) ■ High (>20 dB)

Table 22: M12 Predicted construction noise exceedances evening – residential receivers

Period	ID	Scenario	Activity	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	NCA08	NCA09	NCA10
Evening	1a	Ancillary facility establishment	Peak impact	·	·	·	·	·	·	·	·	·	·
	1b		Typical impact	●	●	·	●	·	·	■	·	·	●
	2a	Ancillary facility operations	Operation	●	·	·	●	·	·	■	·	·	●
	2b		Stockpiling	●	●	·	●	·	·	■	·	·	●
	2c		Batching plant	·	·	·	·	·	·	·	◆	·	·
	3a	Utilities and drainage	Peak impact	·	·	·	·	·	·	·	·	·	·
	3b		Typical impact	·	·	·	·	·	·	·	·	·	·
	4a	Demolition	Peak impact	·	·	·	·	·	·	·	·	·	·
	4b		Typical impact	·	·	·	·	·	·	·	·	·	·
	5a	Clearing	Peak impact	·	·	·	·	·	·	·	·	·	·
	5b		Typical impact	·	·	·	·	·	·	·	·	·	·
	6a	Earthworks	Peak impact	·	·	·	·	·	·	·	·	·	·
	6b		Typical impact	·	·	·	·	·	·	·	·	·	·
	6c		Onsite truck haulage	·	·	·	·	·	·	·	·	·	·
	7a	Bridge works	Peak impact	·	◆	●	●	·	●	◆	·	◆	·
	7b		Typical impact	·	●	·	·	·	·	●	·	●	·
	7c		Concrete works	·	●	·	●	·	●	●	·	●	·
	7d		Girder lifts	·	●	·	·	·	·	·	·	●	·
	8a	Road works	Concrete works	◆	●	·	●	·	■	■	●	◆	●
	8b		Typical works	·	·	·	·	·	·	·	·	·	·
8c	Tie-in works		■	◆	●	■	·	●	◆	◆	◆	·	
9a	Signage, lighting and landscaping		·	·	·	·	·	·	·	·	·	·	

Key to impacts: · No exceedance ● Marginal to minor (1 dB to 10 dB)
◆ Moderate (11 dB to 20 dB) ■ High (>20 dB)

Table 23: M12 Predicted construction noise exceedances night-time – residential receivers

Period	ID	Scenario	Activity	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	NCA08	NCA09	NCA10
Night-time	1a	Ancillary facility establishment	Peak impact	.	.	.	.	.	.	.	.	.	.
	1b		Typical impact	♦	●	●	♦	.	.	■	.	.	♦
	2a	Ancillary facility operations	Operation	●	●	.	♦	.	.	■	.	.	●
	2b		Stockpiling	♦	●	●	♦	.	.	■	.	.	♦
	2c		Batching plant	♦	●	●
	3a	Utilities and drainage	Peak impact	.	.	.	.	.	.	.	.	.	.
	3b		Typical impact	.	.	.	.	.	.	.	.	.	.
	4a	Demolition	Peak impact	.	.	.	.	.	.	.	.	.	.
	4b		Typical impact	.	.	.	.	.	.	.	.	.	.
	5a	Clearing	Peak impact	.	.	.	.	.	.	.	.	.	.
	5b		Typical impact	.	.	.	.	.	.	.	.	.	.
	6a	Earthworks	Peak impact	.	.	.	.	.	.	.	.	.	.
	6b		Typical impact	.	.	.	.	.	.	.	.	.	.
	6c		Onsite truck haulage	●	.	.	●	.	●	●	.	.	.
	7a	Bridge works	Peak impact	.	♦	●	♦	.	♦	♦	●	♦	.
	7b		Typical impact	.	●	.	●	.	●	●	.	●	.
	7c		Concrete works	.	●	●	♦	.	●	●	.	●	.
	7d		Girder lifts	.	●	.	●	.	.	●	.	●	.
	8a	Road works	Concrete works	♦	♦	●	♦	.	■	■	●	♦	●
	8b		Typical works	.	.	.	.	.	.	.	.	.	.
8c	Tie-in works		■	♦	♦	■	.	●	♦	■	■	.	
9a	Signage, lighting and landscaping		.	.	.	.	.	.	.	.	.	.

Key to impacts: . No exceedance ● Marginal to minor (1 dB to 10 dB)
♦ Moderate (11 dB to 20 dB) ■ High (>20 dB)

The above assessment for residential receivers shows that the only works that have been modelled to be 'highly Intrusive (>25dB) above the NML in NCA 08 are associated with the following:

1. Scenario 9a in Table 22: Signage, lighting and landscaping during evening shoulder (6pm – 7pm Monday to Friday)
2. Scenario 8c in Table 24: Road works tie-in works during the night time (10pm to 6am Monday to Friday, 10pm to 7am Saturdays and 10pm to 8am on Sundays and public holidays)

Given the separation distance between the adjoining noise receivers and the construction works zone, it is predicted that the construction activities associated with the M12 on Airport works will satisfy the construction noise guideline level of 75 dB(A). Combined or concurrent impacts have been assessed based on potential concurrency of different phases of works. It is noted that all works will not necessarily be undertaken concurrently.

Approximately five residential receivers (primarily in NCA08) located to the east of the WSA access road have the potential to be influenced by simultaneous works occurring at the WSA and the M12 on Airport.

For receivers in close proximity to the M12 on Airport, noise levels would generally be dominated by construction activities from this project, with worst-case noise levels predicted to be up to 63 dBA compared to 40-45 dBA from bulk earthworks associated with the WSA. In these circumstances, the environmental management measures in Table 42 used to control construction noise from the M12 on Airport would be considered sufficient to control the cumulative noise impacts from the M12 on Airport and the WSA.

Where receivers are further away from the M12 on Airport and closer to the WSA, noise levels may be influenced by the bulk earthworks at WSA and potentially have an increase of worst-case noise levels by up to around 3 dB for concurrent works from the M12 on Airport.

8.2.7 Utilities

As noted in Section 6.11.3 of the WSA Construction Plan, permanent utilities are still undergoing design development, as such the noise modelling cannot be completed at this stage. Noise modelling will be undertaken as part of planning and approvals and will be a requirement to the ALC Consent process. Given the scope of these activities and the nominated locations, it is unlikely that the installation and connection of permanent utility infrastructure for WSA will cause an impact on nearby receptors.

8.2.8 Stage 1 Cargo Works Area

A summary of affected receiver impacts from the works is presented in the table below and Figure 9. In most instances, affected receivers are located to the west of site along Willowdene Avenue.

Works located close to the boundary include fencing, landscaping and road preparation, which has the highest likelihood to impact receivers. The highest predicted impact is associated with road preparation works, there are 3 affected receivers in the 0-10 dBA range that exceed the project NML for standard hours.

The predicted levels for all activities are based on a typical worst case where the bulk of the equipment is modelled at the closest location to each receiver. In practice the equipment for activities such as roadworks and landscaping are likely to be more spread out and would move closer to, and further away from, each receiver location over the duration of the activity.

As the predicted noise level exceedances of the NML are at the lower end of the impact range and are expected to be completed during standard hours, the risk profile for these works is in the low to moderate range during the most intrusive periods of the works.

Table 24: Summary of Predicted Noise Levels (Standard Hours) - Cargo

						Standard hours		
			Residential	Non-residential	Receiver >75	0-10	10-20	20+
Flexible aircraft pavements	1a	FCR Paving	50	49	0	2	0	0
	1b	AGL	45	44	0	0	0	0
	1c	AC Paving	51	51	0	3	0	0
Rigid aircraft pavements	2a	CTB / Concrete Paving	46	45	0	1	0	0
	2b	AGL	43	42	0	0	0	0
Cargo Facility Airside and Landside Roads	3a	Road Preparation	51	50	0	3	0	0
	3b	FCR Paving	50	49	0	2	0	0
	3c	AC Paving	50	50	0	2	0	0
	3d	Concrete Paving	46	45	0	1	0	0
	3e	Building Structural Surrounds	40	40	0	0	0	0
Cargo Drainage	4a	Drainage installation	52	51	0	3	0	0
Airfield facilities	5a	Foundations and framework	42	41	0	0	0	0
Utilities	6a	HV LV and Communication conduits & cables	45	44	0	0	0	0
Landscaping	7a	Topsoil and Hydromulching	44	43	0	0	0	0
Fencing	8a	Install footings and fence construction	41	40	0	0	0	0
Compound	9a	Establishment of compound sites	40	39	0	0	0	0
Batch Plants	10a	Operation of batch plants	46	45	0	0	0	0

8.2.9 Other Activities

Other activities are smaller in nature and risks to the project will be managed in accordance with the mitigation measures in the risk assessment table and other control measures outlined in the CEMP as appropriate. Communications will be distributed regarding the testing of alarms and sirens which may have noise impacts on sensitive receivers and workers.

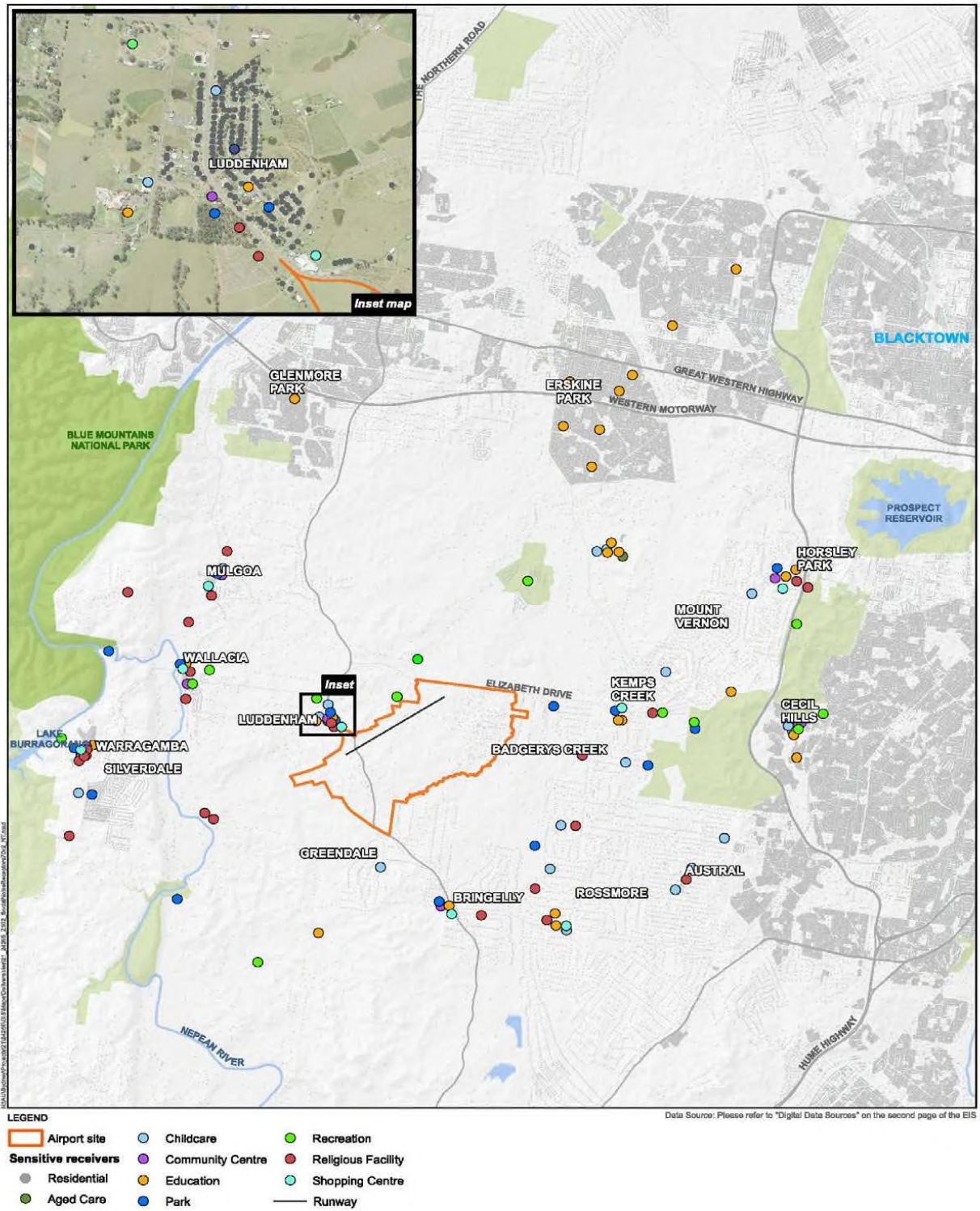


Figure 9: Stage 1 Cargo Works Area and Sensitive Receivers (Figure modified from WSA EIS)

8.3 Construction Traffic Noise

8.3.1 Material Importation

Construction traffic will use the same network as outlined in Section 8.2.1. Traffic volumes are not expected to result in a 60% increase in the current levels and therefore a noise level increase of greater than 2dBA is not expected. Prior to the commencement of out of hours work, the process set out in Section 10 will be completed, which will include detailed modelling. Initial modelling to assess the practicability predicts that noise generated from delivery of material is will not generate noise that is significantly over the NML at the closest receiver, this will be confirmed by more detailed monitoring carried out as part of the out of hours permit for this work.

8.3.2 Bulk Earthworks Activities

The Bulk Earthworks package was completed in early 2023.

8.3.3 TSS Works

Single height CoRTN¹ calculations have been undertaken using construction traffic inputs to predict the expected relative increase in traffic noise levels on the existing road network due to Terminal and Specialty Services. The results of this analysis are presented in **Tables 25, 26 and 27**.

Table 25: Predicted construction traffic noise increased on Elizabeth Drive

Road	Location	Noise level increase (dB)	
		Day	Night
Elizabeth Drive	West of Mamre Road	0.2	0.1
Elizabeth Drive	West of Devonshire Road	0.3	0.1
Elizabeth Drive	West of Lawson Road	0.3	0.1

Table 26: Predicted construction traffic noise increase – Day

Scope and road		AADT	%HV	Trucks	Cars	Total Vehicles	Mean Traffic speed (Km/h)	Estimated increase in L _{Aeq} Traffic noise (dBA)
TSS (based on Elizabeth Dr / BCR)	Existing day time road traffic	24000	15.0%	3600	20400	24000	-	-
	Construction traffic	-	-	57	380	437	80	0.1
	Increase in total traffic	-	15.0%	3657	20780	24437		
Fuel Farm (based on Adams/Anton)	Existing day time road traffic	Existing day time road traffic	900	10.0%	90	810	70	1.3
	Construction traffic	Construction traffic	-	-	34	250		
	Increase in total traffic	Increase in total traffic	-	10.5%	124	1060		

¹ Calculation of Road Traffic Noise, Department of Transport Welsh Office

Table 27: Predicted construction traffic noise increase – Night

		AADT	%HV	Trucks	Cars	Total Vehicles	Mean Traffic speed (Km/h)	Estimated increase in LAeq Traffic noise (dBA)
TSS (based on Elizabeth Dr / BCR)	Existing day time road traffic	2500	25.0%	625	1875	2500	-	-
	Construction traffic	-	-	3	20	23	80	0.0
	Increase in total traffic	-	24.9%	628	1895	2523		
Fuel Farm (based on Adams Road)	Existing day time road traffic	100	10.0%	10	90	100	70	3.8
	Construction traffic	-	-	13	130	143		
	Increase in total traffic	-	9.5%	23	220	243		

By comparison to existing traffic flows on the road network, with the exception of the night-time period for Adams Road the relative increase in road traffic noise levels is expected to remain within 2 dBA. When combined with other phases, traffic volumes are not expected to result in a 60% increase in the current levels and therefore a noise level increase of greater than 2dBA is not expected. This is commensurate with the analysis of Bulk Earthworks and other scopes.

For Adams Road, where the relative increase in road traffic noise level is expected to be greater than 2 dB, analysis of absolute noise level impact to the nearest affected receiver location is required. In accordance with the provisions of Part 2.03 of the Airports (Environmental Protection) Regulations 1997 (AEPR), noise from road traffic is not to exceed 55 dB LAeq between the hours of 2200 to 0600. Single height CoRTN1 calculations have been undertaken using construction traffic inputs to predict the noise level impact to the nearest potentially affected receiver on Adams road at a distance of 35 m. The predicted night time noise impact is calculated to be 47 dB LAeq (9hr) which is below the target criterion of 55 dB LAeq.

Construction traffic entering and leaving the site once removed from the road network has been included in the assessment of construction noise impacts presented in Section 7.1.3. This has been done by calculating the highest 15 minute exposure through all time periods based on anticipated peak traffic volume flows summarised in the Traffic and Access CEMP.

8.3.4 ACP Works

Traffic assumptions have been based upon the detail within the Traffic Staging Management Plan (WSA30-CPBACA-00050-PM-PLN-000019). A summary of the key assumptions is provided below:

The ACP Contractor has been provided with a total of five site entry points (SEPs) to access the site and carry out the project works. As set out in Schedule 4 of the Deed and SWTC documents, the entry points are as follows (refer **Table 28**):

Table 28: ACP Site Entry Points

Site Entry Point No.	Location	Access Date	Restrictions / Comments
1	Anton Road Entry Point	Q3 2022	<ul style="list-style-type: none"> ▪ HV and LV access ▪ BEC upgrading prior to ACP use
2	Eaton Road, near the WSA Experience Centre	Q2 2022	<ul style="list-style-type: none"> ▪ LV only ▪ Shared use with fuel pipeline contractor ▪ Secondary Access
3	Main ACP access point (Freight Access Road / TNR)	Q2 2022	<ul style="list-style-type: none"> ▪ Primary Access ▪ HV and LV

Site Entry Point No.	Location	Access Date	Restrictions / Comments
4	Epic Mine entry point	Q4 2022	<ul style="list-style-type: none"> ▪ HV and LV ▪ Secondary access

Due to its proximity to the arterial road network, recent upgrade, configuration and location, ACP Site Entry Point 3 will be used as the primary site entry point throughout the course of the works.

ACP Site Entry Point 3 has been nominated by WSA and the Contractor as the primary entry point into the Airside Site. The entry point consists of a newly constructed, fully signalised, multi-directional intersection with The Northern Road. The signalised intersection will provide a safe and reliable access point for the high level of anticipated heavy and light vehicle use.

ACP Site Entry Point 4 will form one of the primary access points for Phase 2 of the works from approximately Q4 2022. The entry point has been established and under frequent HV use by the BEC for tunnel spoil deliveries to the main stockpile from Elizabeth Drive. The BEC will hand the access point to the ACP Contractor for the Phase 2 handover. The entry point is currently Left-in Left-out only, and there are no proposed changes to the Entry Point from the existing Bulk Earthworks project configuration.

ACP Site Entry Point 1 does not have access availability until road upgrade works on Anton Road and makes the access roads leading to the entry point suitable for Heavy Vehicle use.

Light Vehicle Traffic Impacts

During construction of ACP works it is expected that the peak light vehicle volumes shown in Table 29 can be expected to exit and enter the WSA site, with majority of access/egress via SEP 3 and The Northern Road.

Table 29: Expected light vehicle volumes

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening (18:00–6:00)	Total/day
Light vehicles	300	50	50	300	100	800

The majority of light vehicles would arrive on site prior to 7am (outside of the AM peak) and begin exiting the site at around 4pm each day until 7pm. All deliveries are expected to take place during normal construction hours.

As the Northern Road already has traffic volumes which are well in excess of this, it is expected that this will have a negligible impact on the road network operation and noise levels.

Heavy haulage traffic impacts

During peak construction of ACP Works, to facilitate the importation of large quantities of quarry products and construction material, it is expected that the heavy vehicle volumes (shown in **Table 30**), can be expected to exit and enter the ACP Works site. For the first Phase of the project access (Early 2022 to Nov 2022) all HV access will be into SEP 3 (The Northern Road). SEP 4 will be available from Nov 2022 for access via Elizabeth Drive. Access from Anton Road into the northern part of the site is still to be confirmed (after upgrade works are completed), which are planned to be carried out by the BEC. The below figures are anticipated peak volumes during 2023 when construction works are active across all disciplines.

Table 30: Expected heavy vehicle volumes (figures are 2-way i.e. inclusive of access and egress)

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening (18:00–6:00)	Total/day
Heavy vehicles	45	122	367	147	5	685

Oversized and semi-trailers	0	5	10	0	0	15
Total per day	45	127	377	147	5	700

The vast majority of heavy vehicle deliveries are expected to come from the west and far south of the site via the newly upgraded and completed, Northern Road and SEP 3. The Northern Road has connections with the M4 Motorway & Great Western Highway to the North, as well as Bringelly Rd, Camden Valley Way and Narellan Rd/Hume Motorway in the South.

The heavy vehicle traffic generated by the project is expected to result in an increase in heavy vehicle volumes as per **Table 31** below.

Table 31: Expected Heavy Vehicle Volumes [Source: EIS Table 15-3]

Road	Additional Heavy Vehicles/day	AADT	% of volume
The Northern Road	520	16,944	~3%
Elizabeth Drive	175	7,311 (axle pairs)	~2%
Badgerys Creek Road	5	Estimated 1,000	<1%

We note that the above AADT figures are taken from the EIS and do not include the cumulative impacts of the increase in movements from other project contractors. In summary, construction vehicles for ACP are anticipated to have negligible impact (~3%) on the perimeter roads around Western Sydney International.

Out of Hours Imported Material Operations

High volumes of imported material is expected to be hauled into the ACP Works site over the course of the project. It is possible that the contractor may seek to continue the current approval to import the material to site 24 hours per day, seven days per week. The vast majority of material will be delivered to site using truck and trailer combinations capable of carrying up to 39 tonnes of material. The main delivery route will be via the motorway network to the Northern Road and to site via Site Entry Point 3. If this approval is granted, it is anticipated the total heavy vehicle volumes will be maintained.

8.3.5 LCB Works

The following traffic data has been assessed based on predicted LCB Works maximum vehicle movements as follows:

Heavy Vehicle Traffic Impacts

Heavy vehicle movements on the public roads are presented with an average number of movements between June-2022 and February-2025, while the peak is May-2023 to August-2023.

- It is expected that 37% of the traffic will take the Northern Road northbound towards Elizabeth Drive, while 63% will use The M7 southbound towards Elizabeth Drive;
- All traffic will pass through Elizabeth Drive, however, 20% will travel on Badgerys Creek Road to access site at LCB Site Entry Points 1 & 2, while 80% will access site at LCB Site Entry Point 3 on Elizabeth Drive. Return trip on same roads in opposite direction;
- AM Peak and Interpeak traffic is 50% in and 50% out;
- PM Peak is 35 % in and 65% out; and
- Number of vehicles in the table are one way traffic which have been doubled for assessment purposes.

Table 32: LCB Works Expected Heavy Vehicle Volumes

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00– 18:00)	Evening (18:00–6:00)	Total (vtpd)
Heavy vehicles	Peak: 10	Peak:48	Peak: 114	Peak: 48	-	Peak: 220
Oversized and semi-trailers	-	Peak: 6	Peak: 6	-	-	Peak: 12
Total per day	Peak: 10	Peak: 54	Peak: 120	Peak: 48	-	Peak: 232

Light Vehicle Traffic Impacts

For Light Vehicles, the average number of vehicle movements is for the period between June-2022 to February 2025, while the peak period is from May 2023 to August 2023.

- All traffic will pass through Elizabeth Drive and Badgerys Creek Road, the only light vehicle access will be LCB Site Entry Point 2;
- Morning and AM peak traffic is all inward bound;
- PM Peak and Evening traffic is all outward bound;
- Evening traffic occurs over the night-time shoulder period and will be consolidated between 18:00 and 19:00; and
- Number of vehicles in **Table 33** are one way traffic which have been doubled for assessment purposes.

Table 33: LCB Works Expected Light Vehicle Volumes

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00– 18:00)	Evening (18:00– 19:00)	Total (vtpd)
Light vehicles	Peak: 203	Peak: 24	-	Peak: 189	Peak: 38	Peak: 454

Based on expected heavy vehicle movements for the arterial roads in Table 15-3 of the EIS, the following predicted traffic noise increases are expected for these routes.

Table 34: LCB Works Predicted construction traffic noise increased on public roads

Road	Location	Noise level increase (dB)	
		Day	Night
Elizabeth Drive	West Badgerys Creek Road	0.12	<0.01
The Northern Road	West of Devonshire Road	0.08	<0.01
Badgerys Creek Road	North of The Northern Road	0.5	<0.01

Table 35: LCB Predicted construction traffic noise increase – Day increase

	AADT	%HV	Trucks	Cars	Total Vehicles	Mean Traffic speed (Km/h)	Estimated increase in L _{Aeq} Traffic noise (dBA)
Existing day time road traffic	24000	15.0%	3600	20400	24000	-	-
Construction traffic (including	-	-	464	908	1372	80	0.7

private vehicles travelling to and from site)							
Increase in total traffic	-	15.0%	4064	21308	21772		

Table 36: LCB Predicted construction traffic noise increase – Night increase

	AADT	%HV	Trucks	Cars	Total Vehicles	Mean Traffic speed (Km/h)	Estimated increase in L _{Aeq} Traffic noise (dBA)
Existing night-time road traffic	2500	25.0%	625	1875	2500	-	-
Construction traffic	-	-	-	38	38	80	0.1
Increase in total traffic	-	24.9%	625	1913	2538		

8.3.6 M12 on Airport

Construction traffic noise impacts associated with the M12 on Airport works have been modelled in the following M12 on Airport Environmental Assessment Documents:

- M12 Motorway Project Environmental Impact Assessment (EIS) (October 2019)
- M12 Motorway Project Amendment Report (October 2020)
- M12 Motorway Project West Package Consistency Assessment (October 2020)

It is noted that the construction traffic noise impacts have not specifically been modelled on Airport land within the M12 on Airport Environmental Assessment Documents. However, it is noted that the works on Airport land will be an extension to the works to be undertaken on Elizabeth Drive.

Construction related traffic has the potential to temporarily increase road traffic noise levels at receivers which are located near to the construction routes.

A comparison of the proposed construction traffic volumes to the forecast traffic volumes during the construction period has been used to determine where increases in road traffic noise (i.e. a greater than 2.0 dB increase over the existing noise level) may be likely to occur.

Based on the proposed construction traffic routes and the forecast redistribution of traffic during construction, no noticeable increases in road traffic noise are predicted.

The baseline traffic volumes for the construction period and proposed construction traffic volumes are detailed in **Table 37**. The predicted increase in traffic noise due to additional construction traffic is outlined in **Table 38**.

Table 37: M12 on Airport Construction Traffic Volumes

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening (18:00–6:00)	Total (vtpd)
Light vehicles	3	15	9	14	3	44
Heavy Vehicles	1	4	9	5	1	20
Total per day	4	19	18	19	4	64

Table 38: M12 Predicted road traffic noise increase due to construction traffic

Road	Section	Predicted Construction Traffic Noise Increase (dB)	
		Day	Night
M7 Motorway	South of M7 Interchange	<0.5	<0.5
	Btwn On/Off Ramps to Elizabeth Dr & Wallgrove Rd	<0.5	<0.5
	North of M7 Interchange	<0.5	<0.5
M7 Motorway – Elizabeth Drive Interchange	NB Off Ramp to Elizabeth Dr	0.5	0.5
	NB On Ramp from Wallgrove Rd	1.0	0.6
	SB Off Ramp to Elizabeth Dr	0.8	1.2
	SB On Ramp from Elizabeth Dr	1.3	0.8
Elizabeth Drive	East of M7 Interchange	<0.5	<0.5
	Btwn M7 Interchange Rd & Cecil Rd	<0.5	<0.5
	Btwn Cecil Rd & Duff Rd	<0.5	<0.5
	Btwn Duff Rd & Mamre Rd	0.5	<0.5
	Btwn Mamre Rd & Devonshire Rd	<0.5	<0.5
	Btwn Devonshire Rd & Clifton Ave	<0.5	<0.5
	Btwn Clifton Ave & Western Rd	0.5	<0.5
	Btwn Western Rd & Martin Rd	0.7	0.5
	Btwn Martin Rd & WSA Business Park East Access	0.6	0.5
	Btwn WSA Business Park East Access & WSA Business Park West Access	0.7	0.7
	Btwn WSA Business Park West Access & Adams Rd	0.7	0.6
	Btwn Adams Rd & Luddenham Rd	0.9	0.8
	Btwn Luddenham Rd & The Northern Road	1.0	0.9
	Wallgrove Road	Btwn Elizabeth Dr & M7 NB On Ramp	1.1	1.0
North of M7 NB On Ramp		0.6	<0.5
Clifton Avenue	North of Elizabeth Dr	<0.5	<0.5
The Northern Road	South of Elizabeth Dr	1.3	1.0
	Btwn Elizabeth Dr & M12	0.5	0.5
	North of M12	0.5	<0.5

Construction traffic will access construction sites using only designated heavy vehicle routes such as the M7 Motorway, Elizabeth Drive and The Northern Road.

8.3.7 Utilities

As noted in Section 6.11.3 of the WSA Construction Plan, permanent utilities are still undergoing design development, as such the traffic noise modelling can't be undertaken. Traffic noise modelling will be undertaken as part of planning and approvals and will be a requirement to the ALC Consent process. Given the scope of these activities and the nominated locations, it is unlikely that traffic movements associated with the installation and connection of permanent utility infrastructure for WSI will cause an impact on nearby receptors.

8.3.8 Stage 1 Cargo Work Area

Light Vehicle Traffic Impacts

During construction of Stage 1 Cargo works it is expected that the peak light vehicle volumes shown in **Table 39** can be expected to exit and enter the WSA site, with majority of access/egress via The Northern Road.

Table 39: Expected light vehicle volumes

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening (18:00–6:00)	Total/day
Light vehicles	300	50	50	300	100	800

The majority of light vehicles would arrive on site prior to 7am (outside of the AM peak) and begin exiting the site at around 4pm each day until 7pm. All deliveries are expected to take place during standard construction hours.

As the Northern Road already has traffic volumes which are well in excess of this, it is expected that this will have a negligible impact on the road network operation and noise levels.

Expected light vehicle numbers may vary as planning progresses. A review of light vehicle numbers will be carried out upon contract award to determine if an update to **Table 39** and the associated modelling is required.

Heavy Haulage Traffic Impacts

During peak construction of Stage 1 Cargo works, to facilitate the importation of large quantities of quarry products and construction material, it is expected that the heavy vehicle volumes (shown in **Table 40**), can be expected to exit and enter the WSA-Cargo site. All HV access will be via The Northern Road entry point.

Table 40: Expected heavy vehicle volumes (this includes inclusive of access and egress)

Vehicle Type	Morning (6:00–7:00)	AM Peak (7:00–9:00)	Interpeak (9:00–15:00)	PM Peak (15:00–18:00)	Evening (18:00–6:00)	Total/day
Heavy vehicles	45	122	367	147	5	685
Oversized and semi-trailers	0	5	10	0	0	15
Total per day	45	127	377	147	5	700

Most heavy vehicle deliveries are expected to come from the west and far south of the site via the newly upgraded and completed Northern Road. The Northern Road has connections with the M4 Motorway & Great Western Highway to the North, as well as Bringelly Rd, Camden Valley Way and Narellan Rd/Hume Motorway in the South.

Expected heavy vehicle numbers may vary as planning progresses. A review of vehicle numbers will be carried out upon contract award to determine if an update to **Table 40** and the associated modelling is required.

Table 41: Predicted construction traffic noise increase on public roads

Road	Location	Noise level increase (dB)	
		Day	Night
Northern Road	West Badgerys Creek Road	0.12	<0.01

Table 42: Predicted construction traffic noise increase - Day

	AADT	%HV	Trucks	Cars	Total Vehicles	Mean Traffic speed (Km/h)	Estimated increase in L _{Aeq} Traffic noise (dBA)
Existing day time road traffic	24000	15.0%	3600	20400	24000	-	-
Construction traffic	-	-	695	700	1395	80	0.25
Increase in total traffic	-	15.0%	4295	20780	25395		

Table 43: Predicted construction traffic noise increase - Night

	AADT	%HV	Trucks	Cars	Total Vehicles	Mean Traffic speed (Km/h)	Estimated increase in L _{Aeq} Traffic noise (dBA)
Existing day time road traffic	2500	25.0%	625	1875	2500	-	-
Construction traffic	-	-	5	100	105	80	0.17
Increase in total traffic	-	24.9%	630	1975	2605		

Expected vehicle numbers may vary as planning progresses. A review of vehicle numbers may be carried out upon contract award to determine if an update to **Table 40** and the associated modelling is required.

8.4 Construction Vibration Assessment

Roads and Maritime Services CNVG provides guidelines for minimum working distances for vibration-intensive activities with respect to the stated standards and guidelines. The minimum working distances for building damage should always be complied with. The distances are noted as being indicative and are likely to vary depending on the item of plant and local geotechnical conditions. The minimum working distances apply to addressing the risk of cosmetic (minor – easily repairable) damage of typical buildings under typical geotechnical conditions.

Where vibration intensive works are required to be undertaken within the specified minimum working distances, vibration monitoring should be undertaken to ensure acceptable levels of vibration are satisfied.

In relation to human comfort, the minimum working distances relate to continuous vibration is shown in **Table 44**. For most construction activities, vibration emissions would be intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods may be allowed. **Table 44** presents the recommended minimum working distances for vibration intensive plant.

Table 44: Recommended safe working distances for vibration intensive plant

Plant item	Rating / description	Minimum working distance – Cosmetic damage (BS7385)	Minimum working distance – Human response (DEC 2006)
Vibratory roller	< 50 kN (Typically 1-2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m

Plant item	Rating / description	Minimum working distance – Cosmetic damage (BS7385)	Minimum working distance – Human response (DEC 2006)
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	4 m
Jackhammer	Hand held	1 m (nominal)	2 m

8.4.1 Material Importation

Upon review of the Material Importation scope, it is considered that there is very limited risk of vibration impacts. Materials imported by Main Works Contractors will be from the edge of the site and the nature of the works are unlikely to generate vibration.

8.4.2 Bulk Earthworks

The Bulk Earthworks package was completed in early 2023.

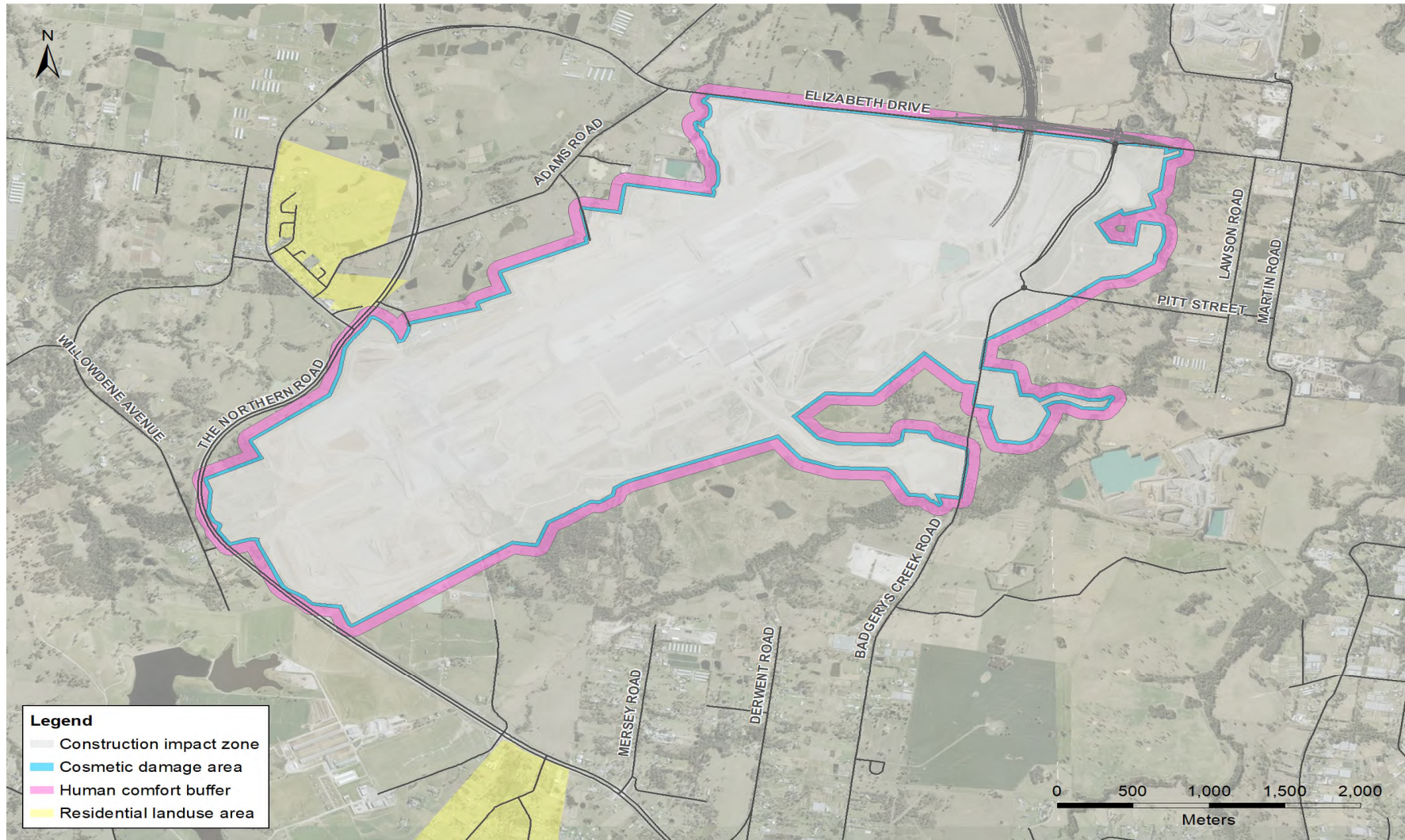


Figure 10: Vibration safe working distance

8.4.3 TSS Works

The aviation fuel hydrant line reticulation works will involve services excavation and trenching, pipework laying, backfilling and compaction. Potential impact hammering may be required if rock subgrade is encountered during services trenching works. The use of vibratory rollers will be utilised in the compaction of backfill of these fuel lines. The fuel farm associated works will also involve excavation and trenching, backfilling and compaction with a vibratory compactor.

There are no receivers (i.e. residential, non-residential, structures or dwellings) within either the cosmetic damage or human comfort minimum work distances listed in **Table 44** of this Noise and Vibration CEMP in relation to the TSS Works. The closest impacted receiver for the TSS Works will be between the WSA Offices at Eaton Road and the proposed aviation fuel hydrant lines at 200m. The distance to the centre of the main Terminal construction zone is 1500m (refer Figure 10). The closest impacted receiver for the Terminal works will be between the WSA Offices at Eaton Road and the proposed aviation fuel hydrant lines at 200m. The closest impacted receiver for the Fuel Farm works will be on Adams Road at approximately 190 m to the fence line of the proposed Fuel Farm works area.

The TSS construction works therefore represent a low risk for the site and do not warrant detailed modelling to be undertaken.

8.4.4 ACP Works

The ACP Works will involve the use of vibration intensive plant for various activities such as:

- Vibratory rollers for asphalt paving;
- Vibratory rollers for compaction works; and
- Rock hammers for trenching or defect demolition.

There are no receivers (i.e., residential, non-residential, structures or dwellings) within either the cosmetic damage or human comfort minimum work distances listed in **Table 44** of this Noise and Vibration CEMP in relation to ACP works. All ACP Works will be within the footprint of the Bulk Earthworks vibration assessment shown in Figure 10 of this CEMP.

The ACP Works therefore represent a low risk for the site and do not warrant detailed modelling to be undertaken.

8.4.5 LCB Works

The following works have the potential to generate vibration during the LCB Works:

- Vibratory rollers for asphalt paving;
- Vibratory rollers for compaction works; and
- Whacker Packers for local compaction.

A vibration buffer zone has been provided detailing the human comfort impact zone around the boundary of the site. While vibratory works are unlikely to be undertaken at the edges of the boundary, this buffer zone provides an indication of the worst-case extent of impacts from the LCB Works. Based on this buffer vibration risk associated with the LCB Works is considered negligible.

8.4.6 M12 On-Airport Works

The main sources of vibration from construction works within the study area are vibratory rollers and rock-breakers are associated with the following phases (as per Section 8).

Vibratory rolling maybe required in discrete locations during the following scenarios:

- Scenario 1a, Ancillary facility and establishment – Peak impact
- Scenario 1b, Ancillary facility and establishment – Typical impact
- Scenario 3a, Utilities and drainage – Peak impact

- Scenario 6a, Earthworks – Peak impact
- Scenario 8a, Road works – tie-in to existing roads.

Rock-breaking may be required in discrete locations during the following scenario:

- Scenario 3a, Utilities and drainage - Peak impact

There are no sensitive receivers (i.e. residential, non-residential, structures or dwellings) within either the cosmetic damage or human comfort minimum work distances listed in **Table 44** of this Noise and Vibration CEMP in relation to the M12 on Airport works. The nearest sensitive receiver to the M12 on Works is approximately 500m.

The M12 on Airport works construction works therefore represent a low vibration risk.

This following construction goals will apply to the On-Airport M12 Works:

- For structural damage to heritage structures, the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration - effects of vibration on structures;
- For damage to other buildings and/or structures, the vibration limits set out in the British Standard BS 7385-1:1990 - Evaluation and measurement for vibration in buildings – Guide for measurement of vibration and evaluation of their effects on buildings; and
- For human exposure, the acceptable vibration values set out in Assessing Vibration: A Technical Guideline (DEC, 2006).

Where a utility asset owner has provided specific vibration limits, the M12 on Airport Contractor will comply with those limits.

8.4.7 Utilities and other building activities

As described in the WSA Construction Plan, the development of the Airport includes construction of permanent utility tie-ins and structures need for the operation of the Airport. These are still undergoing design development, however based on available information around location and construction methodology, works are considered to represent a low risk for the site and do not warrant detailed modelling to be undertaken. Where a utility asset owner has provided specific vibration limits, these will need be considered when finalising tie ins/connections to external points.

8.4.8 Stage 1 Cargo Works

Stage 1 Cargo works will involve the use of vibration intensive plant for various activities such as:

- Vibratory rollers for asphalt paving
- Vibratory rollers for compaction works
- Rock hammers for trenching or defect demolition.

During construction of the Stage 1 Cargo works, all receivers (i.e. residential, non-residential, structures or dwellings) are located outside the cosmetic damage or human comfort minimum work distances (listed in **Table 44** of this document). All construction activities will be undertaken within the footprint of the CIZ shown in Figure 10 Therefore, construction works associated with the Stage 1 Cargo works scope will have a negligible vibration risk to surrounding receivers and additional vibration modelling is not required.

9. Environmental Control Measures

Mitigation and management measures that will be implemented during construction are detailed in **Table 45** and are consistent with those provided in Tables 28-2 and 28-3 in Chapter 28 of the EIS, as per Condition 6 (Section 3.11.2) of the Airport Plan. The relevant control measures will be included in the site-specific Environmental Work Method Statement (EWMS) and Environmental Control Map (ECM) – refer to Section 4.3 of the SEMF for further detail.

Table 45: Noise and Vibration Control Measures

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
MI: Material Importation All Contractors: MI, TSS, LCB, ACP, M12, Utilities, ancillary developments, other building activities and aviation support facilities and other Contractors as delegated by WSA					
GENERAL					
NV_01	Training will be provided to all project personnel, including relevant sub-contractors on noise and vibration requirements from this plan through inductions, toolboxes and targeted awareness training. Noise and vibration training requirements will be as per Section 13 of this plan.	Pre-construction, construction	All personnel will be inducted before commencing works. Toolboxes will be conducted regularly by the Contractor Environmental Team or delegates throughout Construction.	All Contractors	Good Practice
NV_02	Public address systems used at any construction site will not be used outside normal construction hours, except where prior consultation has been undertaken with potentially affected residents or in the case of emergency. Public address systems would be designed to limit noise spillage off-site.	Construction	All personnel will be aware of the normal construction hours.	All Contractors	Good Practice
NV_03	Work compounds and their associated layout, parking areas, equipment and material stockpile sites will be positioned away from noise-sensitive locations.	Construction	Site compound details provided in ECM	All Contractors	Good Practice
NV_04	Site entry and exit points will be located as far as possible from sensitive receivers where possible, considering the importance of safe access.	Construction	Site compound details provided in ECM	All Contractors	Good Practice
NV_05	Where possible, the compounds, refuelling areas and areas near potentially noise and vibration sensitive receivers, will be designed to promote one-way traffic so that vehicle reversing movements are minimised.	Construction	The traffic management plan is designed to comply with this.	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
MI: Material Importation All Contractors: MI, TSS, LCB, ACP, M12, Utilities, ancillary developments, other building activities and aviation support facilities and other Contractors as delegated by WSA					
NV_06	Site training / tool-box talks will reinforce expected behavioural practices on site such as no swearing or unnecessary shouting or loud stereos/ radios on site, no dropping materials from height where practicable, no throwing of items and no slamming of doors.	Construction	All personnel will undertake inductions and receive ongoing site training.	All Contractors	Good Practice
NV_07	Where possible, work will be undertaken within the standard construction hours of: <ul style="list-style-type: none"> - 7am – 6pm, Monday to Friday; - 8am – 1pm Saturday - No work on Sunday or public holidays unless approved through the out of hours process which is described in section 10 of the Noise and Vibration CEMP. Where complaints are received in response to high noise activities (e.g. Rock breaking) respite periods will be applied (e.g. 3 hours of work with 1 hour of no high noise work).	Construction	All personnel will undertake inductions. Planning will be undertaken to program works. Approved hours to be included on the ECM OOHW Permit Figure 11 – Respite Periods	All Contractors	Good Practice
NV_08	Construction Planning will provide for adequate respite periods for Sensitive Receptors from noise and vibration associated with construction activities No blasting activity shall be undertaken during the hours of 5 pm to 9 am on weekdays, on weekends (other than 9 am to 1 pm Saturdays) and on public holidays.	Construction	Planning will be undertaken to program works Refer to environmental control NV_30 and Figure 11 with regards to respite for noise activities)	All Contractors	Airport Plan Condition 6(4) (Section 3.11.2)
PLANT AND EQUIPMENT					
NV_09	Undertake saw-cutting operations during standard work hours wherever possible to minimise noise impacts	Construction	Works planning and assessment to be undertake prior to commencing.	All Contractors	Good Practice
NV_10	Plant or machinery will not be permitted to ‘warm-up’ before the nominated working hours.	Construction Plant located near receivers	All personnel will undertake inductions, which will be reiterated through ongoing site training. Detailed on ECM	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
MI: Material Importation All Contractors: MI, TSS, LCB, ACP, M12, Utilities, ancillary developments, other building activities and aviation support facilities and other Contractors as delegated by WSA					
NV_11	Avoiding queueing, and ensure engines are switched off when equipment is not in use for extended periods (i.e. 30 minutes).	Construction	All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	Traffic and Access CEMP
NV_12	Where possible, the occurrence of consecutive noisy works within the same locality, and/or noisy plant/equipment working close together in the same locality will be avoided or otherwise minimised. Where this occurs at package interfaces the Cumulative Impact of such works will be assessed.	Construction	Works will be scheduled ahead of time, where possible.	All Contractors	Good Practice
NV_13	Where possible high noise generating work (such as use of a concrete saw or hydraulic hammer) will be undertaken during standard construction hours, even in the event of an out-of-hour works approval.	Construction	Works will be scheduled ahead of time, where possible.	All Contractors	Good Practice
NV_14	Manually adjustable or ambient noise sensitive or 'quacker'/broadband type reversing alarms on plant and/or flashing lights will be used at night.	Construction	All vehicles on site will be tested and fitted with appropriate controls before commencing works.	All Contractors	Good Practice
NV_15	Where possible, work will be undertaken away from noise sensitive receivers.	Construction	Works will be scheduled ahead of time, where possible.	All Contractors	Good Practice
NV_16	All construction plant and equipment used on the site will be, in addition to other relevant requirements: <ul style="list-style-type: none"> - Fitted with properly maintained noise suppression devices in accordance with the manufacturer's specifications. - Maintained in an efficient condition. - Operated in a proper and efficient manner 	Construction	All vehicles on site will be tested and fitted with appropriate controls before commencing works.	All Contractors	Good Practice
NV_17	Loading and unloading will be carried out as far as practical away from sensitive receivers. When loading trucks, materials are to be placed into trucks as far as practical, rather than dropped from a height.	Construction	Works will be scheduled ahead of time, where possible. Workers will be trained accordingly on unloading.	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
MI: Material Importation All Contractors: MI, TSS, LCB, ACP, M12, Utilities, ancillary developments, other building activities and aviation support facilities and other Contractors as delegated by WSA					
NV_18	Truck movements will be kept to a minimum, i.e. that trucks are sufficiently utilised for each trip. Travel will be via internal haul routes where practicable and not queue near residential dwellings.	Construction	Works will be scheduled ahead of time, where possible.	All Contractors	Traffic and Access CEMP
NV_19	Noisy and vibration generating plant working simultaneously close together will be avoided to the greatest extent practical adjacent to noise affected / vibration sensitive receivers.	Construction	Works will be scheduled ahead of time, where possible, and in combination with the location of sensitive receivers.	All Contractors	Good Practice
NV_20	Where practical, at the end of shifts, excavation and/or ripping plant will be taken from their work areas and left overnight away from the immediate vicinity of sensitive receivers. Warming up of the plant will then be conducted away from such receivers.	Construction	Machinery storage points will be determined in combination with the location of sensitive receivers.	All Contractors	Good Practice
NV_21	Truck drivers will limit compression braking as far as practicable.	Construction	All truck drivers will undertake induction that informs them of the appropriate measures.	All Contractors	Good Practice
NV_22	Where possible, noise generating equipment will be strategically positioned to take advantage of natural screening from geographical features, earthwork features (e.g. stockpiles) or other structures to reduce the transmission of noise between work sites and receiver locations.	Construction	The locations of noise generating equipment will be in combination with the location of geographical features and structures.	All Contractors	Good Practice
NV_23	Construction activities which are predicted to exceed any noise management levels will be identified. This includes the cumulative impact of interfacing works packages.	Pre-construction, Construction	Predicted exceedances will be managed through work planning prior to starting and verified through monitoring.	All Contractors	Good Practice
NV_24	Selection of less noisy plant and equipment and less noise emitting construction methods, where feasible.	Construction	Works planning and assessment to be undertake prior to commencing.	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
MI: Material Importation All Contractors: MI, TSS, LCB, ACP, M12, Utilities, ancillary developments, other building activities and aviation support facilities and other Contractors as delegated by WSA					
NV_25	Structures (site sheds, stockpiles / bunds, hoarding) will be used where possible to shield residential receivers from noise.	Construction	Works planning and assessment to be undertake prior to commencing.	All Contractors	Good Practice
CONSULTATION AND COMPLAINTS MANAGEMENT					
NV_26	All complaints received will be managed in accordance with the Community and Stakeholder Engagement Plan.	Construction	A Community and Stakeholder Engagement Plan	WSA Community Engagement Manager All Contractors	Good Practice
NV_27	Affected receivers will receive notifications for construction activities likely to affect their amenity through noise and vibration.	Pre-construction, Construction	Noisy construction activities are to be pre-determined.	WSA Community Engagement Manager All Contractors	Good Practice
SURVEY, MONITORING AND REPORTING					
NV_28	Noise and vibration monitoring of plant and equipment will be undertaken to ensure the noise performance levels predicted in this Noise and Vibration CEMP are being met.	Pre-construction, Construction	Plan and schedule monitoring to a program. Reported in Monthly Report	All Contractors	Good Practice
NV_29	Noise and vibration monitoring will be undertaken in accordance with Section 12.2. The program for construction noise and vibration monitoring indicates monitoring frequency, location, how the results of this monitoring are recorded and, procedures that are followed where significant exceedances of relevant noise and vibration goals are detected.	Construction	Monitoring and record keeping to be undertaken in accordance with this Plan. Contractor require to undertake monitoring for construction activities. WSA will conduct monitoring for the Stage 1 Development as per the EIS	All Contractors WSA	Good Practice
RESPITE FROM NOISY ACTIVITIES					
NV_30	For work activities considered to be noisy (e.g. hammering, grinding etc – excluding blasting), adopt an 8.30 am start and a 5 pm finish with two one-hour respite periods starting	Construction	Monitoring and record keeping being undertaken in accordance with this plan.	All Contractors	AEPR Condition 6

ID	Measure / Requirement	When to implement	How to implement	Responsibility for Implementation	Reference
MI: Material Importation All Contractors: MI, TSS, LCB, ACP, M12, Utilities, ancillary developments, other building activities and aviation support facilities and other Contractors as delegated by WSA					
	at 11.30am and 2pm respectively. Saturday works will commence at 8am and finish at 1pm with a one-hour respite period starting at 11am.		Figure 11 – Respite Periods		
NV_31	There is to be no blasting activity during the hours of 5 pm to 9 am on weekdays, on weekends (other than 9 am to 1 pm Saturdays) and on public holidays.	Construction	Monitoring and record keeping being undertaken in accordance with this plan.	All Contractors	AEPR Condition 6
COMBINED OUT OF HOURS ASSESSMENT AND TRACKING					
NV_32	Contractors will provide status updates on Out of Hours works on a weekly basis and excel spreadsheet of predicted receptor noise levels from assessment undertaken for out of hours works, as per Appendix S of the WSA SEMF.	Construction	Provision of information by contractors to WSA in support of out of hours works WSA to use information in assessing permit applications and tracking out of hours works	All Contractors WSA	Good Practice

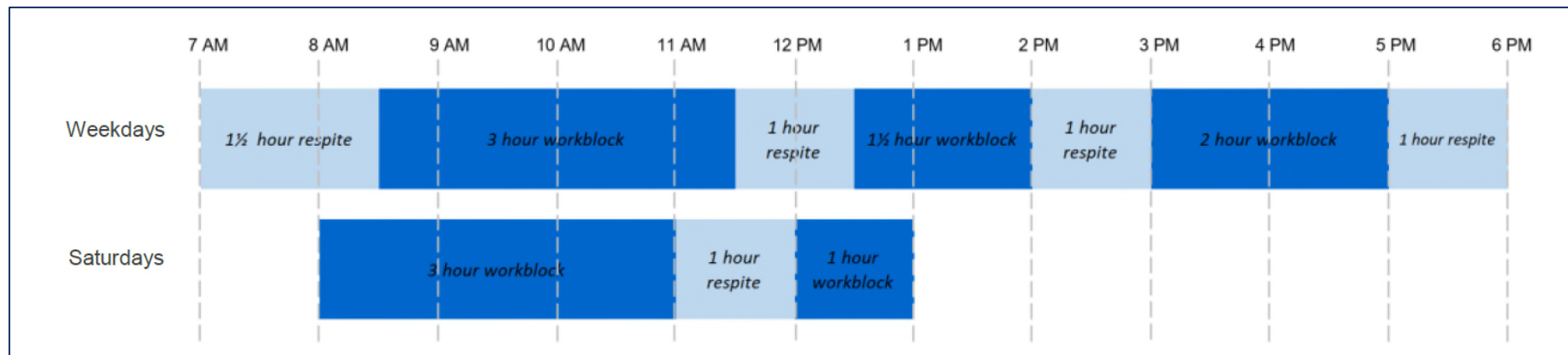


Figure 11: Respite Periods

10. Working Outside of Standard Construction Hours

10.1 Standard Construction Hours

Standard construction hours are:

- 7am – 6pm Monday to Friday;
- 8am – 1pm Saturday; and
- No work on Sunday or public holidays unless approved through the out of hours process.

10.2 Out of Hours Works

Contractors shall undertake work within standard construction hours and provide justification on when out of hours works (OOHW) should be undertaken. Project related OOHW may include:

- Deliveries of oversized plant or structures;
- Responsive activities to protect people, property and the environment in the event of an emergency such as a fire or structural failure;
- Other activities undertaken in accordance with relevant noise guidelines, or which have no material noise or other impacts on residences;
- Catch-up works if works are delayed by unforeseen circumstances;
- Work that relies on third party authorisation;
- Work that would otherwise be a safety risk to project employees or the general public; and
- Work for technically justified reasons, for example. Concrete pours, pavement placement during summer months to ensure optimum ambient temperatures during pours, or concrete cutting based on curing times post paving.

OOHW management and mitigation measures are listed in **Table 46**.

10.2.1 Out-of-hours Works Procedure

An OOHW Procedure has been developed to assess and approve works outside of standard construction hours (refer Appendix S of the SEMF).

The procedure is used to:

- Identify works that are proposed outside of the standard construction hours;
- Assessment of proposed out of hours works in accordance with Project approvals;
- Consider potential cumulative impacts associated with other packages work activities;
- Community notification guidelines; and
- Permit out of hours works in accordance with the process and Project Approval.

The OOHW Permit can be found as Appendix D of the SEMF.

10.2.2 Impact Assessment

The potential degree of impact is assessed relative to the NML and the category is used to define the mitigation measures needed. The categories are set out below:

1. Category A = No exceedance above NML
2. Category B = 1-5 dB(A) above NML
3. Category C = 6-15 dB(A) above NML
4. Category D = 16-25 dB(A) above NML
5. Category E = >25 dB(A) above NML

Following the detailed noise assessment, reasonable and feasible mitigation measures will be considered to assist in the management and mitigation of potential noise impacts. Proposed mitigation measures are outlined in **Table 46**.

Table 46: Proposed management and mitigation measures for OOHW noise impact category

Mitigation Measure	Exceedances of relevant NML dB(A)				
	Category A	Category B	Category C	Category D	Category E
Programming / schedule of works	X	X	X	X	X
Alternative construction techniques/scheduling		X	X	X	X
Alternative plant and equipment		X	X	X	X
Community consultation (i.e. letter box drops, etc)		X	X	X	X
Use of temporary noise screens			X	X	X
Provision for respite for high noise generating activities			X*	X	X
Face to face consultation			X*	X	X
Respite offer / act of good will					X
Reasonable temporary relocation offers where agreeable					X
Negotiated agreement					X

* Category C may include sleep disturbance exceedances. In these instances face to face consultation and respite provisions must be considered.

10.3 Community Notification

Community notifications will be undertaken in accordance with the CSEP.

WSA will notify the potentially affected sensitive receivers a minimum of seven days prior to proposed works by letterbox drop (or other communication methods) for work outside of the standard construction hours, or which is likely to affect the amenity of sensitive receptors within standard operating hours. The notification shall include:

- A diagram that clearly identifies the location of the proposed out-of-hours works in relation to nearby cross streets and local landmarks or geographical features;
- Details of the timing, nature, scope and duration of the proposed works and activities;
- Detail of why the proposed works and activities are being undertaken outside of standard construction hours;
- Details of the predicted noise and vibration impacts of the works on identified sensitive receivers;
- Details of all proposed mitigation measures, including respite periods and proposed scheduling;
- Details of the types of plant and equipment that will be used to undertake the work;
- Details of how complaints may be lodged, and additional information obtained about the work; and
- Contact details in community languages relevant to the locality; and include notification of any upcoming project community meetings / forums.

Where work is required out of standard hours within the seven-day period, a phone call and/or email, and/or doorknock will occur with the potentially affected sensitive receivers. This will be conducted a minimum 48 hours prior to the proposed work.

11. Roles and Responsibilities

The key environmental management roles and responsibilities for the construction phase of the work are detailed in Section 4.4 of the SEMF.

WSA will ensure enough resources are allocated on an ongoing basis to ensure effective implementation by both WSA and the responsible contractors.

The Airport Environment Officer (AEO) will be responsible for day-to-day regulatory oversight of the AEPR compliance at WSA after an Airport Lease is granted.

Specific responsibilities for the implementation of this Noise and Vibration CEMP are detailed below:

11.1 Noise and Vibration Consultant

The noise and vibration consultant engaged by WSA will review and update the construction noise and vibration modelling undertaken as part of the EIS. The consultant will also provide an accessible noise model to allow flexible planning and quick and accurate assessment of impacts by the construction team, ensuring that construction methodologies can be optimised to minimise noise and vibration impact outside of the site boundary.

12. Environmental Inspection, Monitoring, Auditing and Reporting

Monitoring, inspection, auditing, and reporting will be undertaken to measure the effectiveness of the implementation of this Plan and to facilitate continuous improvement of noise and vibration management.

General environmental monitoring, inspection, auditing and reporting requirements are summarised in Section 8 of the SEMF.

A summary of the environmental inspection, monitoring, auditing and reporting requirements is provided below, with details of how they apply to noise and vibration management where applicable.

12.1 Environmental Inspections

12.1.1 WSA Environmental Inspections

Environmental site inspections at active, exposed work areas will be undertaken by the WSA Environment Manager (or delegate) on a weekly basis to evaluate the effectiveness of environmental controls implemented by the Contractor.

The site inspection is to include a visual inspection of general construction activities and any noise and vibration mitigation measures and or controls including but not limited to the following:

- Observation of noise emissions from specific plant and equipment;
- Noise hoarding / containment measures if required;
- Noise and vibration loggers are installed and operational if and as required;
- Observation with regards to construction activities and compliance with the nominated construction hours; and
- General observation with regards to the construction noise levels.

The findings of the WSA site environmental inspection will be recorded on a WSA Site Environmental Inspection Checklist with an accompanying photographic style inspection report.

Refer to Appendix K of the SEMF for further details with regards to completing the Site Environmental Inspection Checklist.

12.1.2 Contractor Environmental Inspections

Weekly site inspections will be undertaken to monitor compliance with this Plan. Inspection results will be recorded, and the inspection log made available to the Infrastructure Department upon request. Any non-conformance or improvement opportunities associated with noise or vibration will be documented in the monthly report and discussed at the Environmental Coordination meeting.

More frequent site inspections by the person accountable for noise and vibration management will be conducted onsite when activities with a high potential to produce noise and vibration impacts are being carried out.

The Contractor's Environmental Manager and/or Environmental Coordinators will undertake inspections in accordance with the Contractor Environmental Management Framework. The Contractor's Environmental Coordinators will record inspection findings on an inspection checklist form.

If any maintenance and/or deficiencies in environmental controls or in the standard of environmental performance are observed, they will be recorded on the checklist form. Records will also include details of any maintenance required, the nature of the deficiency, any actions required and an implementation priority.

12.1.3 Pre-start Inspection

Prior to the commencement of works on each shift, an informal inspection will be carried out by the relevant contractor and will include a check of relevant environmental controls and resources required to ensure effective operation and maintenance. This is to include an inspection of relevant noise and vibration management mitigation measures and controls where applicable. Works are not to commence unless inspections are found to be satisfactory.

The Foreman will undertake the pre-work inspection and record daily observations.

12.2 Noise and Vibration Monitoring

General environmental monitoring requirements are set out in the AEPR and include the following:

- Monitoring must take place under the direction of an appropriately qualified person with previous noise and vibration monitoring experience; and
- The results of the monitoring must be kept in a written record.

Specific noise and vibration monitoring requirements, including timing and responsibilities, are included in **Table 47**.

Table 47: Noise and Vibration Monitoring Requirements

Reference	Requirement	Timing	Responsibility
Noise Monitoring			
NV_M_01	Noise monitoring in accordance with AS1055 will be conducted at the nearest sensitive receptor locations to determine the effectiveness of mitigation measures against predicted impacts. During construction monitoring of new activities or new location will be completed within the first two shifts (or whenever the greatest noise impact is predicted) to confirm noise levels are within predicted levels and mitigation measures are appropriate. Noise monitoring programs must use a combination of static and hand-held attended monitoring tools. Further monitoring will be offered in response to a complaint.	Pre-construction and during construction	WSA (Stage 1 Development monitoring) All Contractors (monitoring for work activities)
NV_M_02	An inspection log will be prepared following each monitoring event and will made available to DIRDC upon request.	As required	All Contractors
NV_M_03	Where complaints are received, additional noise monitoring may be undertaken at sensitive receptors to determine if the actual construction noise generated exceeds the predicted 'worst case' construction noise levels.	During construction	All Contractors
NV_M_04	Noise monitoring may be carried out for the purpose of refining construction methods or techniques to minimise noise.	During construction	All Contractors
NV_M_05	Ongoing spot checks of noise intensive plant and equipment will be undertaken throughout construction to ensure compliance with manufactures specifications.	During construction	All Contractors
NV_M_06	The frequency of site inspections will be increased by the person accountable for onsite noise and vibration issues when activities with a high potential to result in elevated noise emissions are undertaken near residential receptors.	During construction	All Contractors

Reference	Requirement	Timing	Responsibility
NV_M_07	Where actual noise levels are found to exceed the predicted worst-case levels, the source of excessive noise generation will be identified, and any additional feasible and reasonable measures available will be implemented to either reduce noise emissions or reduce the impacts on receptors.	During construction	All Contractors
Vibration Monitoring			
NV_M_08	For the protection of buildings, monitoring will be carried out at the commencement of vibratory compaction work within 50 metres of buildings to ensure that safe vibration levels specified in Section 6 are not exceeded and to confirm safe working distances.	During construction	All Contractors
NV_M_09	When vibration intensive activities are required, vibration monitoring will be carried out within the established buffer zones, or where there is a risk that levels may exceed the relevant structural damage goals.	During construction	All Contractors
NV_M_10	Vibration monitoring may be carried out in response to complaints, exceedances, or for the purpose of refining construction methods or techniques to minimise vibrations.	During construction	All Contractors
NV_M_11	Vibration monitoring will continue throughout construction, where appropriate, at nominated sensitive receptor locations to determine the effectiveness of mitigation strategies.	During construction	All Contractors

Details of site activity and equipment usage will be noted during construction noise and vibration monitoring.

Acoustic instrumentation employed in the noise monitoring surveys will comply with the requirements of:

- AS/NZS IEC 61672.1:2019 - Electroacoustics - Sound level meters, Part 1: Specifications; and
- AS/NZS IEC 61672.2:2019 - Electroacoustics - Sound level meters, Part 2: Pattern evaluation tests.

Where vibration is found to exceed safe levels, impacts will be avoided by changing work methods and/or equipment, or through the provision of building protection measures where possible. In the event a complaint relating to property damage is received, an inspection of the property will be undertaken, and an interim building condition survey prepared.

Vibration monitoring will be carried out in accordance with:

- For structural damage vibration – German Standard DIN 4150 and BS 7385: Part 2 – 1993; and
- For human exposure to vibration – the evaluation criteria presented in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DEC 2006).

Where a non-conformance is detected, or monitoring results are outside of the expected range, the non-conformance process described in the SEMF Section 9 will be implemented.

12.2.1 Stage 1 Airport Development Noise Monitoring Program

In addition to targeted noise monitoring as required under NV_M_01, WSA will continue to implement a concurrent program of noise monitoring / logging at representative locations which have been identified in consultation with the NSW EPA. Noise monitoring has been undertaken since October 2017 and remains ongoing) at the Airport Site for the purpose of obtaining noise data. Baseline noise monitoring data includes monitoring from the EIS and before September 2018 when EEW started. Details of the methodology and sampling locations are provided in the sections below.

The current locations of the noise loggers for the noise monitoring program are shown in Figure 12. However, it should be noted that these locations are subject to change and will be dependent on the staging of the construction activities. The Northern and Western stations were repositioned due to clash with bulk earthwork operations following consultation. Any subsequent change to monitoring locations will be conducted in consultation with the NSW EPA and the AEO and will be included in this CEMP.

Noise monitoring will be undertaken using EPA noise monitoring units complying with AS/NZS IEC 61672.2:2019 - Electroacoustics - Sound level meters, Part 2: Pattern evaluation tests or equivalent approved by WSA. The noise monitoring units are programmed to accumulate 15-minute period of LA₉₀, LA₁₀, LA_{eq} and LA_{max} sound pressure levels continuously over the entire monitoring period. At monthly intervals (or in response to complaints), the noise monitoring data will be downloaded and analysed. The noise monitoring data will be filtered to exclude any anomalous data and data potentially affected by adverse weather conditions including wind speeds greater than 5 m/s and rain above 0.2 mm/h. The onsite meteorological station located at the southern site will be used for this analysis. Calibration checks will be performed during the site visits, along with offsite / factory calibrations as per manufacturers specification (during offsite calibration, a replacement unit will be onsite to ensure coverage). This is to ensure the microphone is recording sound pressure levels within the acceptable tolerance of ± 0.5 dB(A).

The details of each of the noise loggers (as shown in Figure 12) are provided in **Table 48**. The noise monitoring locations and monitoring network are considered adequate for monitoring the Stage 1 Airport Development works.

During testing and commissioning of the airport the location of the noise monitors will be reviewed and may change to reflect potential risks associated with airport operations.

Table 48: Noise Monitoring Station Details

Monitoring Site	Equipment	Coordinates
Northern	BSWA 309	288391E, 6249331N
Southern	BSWA 309	288314E, 6245134N
Eastern	BSWA 309	292035 E, 6248589N
Western	BSWA 309	287314E, 6248169N

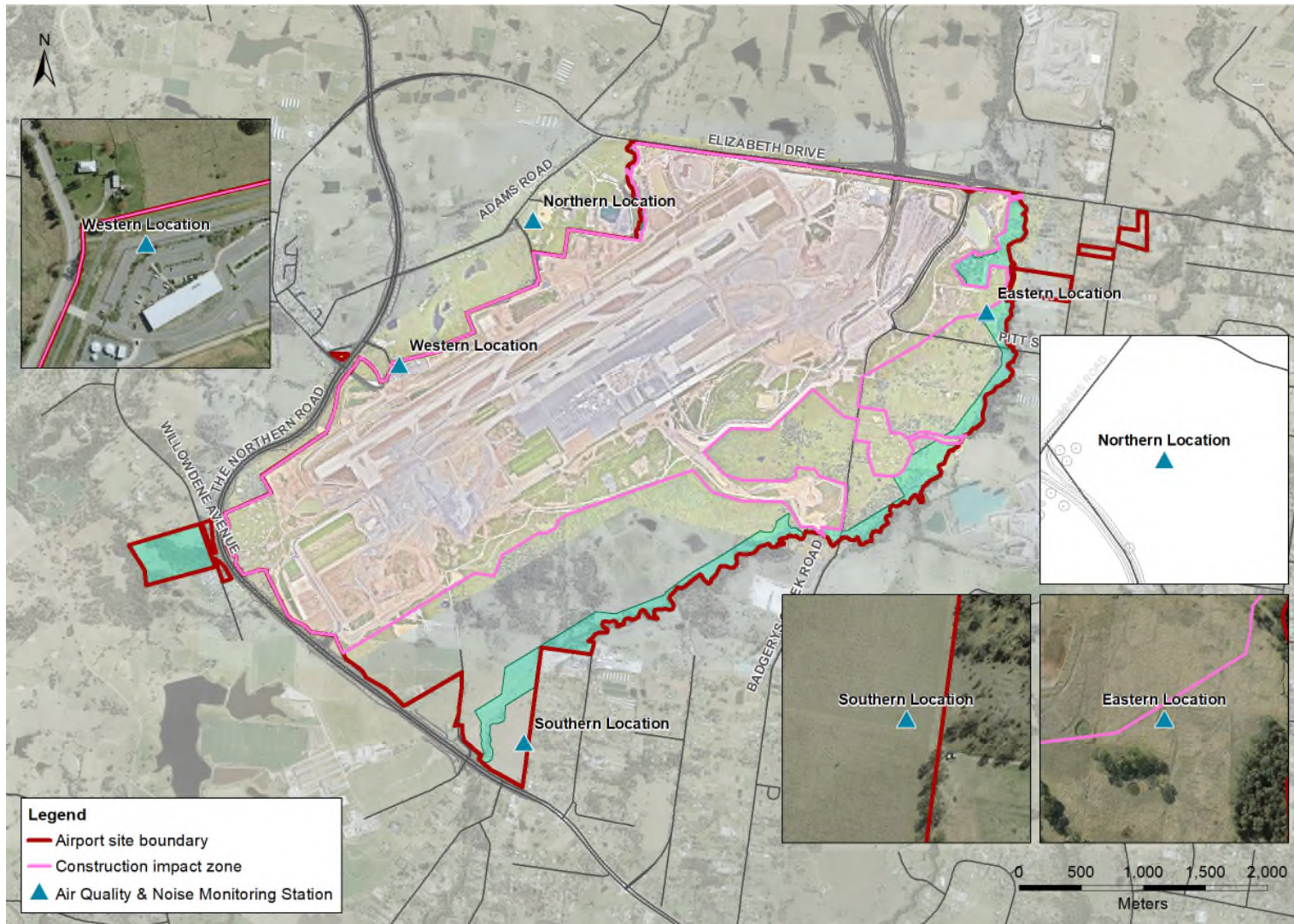


Figure 12: Noise Monitoring Locations

12.2.2 Contractor Noise Monitoring Program

Noise monitoring in accordance with AS1055 will be conducted by each contractor to determine accuracy of predicted noise and the effectiveness of mitigation measures. Noise monitoring is to be conducted and results catalogued and subsequently provided must be to Australian Standards 1055 Acoustics - Description and measurement of environmental noise. The type (i.e. a combination of static and attended monitoring) and location of monitoring (i.e. near receptors or near noise sources) must consider amongst other things, the nature of works and the potential for Cumulative Impacts. Where attended monitoring is carried out at a receptor, it will be typically carried out at the property boundary, unless access within the property is obtained (i.e. in response to a complaint). Details on location (distance from receptor building / property boundary etc.) will be recorded within the event report.

During new construction activities, or during work in new locations noise monitoring will be completed within the first two shifts (or whenever the greatest noise impact is predicted) to confirm noise levels are within the predicted range, and that mitigation measures are appropriate. The noise monitoring locations will be determined by the Contractor Environmental Manager and will be based on the Contractor's noise modelling data. Further noise monitoring will be offered in the event of a complaint (as per Section 12.6, details of complaints management is given in Section 6 of the WSA SEMF and WSA CSEP)

The Contractor is to provide WSA with a monthly summary of all noise and vibration monitoring data, including an assessment of compliance with criteria, including predicted and actual noise impacts during OOHW.

Raw monitoring data is to be provided to WSA upon request in excel or similar format (as agreed with WSA).

12.3 Environmental Auditing

Refer to Section 8.2 of the SEMF for environmental auditing requirements, including internal WSA audits, independent audits and audits to be undertaken by contractors.

12.4 Environmental Reporting

General environmental reporting requirements are detailed in Section 8.3 of the SEMF.

In addition, a summary of reporting requirements required under this Noise and Vibration CEMP (including environmental reporting requirements under the Airport Plan specific to this Noise and Vibration CEMP) is provided in **Table 49**.

Table 49: Noise and Vibration Reporting

Action	Scope	Timing / Frequency	Responsibility
Annual reporting	<p>Unless otherwise agreed in writing by an Approver, an annual report will be prepared in relation to compliance with the Noise and Vibration CEMP (Condition 47).</p> <p>Unless otherwise agreed in writing by an Approver, WSA will publish each of the annual reports on its website within three months of the end of the period in respect of which the report was prepared, with evidence providing proof of the date of publication to the Secretary of the Department of Infrastructure, Transport, Regional Development and Communications with a copy to the Environment Department. The report must remain on the website for a period of at least 12 months (Condition 47).</p>	Annually	WSA Environment Manager
Complaints reporting	Recording of complaints and stakeholder interactions.	As required	WSA Environment Manager WSA Community and Stakeholder Manager All Contractors
Environmental Site Register (required under the 6.02(3) of the AEPR)	<p>Environmental Site Register to be kept and maintained to include written record of environmental conditions of the Airport and its environmental management generally.</p> <p>The register is to include the results of monitoring required under section 12.2 and a record of any exceptional incidents that cause excessive pollution and the action taken to resolve the situation</p>	Include in Annual report	WSA Environment Manager
Excessive noise reporting	In accordance with the AEPR, WSA must provide an AEO, within 14 days, a written report in the event that monitoring results indicate excessive noise, occurring as a result of the Stage 1 Airport Development.	As required	WSA
Monitoring compliance reporting	Undertaking monitoring as required by this Noise and Vibration CEMP. Contractor is to provide WSA with a monthly summary of all noise and vibration monitoring undertaken and advise of compliance with criteria.	Monthly	All Contractors
Reporting of non-conformances and improvement opportunities	The management and reporting requirements of environmental non-conformances and improvement opportunities will be in accordance with Section 8 of the WSA SEMF.	As required	WSA and All Contractors

12.5 Review of Approved Plans

As per the WSA EMS, review of all Approved Plans will be undertaken annually to ensure they continue to meet conditions set out in Section 3.11.2 of the Airport Plan (refer Condition 47). If the review identifies areas where the plan does not continue to meet the approval criteria for that Plan, a variation to the Approved Plan will be prepared and submitted for approval.

Under Condition 49 (4) of the Airport Plan, WSA is also required to review each Approved Plan at least every five years (from the date of approval). Findings of this review will be included in the Annual Report (refer Section 8.3 of the SEMF) and if needed, a variation to the Approved Plan will be prepared and submitted for approval.

Additionally, WSA may initiate reviews of Approved Plans at other times in response to improvement opportunities, non-conformances, and changes to scope of work or construction methodology or alterations to legal or contractual requirements.

Any changes identified and implemented through the variation and review process identified above will be communicated to relevant contractors through re-issue of the revised WSA Approved Plan and subsequent training and awareness (refer Section 4 of the SEMF).

12.6 Environmental Incidents and Complaints Management

The management and reporting of environmental incidents and non-conformances shall be undertaken by the appropriate person as detailed in Section 6 of the SEMF.

All communications and complaints management will be implemented and managed in accordance with Section 7 of the SEMF and the CSEP.

13. Competence, Training and Awareness

To ensure this Noise and Vibration CEMP is effectively implemented, each level of management is responsible for ensuring that all personnel reporting to them are aware of the requirements within. The WSA Environment Manager will coordinate the necessary and relevant environmental training in conjunction with other training and development activities.

All employees, contractors and utility staff conducting work activities on site shall be required to undertake a site induction (or visitors induction) that includes construction noise and vibration risks and mitigation measures. The induction training should include: requirements of this CEMP, relevant regulations, incidents and non conformance responses, construction hours, out of hours work processes, location of sensitive receptors, complaints management etc. All competence, training and awareness requirements will be implemented as detailed in Section 5 of the SEMF.

14. References

AS/NZS ISO 14001: 2016 *Environmental management systems – Requirements with guidance for use*

Commonwealth Department of Infrastructure and Regional Development, 2016. *Airport Plan* (December 2016)

Commonwealth Department of Infrastructure and Regional Development, 2016. *Airport Plan Western Sydney Airport Variation 2* (September 2021)

Commonwealth Department of Infrastructure and Regional Development, 2016. *Western Sydney Airport Environmental Impact Statement*, 2016

CONCAWE: May 1981 - *The propagation of noise from petroleum and petrochemical complexes to neighbouring communities*

M12 Motorway Project Environmental Impact Assessment (EIS) (October 2019)

M12 Motorway Project Amendment Report (October 2020)

M12 Motorway Project West Package Consistency Assessment (October 2020)

Appendix A Australian Standard AS2436-2010

Table A1

AS2436-2010, 'Guide to noise and vibration control on construction, demolition and maintenance sites'

APPENDIX A

TYPICAL SOUND LEVELS FROM CONSTRUCTION, MAINTENANCE AND DEMOLITION PLANT

(Informative)

The noise generated by machinery such as construction, maintenance and demolition plant may be expressed in terms of the A-weighted sound pressure level measured at some distance from the machine, or in terms of the A-weighted sound power level. Table A1 lists typical construction plant and equipment and the range of sound power levels and mid-point sound pressure levels at 10 m.

TABLE A1

TYPICAL SOUND LEVELS OF CONSTRUCTION PLANT AND EQUIPMENT*

Plant description	A-weighted sound power levels L_{WA} dB ref: 10^{-12} W		A-weighted sound pressure levels L_{pA} (mid-point) dB at 10 m
	Typical or Range	Typical (mid-point)	
Asphalt paver	103-112	108	80
Asphalt rotomill	111	111	83
Backhoe	100-108	104	76
Backhoe with auger	100-111	106	78
Bulldozer	102-114	108	80
Cherry picker	105	105	77
Compactor	110-115	113	85
Compressor (silenced)	93-110	101	73
Concrete agitator truck	107-111	109	76
Concrete pencil vibrator	101-105	103	75
Concrete pump truck	103-113	108	80
Concrete saw	112-122	117	89
Concrete vibratory screed	115	115	87
Crane (mobile)	95-113	104	76
Crane (tower)	105	105	77
Excavator	97-117	107	79
Filtration unit (40 000 cfm)	109	109	81
Forklift	106	106	78
Front end loader	110-115	113	85
Generator (diesel)	84-113	99	71
Grader	105-115	110	82
Gritblaster (grit & nozzle air noise)	129	129	101
Hand tools (electric)	95-110	102	74
Hand tools (pneumatic)	114-117	116	88

(continued)

TABLE A1 (continued)

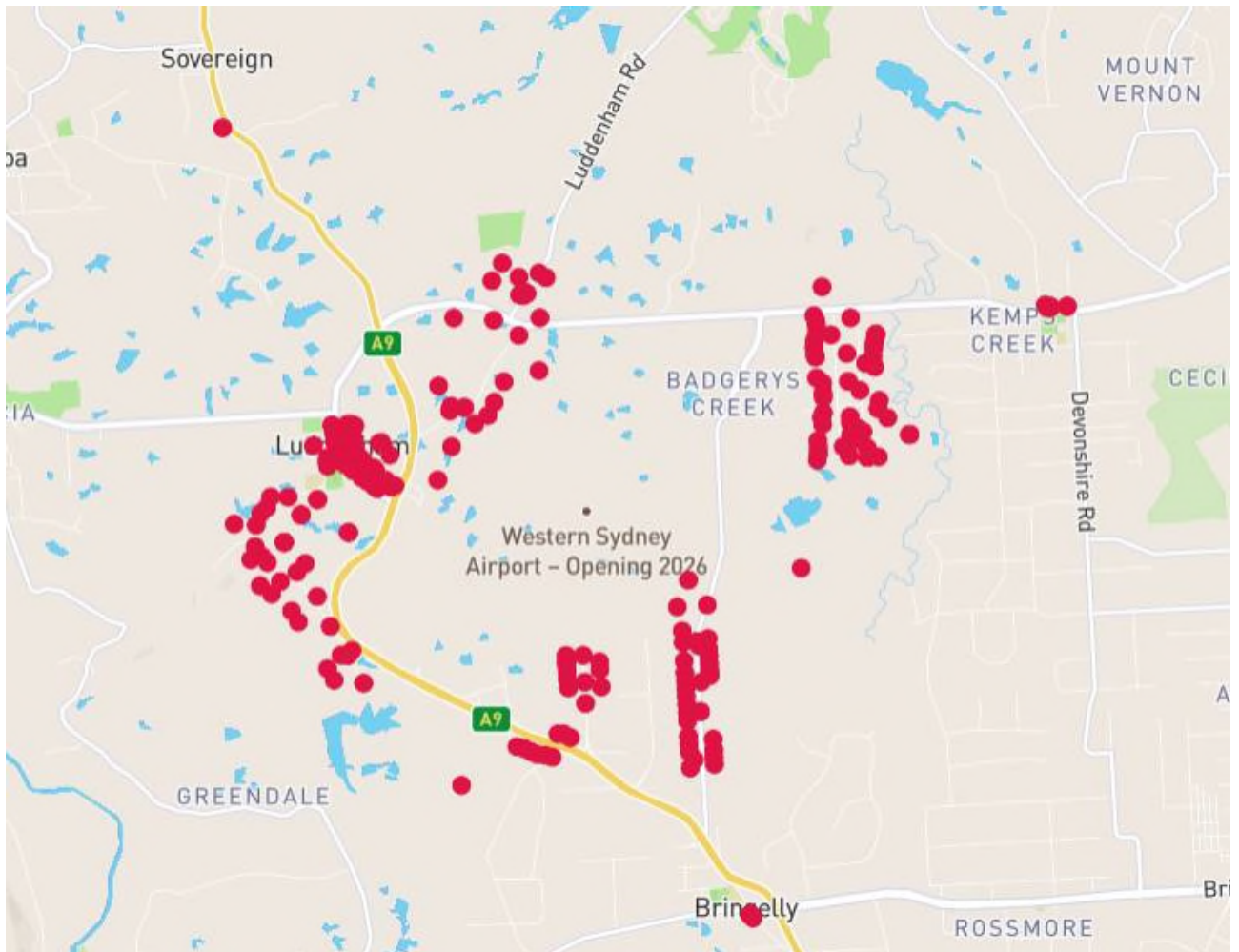
Plant description	A-weighted sound power levels L_{wA} dB ref: 10^{-12} W		A-weighted sound pressure levels L_{pA} (mid-point) dB at 10 m
	Typical or Range	Typical (mid-point)	
Jack hammers	121	121	93
Loader (wheeled)	99-111	105	77
Machine mounted hydraulic drill	110-115	113	85
Machine mounted percussive drill	116	116	88
Machine mounted pneumatic drill	110-121	116	88
Piling (bored)	111	111	83
Piling (impact sheet) (L_{max})	126-147	137	109
Piling (vibratory)	116-133	125	97
Rock breaker	118	118	90
Roller (vibratory)	103-112	108	80
Scraper	116	116	88
Spreader	95	95	67
Truck (>20 tonne)	107	107	79
Truck (dump)	117	117	89
Truck (water cart)	106-108	107	79
Vehicle (light commercial e.g. 4WD)	100-111	106	78
Welder	100-110	105	77

* Information in Table A1 has been derived from a combination of the following sources and further information can be obtained from them:

- AS 2436—1981 *Guide to noise control on construction, maintenance and demolition sites.*
- BS 5228-1, *Code of practice for noise and vibration control on construction and open sites. Noise.*
- DEFRA—Department for Environment Food and Rural Affairs (United Kingdom), Update of noise database for prediction of noise on construction and open sites-Phase 3: Noise measurement data for construction plant used on quarries, July 2006.

NOTE: The sound power data within the column marked 'Typical (mid-point)' can be used to calculate typical noise levels at the nominated assessment locations.

Appendix B Sensitive Receptors



Id	Privacy	Address	Suburb	State	Post Code
3027	No Restrictions	137 Willowdene Avenue	Luddenham	NSW	2745
3029	No Restrictions	45 Willowdene Avenue	Luddenham	NSW	2745
3031	No Restrictions	38 Jamison Street	Luddenham	NSW	2745
3032	No Restrictions	40 Jamison street	Luddenham	NSW	2745
3033	No Restrictions	2550 Elizabeth Drive	Luddenham	NSW	2745
3034	No Restrictions	2620 Elizabeth Drive	Luddenham	NSW	2745
3035	No Restrictions	889 Luddenham road	Luddenham	NSW	2745
3037	No Restrictions	887 Luddenham road	Luddenham	NSW	2745
3038	No Restrictions	869 Luddenham road	Luddenham	NSW	2745
3039	No Restrictions	869A Luddenham Road	Luddenham	NSW	2745
3040	No Restrictions	846 Luddenham Road	Luddenham	NSW	2745
3041	No Restrictions	882 Luddenham road	Luddenham	NSW	2745
3042	No Restrictions	892 Luddenham road	Luddenham	NSW	2745
3044	No Restrictions	2172 The Northern road	Luddenham	NSW	2745
3045	No Restrictions	2166 The Northern road	Luddenham	NSW	2745
3046	No Restrictions	9 Blaxland avenue	Luddenham	NSW	2745

Id	Privacy	Address	Suburb	State	Post Code
3047	No Restrictions	11 Blaxland Avenue	Luddenham	NSW	2745
3048	No Restrictions	13 Blaxland Avenue	Luddenham	NSW	2745
3049	No Restrictions	15 Blaxland Avenue	Luddenham	NSW	2745
3050	No Restrictions	17 Blaxland Avenue	Luddenham	NSW	2745
3051	No Restrictions	19 Blaxland Avenue	Luddenham	NSW	2745
3052	No Restrictions	21 Blaxland Avenue	Luddenham	NSW	2745
3053	No Restrictions	23 Blaxland Avenue	Luddenham	NSW	2745
3054	No Restrictions	25 Blaxland Avenue	Luddenham	NSW	2745
3056	No Restrictions	27 Blaxland Avenue	Luddenham	NSW	2745
3057	No Restrictions	29 Blaxland Avenue	Luddenham	NSW	2745
3058	No Restrictions	31 Blaxland Avenue	Luddenham	NSW	2745
3059	No Restrictions	33 Blaxland Avenue	Luddenham	NSW	2745
3060	No Restrictions	35 Blaxland Avenue	Luddenham	NSW	2745
3061	No Restrictions	37 Blaxland Avenue	Luddenham	NSW	2745
3062	No Restrictions	39 Blaxland Avenue	Luddenham	NSW	2745
3063	No Restrictions	41 Blaxland Avenue	Luddenham	NSW	2745
3064	No Restrictions	43 Blaxland Avenue	Luddenham	NSW	2745
3065	No Restrictions	45 Blaxland Avenue	Luddenham	NSW	2745
3066	No Restrictions	28 Blaxland Avenue	Luddenham	NSW	2745
3067	No Restrictions	30 Blaxland Avenue	Luddenham	NSW	2745
3068	No Restrictions	22 Blaxland Avenue	Luddenham	NSW	2745
3069	No Restrictions	18 Blaxland Avenue	Luddenham	NSW	2745
3070	No Restrictions	14 Blaxland Avenue	Luddenham	NSW	2745
3071	No Restrictions	16 Blaxland Avenue	Luddenham	NSW	2745
3072	No Restrictions	12 Blaxland Avenue	Luddenham	NSW	2745
3073	No Restrictions	10 Blaxland Avenue	Luddenham	NSW	2745
3074	No Restrictions	1 Michael Avenue	Luddenham	NSW	2745
2386	No Restrictions	7 Wade Close	Luddenham	NSW	2745
2385	No Restrictions	4 Wade Close	Luddenham	NSW	2745
2384	No Restrictions	3 Wade Close	Luddenham	NSW	2745
2383	No Restrictions	10 Wade Close	Luddenham	NSW	2745
2382	No Restrictions	6 Wade Close	Luddenham	NSW	2745
2381	No Restrictions	5 Wade Close	Luddenham	NSW	2745
2379	No Restrictions	2150 The Northern Road	Luddenham	NSW	2745
2378	No Restrictions	2150A The Northern Road	Luddenham	NSW	2745
2377	No Restrictions	2146 The Northern Road	Luddenham	NSW	2745
2387	No Restrictions	8 Wade Close	Luddenham	NSW	2745
2388	No Restrictions	9 Jamison Street	Luddenham	NSW	2745
2389	No Restrictions	11 Jamison Street	Luddenham	NSW	2745
2394	No Restrictions	260 Willowdene Avenue	Luddenham	NSW	2745
2395	No Restrictions	295 Willowdene Avenue	Luddenham	NSW	2745
2483	No Restrictions	2179 Elizabeth Drive	Luddenham	NSW	2745
2514	No Restrictions	1197 The Northern Road	Bringelly	NSW	2556
2515	No Restrictions	8/45-51 Wentworth Rd	Bringelly	NSW	2556
2516	No Restrictions	8/1197 The Northern Road	Bringelly	NSW	2556

Id	Privacy	Address	Suburb	State	Post Code
2631	No Restrictions	6/2130 The Northern Road	Luddenham	NSW	2745
2632	No Restrictions	2130 The Northern Road	Luddenham	NSW	2745
2829	No Restrictions	6/1197 The Northern Rd	Bringelly	NSW	2553
2837	No Restrictions	3/1197 The Northern Road	Bringelly	NSW	2556
2955	No Restrictions	200 Lawson Road	Badgerys Creek	NSW	2555
3006	No Restrictions	435 Willowdene Avenue	Luddenham	NSW	2745
3007	No Restrictions	163 Adams road	Luddenham	NSW	2745
3008	No Restrictions	160 Martin road	Badgerys Creek	NSW	2555
3009	No Restrictions	260 Martin Road	Badgerys Creek	NSW	2555
3010	No Restrictions	217 Martin road	Badgerys Creek	NSW	2555
3011	No Restrictions	211 Martin road	Badgerys Creek	NSW	2555
3012	No Restrictions	195 Martin road	Badgerys creek	NSW	2555
3013	No Restrictions	2 Willowdene Avenue	Luddenham	NSW	2745
3014	No Restrictions	80 Willowdene Avenue	Luddenham	NSW	2745
3015	No Restrictions	120 Willowdene Avenue	Luddenham	NSW	2745
3016	No Restrictions	160 Willowdene Avenue	Luddenham	NSW	2745
3017	No Restrictions	200 Willowdene Avenue	Luddenham	NSW	2745
3018	No Restrictions	220A Willowdene Avenue	Luddenham	NSW	2745
3019	No Restrictions	230 Willowdene Avenue	Luddenham	NSW	2745
3020	No Restrictions	230A Willowdene Avenue	Luddenham	NSW	2745
3021	No Restrictions	235A Willowdene Avenue	Luddenham	NSW	2745
3023	No Restrictions	215 Willowdene Avenue	Luddenham	NSW	2745
3024	No Restrictions	165A Willowdene Avenue	Luddenham	NSW	2745
3025	No Restrictions	164 Willowdene Avenue	Luddenham	NSW	2745
3026	No Restrictions	135 Willowdene Avenue	Luddenham	NSW	2745
3121	No Restrictions	7 Ethan close	Luddenham	NSW	2745
3122	No Restrictions	5 Ethan close	Luddenham	NSW	2745
3123	No Restrictions	3 Ethan close	Luddenham	NSW	2745
3124	No Restrictions	2010 The Northern Road	Luddenham	NSW	2745
3125	No Restrictions	2208 The Northern road	Luddenham	NSW	2745
3126	No Restrictions	2206 The Northern road	Luddenham	NSW	2745
3127	No Restrictions	2204 The Northern road	Luddenham		2745
3128	No Restrictions	2202 The Northern road	Luddenham	NSW	2745
3129	No Restrictions	2200 The Northern road	Luddenham	NSW	2745
3130	No Restrictions	2198 The Northern road	Luddenham		2745
3131	No Restrictions	2196 The Northern road	Luddenham	NSW	2745
3132	No Restrictions	2194 The Northern road	Luddenham	NSW	2745
3133	No Restrictions	2190 The Northern road	Luddenham	NSW	2745
3134	No Restrictions	2188 The Northern road	Luddenham	NSW	2745
3135	No Restrictions	2186 The Northern road	Luddenham		2745
3136	No Restrictions	2184 The Northern road	Luddenham	NSW	2745
3138	No Restrictions	4/2182 The Northern road	Luddenham		2745
3139	No Restrictions	2/2182 The Northern road	Luddenham	NSW	2745
3140	No Restrictions	1/2182 The Northern road	Luddenham	NSW	2745
3302	No Restrictions	136G Mersey road	Bringelly		2556

Id	Privacy	Address	Suburb	State	Post Code
3303	No Restrictions	136H Mersey road	Bringelly		2556
3304	No Restrictions	132 Mersey road	Bringelly		2556
3305	No Restrictions	122 Mersey road	Bringelly		2556
3306	No Restrictions	130 Mersey road	Bringelly		2556
3307	No Restrictions	120 Mersey road	Bringelly		2556
3309	No Restrictions	110A Mersey road	Bringelly		2556
3312	No Restrictions	306 Badgerys Creek road	Badgerys Creek		
3580	No Restrictions	Mersey road	Bringelly		2556
5555	No Restrictions	Lot 1 Campbell Street	Luddenham	NSW	2745
5556	No Restrictions	56 Campbell Street	Luddenham	NSW	2745
5558	No Restrictions	58 Campbell Street	Luddenham	NSW	2745
5559	No Restrictions	60 Campbell Street	Luddenham	NSW	2745
5561	No Restrictions	64 Campbell Street	Luddenham	NSW	2745
5562	No Restrictions	68 Campbell Street	Luddenham	NSW	2745
5564	No Restrictions	10A Willodene Avenue	Luddenham	NSW	2745
5565	No Restrictions	220 Willodene Avenue	Luddenham	NSW	2745
5569	No Restrictions	1655 The Northern Road	Bringelly	NSW	2556
5570	No Restrictions	1635 The Northern Road	Bringelly	NSW	2556
5571	No Restrictions	2 Dwyer Road	Bringelly	NSW	2556
5572	No Restrictions	1615 The Northern Road	Bringelly	NSW	2556
5573	No Restrictions	1592 The Northern Road	Bringelly	NSW	2556
5574	No Restrictions	1582 The Northern Road	Bringelly	NSW	2556
5575	No Restrictions	3 Jamison Street	Luddenham	NSW	2745
3075	No Restrictions	3 Michael Avenue	Luddenham	NSW	2745
3077	No Restrictions	7 Michael Avenue	Luddenham	NSW	2745
3078	No Restrictions	9 Michael Avenue	Luddenham	NSW	2745
3079	No Restrictions	11 Michael Avenue	Luddenham	NSW	2745
3080	No Restrictions	13 Michael Avenue	Luddenham	NSW	2745
3081	No Restrictions	15 Michael Avenue	Luddenham	NSW	2745
3082	No Restrictions	17 Michael Avenue	Luddenham	NSW	2745
3083	No Restrictions	19 Michael Avenue	Luddenham	NSW	2745
3085	No Restrictions	10 Michael Avenue	Luddenham	NSW	2745
3086	No Restrictions	8 Michael Avenue	Luddenham	NSW	2745
3087	No Restrictions	6 Michael Avenue	Luddenham	NSW	2745
3088	No Restrictions	4 Michael Avenue	Luddenham	NSW	2745
3089	No Restrictions	2 Michael Avenue	Luddenham	NSW	2745
3090	No Restrictions	1 Hawkins Avenue	Luddenham	NSW	2745
3091	No Restrictions	2 Hawkins Avenue	Luddenham	NSW	2745
3092	No Restrictions	3 Hawkins Avenue	Luddenham	NSW	2745
3093	No Restrictions	4 Hawkins Avenue	Luddenham	NSW	2745
3094	No Restrictions	6 Hawkins Avenue	Luddenham	NSW	2745
3095	No Restrictions	8 Hawkins Avenue	Luddenham	NSW	2745
3096	No Restrictions	10 Hawkins Avenue	Luddenham	NSW	2745
3097	No Restrictions	26 Hawkins Avenue	Luddenham	NSW	2745
3098	No Restrictions	20 Hawkins Avenue	Luddenham	NSW	2745

Id	Privacy	Address	Suburb	State	Post Code
3099	No Restrictions	18 Hawkins Avenue	Luddenham	NSW	2745
3100	No Restrictions	14 Hawkins Avenue	Luddenham	NSW	2745
3101	No Restrictions	5 Hawkins Avenue	Luddenham	NSW	2745
3102	No Restrictions	7 Hawkins Avenue	Luddenham	NSW	2745
3103	No Restrictions	9 Hawkins Avenue	Luddenham	NSW	2745
3104	No Restrictions	11 Hawkins Avenue	Luddenham	NSW	2745
3105	No Restrictions	13 Hawkins Avenue	Luddenham	NSW	2745
3106	No Restrictions	15 Hawkins Avenue	Luddenham	NSW	2745
3107	No Restrictions	17 Hawkins Avenue	Luddenham	NSW	2745
3108	No Restrictions	24 Hawkins Avenue	Luddenham	NSW	2745
3109	No Restrictions	22 Hawkins Avenue	Luddenham	NSW	2745
3110	No Restrictions	16 Hawkins Avenue	Luddenham	NSW	2745
3111	No Restrictions	12 Hawkins Avenue	Luddenham	NSW	2745
3112	No Restrictions	21 Jamison Street	Luddenham	NSW	2745
3113	No Restrictions	25 Jamison Street	Luddenham	NSW	2745
3114	No Restrictions	2 Ethan close	Luddenham	NSW	2745
3115	No Restrictions	4 Ethan close	Luddenham	NSW	2745
3116	No Restrictions	6 Ethan close	Luddenham	NSW	2745
3117	No Restrictions	8 Ethan close	Luddenham	NSW	2745
3118	No Restrictions	10 Ethan close	Luddenham	NSW	2745
3119	No Restrictions	12 Ethan close	Luddenham	NSW	2745
3120	No Restrictions	16 Ethan close	Luddenham	NSW	2745
586	No Restrictions	105-115 Adams Road	LUDDENHAM	NSW	2745
589	No Restrictions	2 Jamison Street	LUDDENHAM	NSW	2745
1560	No Restrictions	1463 Elizabeth Drive	KEMPS CREEK	NSW	2178
699	No Restrictions	151 Adams Road	Luddenham	NSW	
701	No Restrictions	1970 Elizabeth Drive	BADGERYS CREEK	NSW	2555
703	No Restrictions	40 Martin Road	Badgerys Creek	NSW	2555
706	No Restrictions	170 Martin Road	BADGERYS CREEK	NSW	2555
1475	No Restrictions	2178 The Northern Road	LUDDENHAM	NSW	2745
707	No Restrictions	165 Martin Road	Badgerys Creek	NSW	2555
1370	No Restrictions	Lot 5/1443 Elizabeth Dr	KEMPS CREEK	NSW	2178
708	No Restrictions	150 Martin Road	BADGERYS CREEK	NSW	2555
1269	No Restrictions	1443 Elizabeth drive	KEMPS CREEK	NSW	2178
709	No Restrictions	115 Martin Road	BADGERYS CREEK	NSW	2555
1010	No Restrictions	345 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
1009	No Restrictions	335 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
1007	No Restrictions	260 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
1006	No Restrictions	230 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
1005	No Restrictions	190 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
1004	No Restrictions	158 Badgerys Creek Road	BADGERYS CREEK	NSW	2555

Id	Privacy	Address	Suburb	State	Post Code
1002	No Restrictions	145 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
1001	No Restrictions	130 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
1000	No Restrictions	110 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
999	No Restrictions	100 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
997	No Restrictions	475 Badgerys Creek Road		NSW	2555
971	No Restrictions	270 Badgerys Creek Road	BADGERYS CREEK	NSW	2556
785	No Restrictions	4/2170 The Northern Road,	Luddenham	NSW	2745
810	No Restrictions	355 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
949	No Restrictions	1/1455-1463 Elizabeth Drive	KEMPS CREEK	NSW	2178
947	No Restrictions	1465-1467 Elizabeth Drive	KEMPS CREEK	NSW	2178
811	No Restrictions	355a Badgerys Creek Road	BADGERYS CREEK	NSW	2555
812	No Restrictions	325 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
813	No Restrictions	220 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
814	No Restrictions	305 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
830	No Restrictions	155 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
829	No Restrictions	120 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
828	No Restrictions	175 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
827	No Restrictions	195 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
826	No Restrictions	140 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
825	No Restrictions	205 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
824	No Restrictions	152 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
823	No Restrictions	235 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
822	No Restrictions	162 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
821	No Restrictions	180 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
820	No Restrictions	200 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
819	No Restrictions	293 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
815	No Restrictions	315 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
816	No Restrictions	210 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
365	No Restrictions	3059 Northern Road	Luddenham	NSW	2745
366	No Restrictions	3057 Northern Road	Luddenham	NSW	2745
369	No Restrictions	3051 Northern Road	Luddenham	NSW	2745
370	No Restrictions	3047 Northern Road	Luddenham	NSW	2745
2227	No Restrictions	7 Jamison Street	LUDDENHAM	NSW	
2226	No Restrictions	5 Jamison Street	LUDDENHAM	NSW	
2225	No Restrictions	1 Jamison Street	LUDDENHAM	NSW	

Id	Privacy	Address	Suburb	State	Post Code
2224	No Restrictions	23 Jamison Street	LUDDENHAM	NSW	2745
2222	No Restrictions	18 Jamison Street	LUDDENHAM	NSW	
371	No Restrictions	3045 Northern Road	Luddenham	NSW	2745
2220	No Restrictions	14 Jamison Street	LUDDENHAM	NSW	
2219	No Restrictions	12 Jamison Street	LUDDENHAM	NSW	2745
372	No Restrictions	3043 Northern Road	Luddenham	NSW	2745
373	No Restrictions	3039 Northern Road	Luddenham	NSW	2745
375	No Restrictions	3035 Northern Road	Luddenham	NSW	2745
2218	No Restrictions	6 Jamison Street	LUDDENHAM	NSW	
376	No Restrictions	19 Northern Road	Luddenham	NSW	2745
2216	No Restrictions	2156 The Northern Road	LUDDENHAM	NSW	2745
379	No Restrictions	65 Adams Road	Luddenham	NSW	2745
2215	No Restrictions	2154 The Northern Road	Luddenham	NSW	2745
2212	No Restrictions	2144 The Northern Road	LUDDENHAM	NSW	2745
387	No Restrictions	265 Adams Road	Luddenham	NSW	2745
393	No Restrictions	892 Luddenham Road	Luddenham	NSW	2745
399	No Restrictions	2111 Elizabeth Drive	Luddenham	NSW	2745
2185	No Restrictions	375 Willowdene Avenue	LUDDENHAM	NSW	2745
404	No Restrictions	2-1953 Elizabeth Drive	Luddenham	NSW	2745
410	No Restrictions	15 Lawson Road	Badgerys Creek	NSW	2555
2176	No Restrictions	150 Mersey Road	BRINGELLY	NSW	2555
413	No Restrictions	65 Lawson Road	Badgerys Creek	NSW	2555
422	No Restrictions	155 Lawson Road	Badgerys Creek	NSW	2555
1866	No Restrictions	235 Willowdene Avenue	Luddenham	NSW	2745
428	No Restrictions	160 Lawson Road	Badgerys Creek	NSW	2555
434	No Restrictions	210 Lawson Road	Badgerys Creek	NSW	2555
1854	No Restrictions	55 Lawson Road	BADGERYS CREEK	NSW	2555
443	No Restrictions	60 Martin Road	Badgerys Creek	NSW	2555
446	No Restrictions	65 Martin Road	Badgerys Creek	NSW	2555
1850	No Restrictions	125 Lawson Road	BADGERYS CREEK	NSW	2555
460	No Restrictions	80 Martin Road	Badgerys Creek	NSW	2555
461	No Restrictions	90 Martin Road	Badgerys Creek	NSW	2555
463	No Restrictions	186 Martin Road	Badgerys Creek	NSW	2555
559	No Restrictions	2/2140 The Northern Road	LUDDENHAM	NSW	2745
563	No Restrictions	6/2140 The Northern Road,	Luddenham	NSW	2745
576	No Restrictions	14 Eaton Road	LUDDENHAM	NSW	2745
584	No Restrictions	15 Adams Road	LUDDENHAM	NSW	2745
2933	No Restrictions	35 Lawson Road	Badgerys Creek	NSW	2555
2859	No Restrictions	260 Willowdene Avenue	Luddenham	NSW	2745
1844	No Restrictions	195 Lawson Road	BADGERYS CREEK	NSW	2555
403	No Restrictions	1745 (Lot 3) Elizabeth Drive	Luddenham	NSW	2745
3249	No Restrictions	1602 The Northern Road			
2830	No Restrictions	4/1153 The Northern Road	Bringelly	NSW	2553
378	No Restrictions	50-80 Adams Road	Luddenham	NSW	2745

Id	Privacy	Address	Suburb	State	Post Code
784	No Restrictions	3/2140 The Northern Road	Luddenham	NSW	2745
3272		1645 The Northern Road	Bringelly	NSW	
2175	No Restrictions	145 Mersey Road	BRINGELLY	NSW	2556
1584	No Restrictions	4/1455 Elizabeth Drive	KEMPS CREEK	NSW	2178
3319	No Restrictions	1675 The Northern Road	Bringelly	NSW	2556
696	No Restrictions	2140 The Northern Road	Luddenham	NSW	2745
2182	No Restrictions	460 Willowdene Avenue	LUDDENHAM	NSW	2745
389	No Restrictions	185 Adams Road (7 Anton Road)	Luddenham	NSW	2745
1855	No Restrictions	45 Lawson Road	BADGERYS CREEK	NSW	2555
430	No Restrictions	190 Lawson Road	Badgerys Creek	NSW	2555
711	No Restrictions	50 Martin Road	BADGERYS CREEK	NSW	2555
368	No Restrictions	3053 Northern Road	Luddenham	NSW	2745
421	No Restrictions	145 Lawson Road	Badgerys Creek	NSW	2555
950	No Restrictions	175 Badgerys Creek Rd	BRINGELLY	NSW	2556
377	No Restrictions	Lot 3 Adams Road	Luddenham	NSW	2745
557	No Restrictions	70 Eaton Road	LUDDENHAM	NSW	2745
575	No Restrictions	18 Eaton Road	LUDDENHAM	NSW	2745
1371	No Restrictions	9 Elizabeth drive	KEMPS CREEK	NSW	2178
1843	No Restrictions	205 Lawson Road	BADGERYS CREEK	NSW	2555
2249	No Restrictions	125 Mersey Road	Bringelly	NSW	2556
1841	No Restrictions	235 Lawson Road	BADGERYS CREEK	NSW	2555
1754	No Restrictions	150 Lawson Road	BADGERYS CREEK	NSW	2555
2373	No Restrictions	330 Willowdene Avenue	Luddenham	NSW	2745
923	No Restrictions	1/2130 Northern Road, Luddenham	LUDDENHAM	NSW	2745
964	No Restrictions	175 Badgerys Creek Road	BADGERYS CREEK	NSW	
388	No Restrictions	275 Adams Road	Luddenham	NSW	2745
601	No Restrictions	12 Eaton Road	LUDDENHAM	NSW	2745
1489	No Restrictions	210 Martin Road	BADGERYS CREEK	NSW	2555
416	No Restrictions	87 Lawson Road	Badgerys Creek	NSW	2555
1852	No Restrictions	83 Lawson Road	BADGERYS CREEK	NSW	2555
788	No Restrictions	Lot 10, 140 Adams Road	Luddenham	NSW	2745
817	No Restrictions	297 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
2722	No Restrictions	325 Willowdene Avenue	Luddenham	NSW	2745
2180	No Restrictions	510 Willowdene Avenue	LUDDENHAM	NSW	2745
2209	No Restrictions	320 Badgerys Creek Road	BADGERYS CREEK	NSW	2555
1853	No Restrictions	75 Lawson Road	BADGERYS CREEK	NSW	2555
2250	No Restrictions	135 Mersey Road	BRINGELLY	NSW	2556
3222	No Restrictions	161 Adams Road	Luddenham	NSW	2745
418	No Restrictions	115 Lawson Road	Badgerys Creek	NSW	2555
3326	No Restrictions	180 Adams Road	Luddenham	NSW	
3232	No Restrictions	180 Adams road	Luddenham	NSW	2745

Id	Privacy	Address	Suburb	State	Post Code
698	No Restrictions	205 Adams Road	Luddenham	NSW	2745
448	No Restrictions	210 Martin Road	Badgerys Creek	NSW	2555
789	No Restrictions	125-135 Adams Road	Luddenham	NSW	2745
602	No Restrictions	16 Eaton Road	LUDDENHAM	NSW	2745
1366	No Restrictions	1745 Elizabeth Drive	Badgerys Creek	NSW	
3235	No Restrictions	510 Willowdene Ave	Luddenham	NSW	2745
2838	No Restrictions	1/1193 The Northern Road	Bringelly	NSW	2553
944	No Restrictions	325 Badgerys Creek Road	BRINGELLY	NSW	2556
2639	No Restrictions	50 Willowdene Avenue	Luddenham	NSW	2745
2638	No Restrictions	50 Willowdene Avenue	Luddenham	NSW	2745
1486	No Restrictions	50 Willowdene Ave	LUDDENHAM	NSW	2745
429	No Restrictions	180 Lawson Road	Badgerys Creek	NSW	2555
581	No Restrictions	16 Adams Road	LUDDENHAM	NSW	2745
2184	No Restrictions	405 Willowdene Avenue	LUDDENHAM	NSW	2745
2248	No Restrictions	101-107 Mersey Road	BRINGELLY	NSW	2556
1721	No Restrictions	30 Martin Road	BADGERYS CREEK	NSW	2555
1035	No Restrictions	30 Martin Road	BADGERYS CREEK	NSW	2556
407	No Restrictions	5 Lawson Road	Badgerys Creek	NSW	2555
713	No Restrictions	7,2130 Northern Road	LUDDENHAM	NSW	2745
439	No Restrictions	255 Lawson Road	Badgerys Creek	NSW	2555
3233	No Restrictions	475 Badgerys Creek road	Badgerys Creek	NSW	2555
1975	No Restrictions	1675 The Northern road	Bringelly	NSW	2556
1490	No Restrictions	210 Martin Road	BADGERYS CREEK	NSW	2555
590	No Restrictions	2215 Northern Road	LUDDENHAM	NSW	2745
361	No Restrictions	3069 Northern Road	Luddenham	NSW	2745
447	No Restrictions	100-110 Martin Road	Badgerys Creek	NSW	2555
3036	No Restrictions	300 Badgerys creek road	Badgerys Creek	NSW	2556
579	No Restrictions	7 Adams Road	LUDDENHAM	NSW	2745
3308	No Restrictions	110 Mersey road	Bringelly	NSW	2556
2576	No Restrictions	115 Mersey Road	BRINGELLY	NSW	2556
3161	No Restrictions	1783 Elizabeth Drive	Luddenham	NSW	2745
857	No Restrictions	185 Lawson Road	BADGERYS CREEK	NSW	2555
1561	No Restrictions	Lot 10 1455 Elizabeth Drive	KEMPS CREEK	NSW	2178
2194	No Restrictions	2215 The Northern Road	LUDDENHAM	NSW	2745
1842	No Restrictions	225 Lawson Road	BADGERYS CREEK	NSW	2555
710	No Restrictions	85 Martin Road	BADGERYS CREEK	NSW	2555
1557	No Restrictions	210 Martin Road	BADGERYS CREEK	NSW	2555
840	No Restrictions	1 Anton Road	LUDDENHAM	NSW	2745
2187	No Restrictions	350 Willowdene Avenue	LUDDENHAM	NSW	2745
438	No Restrictions	245b Lawson Road	Badgerys Creek	NSW	2555
1840	No Restrictions	245 Lawson Road	BADGERYS CREEK	NSW	2555

Id	Privacy	Address	Suburb	State	Post Code
1857	No Restrictions	25 Lawson Road	BADGERYS CREEK	NSW	2555
3137	No Restrictions	3/2182 The Northern road	Luddenham	NSW	2745
582	No Restrictions	18 Adams Road	LUDDENHAM	NSW	2745
382	No Restrictions	180 Adams Road	Luddenham	NSW	2745