Western Sydney Airport

Air Quality
Construction Environmental Management Plan

December 2019

Western Sydney Airport

Document Control

File Name	Document Name	Revision
WSA00-WSA-00400-EN-PLN-000006	WSA Air Quality CEMP	2.0

Revision History

Revision	Date	Description	Author	Reviewer
0	24/09/2018	Approved		
0.1	09/11/2018	Draft update for the Experience Centre and Site Office phase and Material Importation phase	WSA	S Reynolds
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1	14/12/2018	Revision update to include the Experience Centre and Site Accommodation phase and Material Importation	WSA	S Reynolds
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1.2a	02/09/2019	Issued to Bulk Earthworks Contractor	WSA	S Reynolds
1.2b	20/09/2019	Updated for Bulk Earthworks	CPBLLJV	J. May
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1.4	15/11/2019	Updated to address comments and outcome of annual review	WSA	S Reynolds
1.5	06/12/2019	For Approval	WSA	S Bellido
2.0	18/12/2019	Approved	WSA	S Reynolds

Plan Authorisation

Position	Name	Signature	Date
Environment Manager	S Reynolds		06/12/2019

Glossary and Definitions

Item	Definition
the Act	*Airports Act 1996* (Airports Act)
Airport	The airport located at the Airport Site. Note: The Airport is referred to in the Act as Sydney West Airport and also commonly known as Western Sydney Airport
Airport Lease	An airport lease for the Airport granted under section 13 of the Act
Airport Lessee Company	The company that is granted a lease over the Airport Site
Airport Plan	Means the airport plan for the Airport Site as determined by the Infrastructure Minister under section 96B of the Airports Act in December 2016 as varied from time to time in accordance with the Airports Act.
Airport Site	The site for Sydney West Airport as defined in the Act
Approver	(a) 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; and (b) for other matters – the Infrastructure Minister or an SES employee in the Infrastructure Department.
Apron	The part of an airport used for: 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
Associated Site	An 'associated site for Sydney West Airport' as set out in section 96L of the Act
Bulk Earthworks	The large-scale earthworks required to flatten the Stage 1 area in preparation for further construction works as described in section 6 of the Construction Plan.'
Condition	A condition set out in Part 3 of the Airport Plan in accordance with section 96C of the Act
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 approved in accordance with Condition 1.
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.
Environment Minister	The Minister responsible for the EPBC Act
ECZ	Environmental Conservation Zone
Environmental Impact Statement	The environmental impact statement prepared in relation to the Airport under the EPBC Act
the EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
Infrastructure Department	The department responsible for administering the Airports Act, currently the Australian Government Department of Infrastructure, Regional Development and Cities
Infrastructure Minister	The Minister responsible for the Act from time to time
Laws	Statutes, regulations, rules, bylaws and other subordinate legislation of the Commonwealth or a state or territory
Main Construction Works	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
Non-conformance	Failure to conform to the requirements of the Airport Plan (including the SEMF)
Preparatory Activities	The following:

Item	Definition
	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 0ncluding 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: (i) demolition or relocation of existing structures 0ncluding 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
the Project	Western Sydney Airport – Stage 1 development
Stage 1 Development	The Developments described in Part 3 of the Airport Plan
Sydney West Airport	The Airport. Note: this is the name used in the Act. The Airport is also commonly known as Western Sydney Airport
Western Sydney International (Nancy-Bird Walton) Airport (WSI)	The Airport. Note: Under the Act the Airport is referred to as Sydney West Airport

Acronyms and abbreviations

Item	Definition
AEPR	Airports (Environment Protection) Regulations 1997
AS	Australian Standard
BEC	Bulk Earthworks Contract
CEMP	Construction Environmental Management Plan
CO	Carbon monoxide
ECM	Environmental Control Map
EEW	Early Earthworks Contractor
EIS	Environmental Impact Statement
EPA	NSW Environmental Protection Authority
EWMS	Environmental Work Method Statement
MI	Material Importation
NEPM-AQQ	National Environment Protection (Ambient Air Quality) Measure
NERDDC	National Energy Research Development and Demonstration Council
OU	Odour unit
PM	Particulate Matter
POEO Act	*NSW Protection of the Environment Operations Act 1997*
SEMF	Site Environmental Management Framework. The SEMF is contained within the Construction Plan (included as Appendix 2).
TSP	Total suspended particulate matter
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 1996 (Cth), WSA is the “airport-lessee company” for WSI
WSI	Western Sydney International (Nancy-Bird Walton) Airport

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1 Introduction

1.1 Background/Context

This WSA Air Quality Construction Environmental Management Plan (Air Quality CEMP) (this Plan) has been prepared to satisfy the requirements of the Air Quality CEMP set out in the Conditions for the Stage 1 Development of the Western Sydney International (Nancy-Bird Walton) Airport (**WSI**) detailed in Section 3.10.2 of the Airport Plan. Specifically, Section 3.10.2 Condition 10(1) of the Airport Plan requires that an Air Quality CEMP be approved under the Airport Plan prior to the commencement of Main Construction Works.

This Air Quality CEMP provides the management approach and requirements (including environmental mitigation measures, controls, monitoring and reporting) for managing air quality during construction of the Stage 1 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, sits adjacent to other Project level management plans including the Community and Stakeholder Engagement Plan 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. Specifically, for the Air Quality CEMP, it is considered that the following management plan linkages can be made:

- Biodiversity CEMP – Management of dust and air emissions to prevent impact on adjacent vegetation and fauna habitat, including aquatic and terrestrial.
- Soil and Water CEMP – Management of dust emissions often requires the application and use of water for suppression to control release of particulate matter. The use of water on site will need to be undertaken in a manner to ensure the control of runoff is managed and receiving waters are not impacted by the works.
- Waste and Resources CEMP – Water usage is considered a key resource for the suppression and management of dust generation during the construction phase. Where possible, water required for dust generation will be sourced from the on-site storage dams. If the water within the storage dams are insufficient, alternative water sources would be sought as per the Waste and Resources CEMP.
- Visual and Landscape CEMP – Impact on the air quality has the potential to affect the visual amenity and landscape of the receiving environment, particularly with regards to dust generation.
- Community and Stakeholder Engagement Plan – it is anticipated that the surrounding community and stakeholders will be highly receptive to air quality impacts, particularly dust generation and the accumulation of particulate matter.
- Sustainability Plan– Management and reduction of greenhouse gas emissions and management of impacts regarding general health, wellbeing, and quality of life for surrounding communities.

Where relevant, linkages to other CEMPs and management objectives have been included in the risk assessment and the environmental control measures, Section 6.2 and Section 7 respectively.

Table 1 below highlights relationships and linkages of this Air Quality CEMP with other CEMPs and management plans, including key cross-referencing to Airport Plan and EIS requirements.

Table 1 Air Quality CEMP relationship with other CEMP documentation

CEMP or Plan	Airport Plan Condition (3.10.2)	EIS Chapter Table 28: Management area	EIS Chapter Table 28: Mitigation measures
Aboriginal Cultural Heritage	11	28-12	28-13
Air Quality (this Plan)	**10**	**28-10**	**28-11**
Biodiversity	7	28-04	28-05
Community and Stakeholder Engagement Plan	15	28-20	28-21
European and other Heritage	12	28-14	28-15
Noise and Vibration	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
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 9 of the WSA SEMF.

The context of this Plan in relation to the WSA environmental management system is presented below in Figure 1.

1.2 Document purpose

The purpose of this Plan is to provide the foundation for the management of air quality impacts in accordance with best practice and legal requirements (including environmental mitigation measures, controls, monitoring and reporting) during the construction phase of the Stage 1 development based on the assessment undertaken as part of the EIS.

This Plan details the air quality management requirements that must be satisfied in order to demonstrate compliance with the conditions as set out in Condition 10 of Section 3.10.2 of the Airport Plan for the construction of the Stage 1 development of the Western Sydney Airport.

Legal and other requirements are identified and maintained in a register within the SEMF (refer SEMF Appendix C). Mitigation measures (specific to air quality) required to satisfy these requirements are derived from the EIS and through risk assessment processes (refer Section 6.2) and included within this CEMP (refer Section 7).

Implementation of these measures is ensured through monitoring, training and competence, inspection, audit and reporting actions detailed in Section 10 and 11, with the responsibilities for implementation identified in Section 9. Continual improvement processes in relation to compliance with regulatory requirements are detailed in SEMF Section 9.

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 air quality 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 environmental management system 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 E of the SEMF.

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

The SEMF is the overarching management plan for 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 overall construction of the Stage 1 development.

The structure of the environmental management system for the Project is shown in Figure 1.

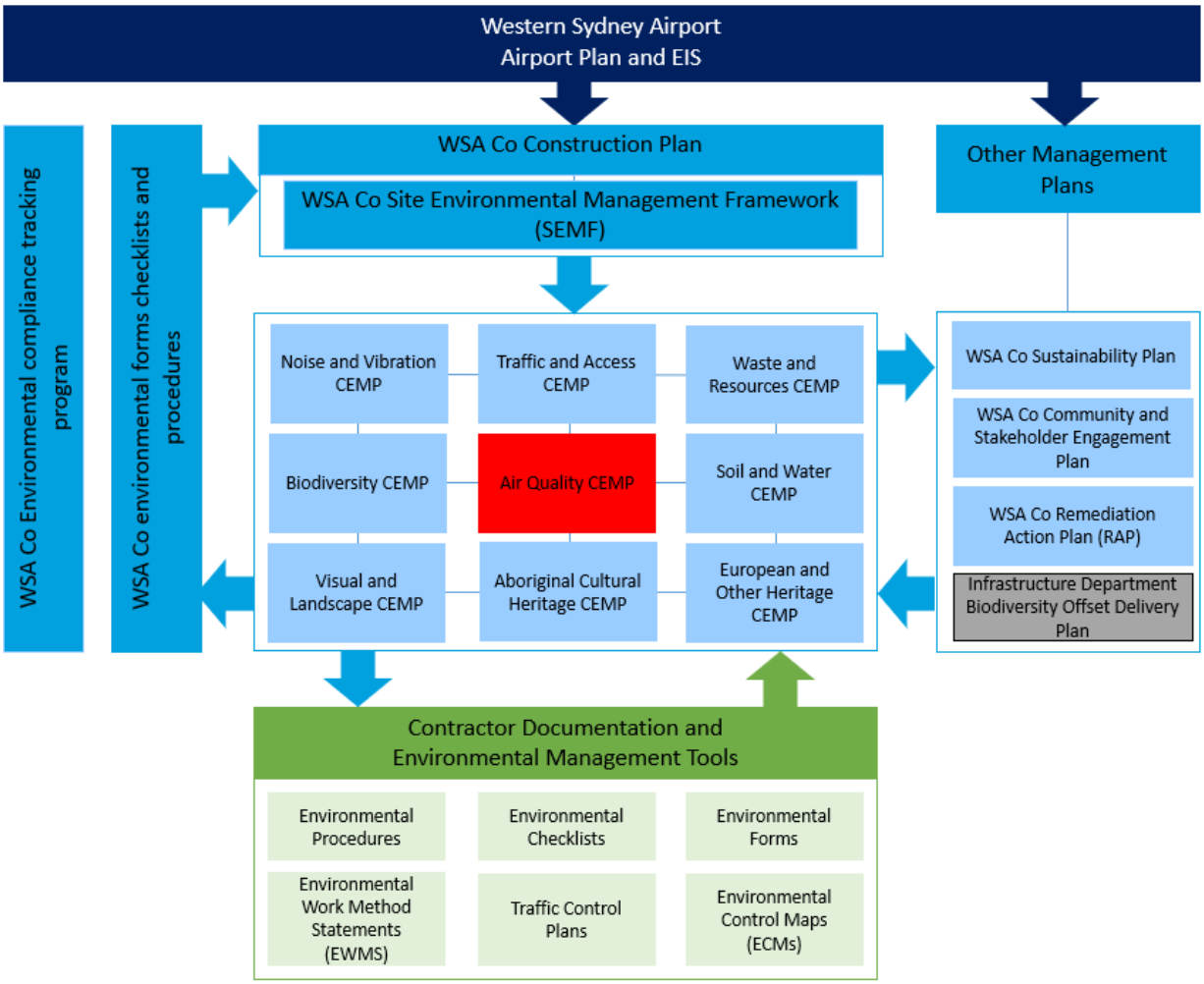


Figure 1 WSA Environmental Management System and CEMP context

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 as well as the Environment Department and OEH for specific CEMPs. NSW Government agencies specified by Department of Premier and Cabinet for consultation for this CEMP, including the OEH, Penrith City Council and Liverpool City Council.

Further, Airport Plan Condition 10(3) requires that this CEMP has taken into account Table 28-10 of the EIS which states the CEMP should also be prepared in consultation with the NSW Environment Protection Authority and NSW Health.

Consultation has been completed during the development of this CEMP (Revision 0) and subsequently during the review and update of Revision 1 of this document. A summary of the stakeholder and government authority consultation completed and used to inform the review of Revision 1 and finalisation of Revision 2 is presented in Table 2.

Consultation will continue with agencies, councils 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 2

A consultation plan outlining the process for engaging with stakeholders was prepared by the WSA Community and Engagement team. The plan and a scoping document outlining the Bulk Earthworks project 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 the stakeholders on the level of impact that would result from the next phase of construction activities. Prior to contract award, stakeholders were invited to attend a site visit (bus tour) on 9 July 2019 to assist the stakeholders to understand the size and scale of the site elements. Following the Bulk Earthworks Contract (BEC) award, the CEMPs were updated to reflect the next stage of construction. In October 2019, stakeholders were provided with the nine draft CEMPs to review and were requested to provide comment. To facilitate the review stakeholders were invited to attend a workshop on 8th October 2019, where an overview of the Bulk Earthworks phase was presented and key aspects discussed. A summary of the consultation is provided in Table 2.

Table 2 Air Quality CEMP consultation summary

Activity	Date	Invitees	Summary
Consultation Summary			
Site visit for stakeholders	9 July 2019	• Liverpool City Council • Penrith City Council • NSW Health • NSW Aboriginal Affairs • Transport for NSW (RMS) • Western Sydney Unit • Department of Energy and Environment • South Western Sydney Local Health District • Rural Fire Service • DFSI – Waste Assets Management Corporation • NSW Government Architect • Planning and Environment (OEH) • Western Sydney Planning Partnership (DPE/GSC/Councils) • Department of Primary Industries – Water • Greater Sydney Commission • City Deal Alliance (Councils) • Planning and Environment	As part of the continuous improvement of the consultation process, a site visit (bus tour) for stakeholders was organised. This has been included due to the good feedback from the last CEMP round where a workshop was held. It is a useful element to assist stakeholders to understand size and scale and also have discussions related to site elements as they are seen during the bus tour.
CEMPs provided to stakeholders for comment	October 2019	• Liverpool City Council • Penrith City Council • NSW Health • NSW Aboriginal Affairs • Transport for NSW (RMS) • Western Sydney Unit • Department of Energy and Environment	Key themes: - Noise during out of hours construction; - Water quality and water source - Air quality and dust management - Source of imported material - Biodiversity surveys - Heritage management
Stakeholder Workshop	8th October 2019		

Activity	Date	Invitees	Summary
Consultation Summary			
		• South Western Sydney Local Health District • Rural Fire Service • DFSI – Waste Assets Management Corporation • NSW Government Architect • Planning and Environment (OEH) • Western Sydney Planning Partnership (DPE/GSC/Councils) • Department of Primary Industries – Water • Greater Sydney Commission • City Deal Alliance (Councils) • Department of Planning Industry and Environment	

1.5 Certification and approval

This Air Quality CEMP has been reviewed and approved for issue by the WSA Environment Manager prior to submission to Western Sydney Unit, Australian Government Department Infrastructure, Regional Development and Cities (Infrastructure Department).

1.6 Distribution

All WSA personnel and contractors will have access to this Air Quality CEMP via the Project document control management system. The Approved Plan must be published on WSA Co'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 - http://wsaco.com.au/Project/index.aspx

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 Development as progressing generally from the north-east to the south-west of the Airport Site, allowing for the relocation of the Northern Road and a TransGrid transmission line.

The delivery of the Stage 1 Development will be through a packaging strategy with a wide variety of package sizes, risk profiles and contracting entities. Each package 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 Development of the Project comprises the following key features as described in the Construction Plan (which is consistent with the Airport Plan and EIS Chapter 5):

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

Details of the Project construction activities, staging and programming including the phases of works 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 the Bulk Earthworks, Early Earthworks and Material Importation phases of works as described in Section 6 of the Construction Plan (WSA00-WSA-00000-CN-PLN-000001). 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 Air Quality CEMP is to ensure that impacts associated with air quality are managed to within permitted air quality criteria as far as practicable, and best practice controls and procedures are implemented during construction activities to maintain ambient air quality at acceptable levels at sensitive receivers surrounding the Airport Site and minimise the risk of dust or odour nuisance impacts on neighbours.

To achieve this objective, the following will be undertaken:

- Ensure emissions are minimised from all plant, equipment and machinery;
- Ensure appropriate measures are implemented to address the management measures detailed in Table 28-10 and the mitigation measures Table 28-11 in Chapter 28 the EIS; and
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 4 of this Plan.

3.2 Targets and performance criteria

Air quality specific targets and performance criteria have been established for the management of air quality impacts during the Project which have been, in part, derived from the performance criteria identified in the EIS Table 28-10, as presented below in Table 3.

Table 3 Air quality targets

Objective	Target	Document Reference
Ensure ambient air quality is maintained at acceptable levels at sensitive receptor locations surrounding the airport site	Not exceeding the criteria outlined in Table 13. No dust or odour related complaints	Complaints database
Minimising the risk of dust or odour nuisance impacts on neighbours	No dust or odour related complaints Not exceeding the criteria outlined in Table 13.	Complaints database
Ensure emissions are minimised from all plant, equipment and machinery	All plant and equipment are maintained in accordance with manufacturers requirements Not exceeding the criteria outlined in Table 13.	Plant and equipment log books

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 (as detailed further in environmental control measures in Table 13) 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 Airports Act, some state laws will not be applicable to the Project (s112 of this 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

Legislation and regulations to this Plan are summarised in Table 4.

Table 4 Principal legislation and relevance

Legislation or regulation	Relevance	CEMP compliance provisions
Commonwealth		
Airports Act 1996 (Airports Act)	The Airports Act and Airports Regulations set out the framework for the regulation and management of activities at airports that could have potential to cause environmental harm. This includes offences related to environmental harm, environmental management standards, monitoring and incident response requirements. 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. Criminal offences are applicable if these measures are not complied with.	This CEMP forms part of the overall WSA Co environmental management system which has as a target, full compliance with the Airport Plan.
Airports (Environment Protection) Regulations 1997 (AEPR)	Imposes a general duty to prevent or minimise environmental pollution once an airport lease is granted. Promotes improved environmental management practices at airports. Includes provisions setting out definitions, acceptable limits and objectives for air quality, as well as monitoring and reporting requirements.	Refer to commentary on Airport Plan above.
National Environment Protection (Ambient Air Quality) Measure (NEPM-AAQ)	Sets the national health-based air quality standards for six air pollutants (carbon monoxide, nitrogen dioxide, sulphur dioxide, lead, ozone and PM_{10}) and includes advisory reporting standards for PM2.5.	Section 7 – Environmental Control Measures Section 8 – Air Quality Criteria Section 10 – Environmental Inspection, Monitoring, Auditing and Reporting
National Environment Protection (Air Toxics) Measure National Environment Protection (National	Sets a nationally consistent approach to monitoring (by reference to 'investigation levels') for five air toxics: benzene, formaldehyde, toluene, xylenes and benzo (a) pyrene (as a marker for polycyclic aromatic hydrocarbons). These are not compliance standards but are for	Section 8 – Air Quality Criteria Section 10 – Environmental Inspection, Monitoring, Auditing and reporting

Legislation or regulation	Relevance	CEMP compliance provisions
Pollutant Inventory) Measure 1998	use in assessing the significance of the monitored levels of air toxics with respect to the protection of human health.	Note: Monitoring of these five air toxics may not be relevant, however, this summary is provided as a trigger for continued consideration of this requirement as delivery of the Airport progresses.
National Environment Protection (National Pollutant Inventory) Measure	The primary goals are to: (a) collect a broad base of information on emissions and transfers of substances and (b) disseminate information to all sectors of the community. This NEPM covers a variety of air pollutants.	Refer to Sustainability Plan
National Greenhouse and Energy Reporting Act 2007	An airport lessee company (ALC) is required to register and report its operational greenhouse gas emissions attributable to the activities over which it has operational control. This is because it is expected that its emissions will exceed relevant thresholds. This may also apply to the construction contractor and other contractors or users of the airport (e.g. airlines).	Section 7 – Environmental Control Measures
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 and the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995	This Act and these Regulations impose controls on the manufacture, import, export and management of substances that deplete ozone in the atmosphere including CFCs 11, 12, 113, 114 and halons 1211, 1301 and 2402.	Section 7 – Environmental Control Measures
NSW		
As the Airport is to be developed under the Airport Plan determined under the Airports Act, 1996 (Cth), some state laws will not be applicable to the project (see for example S 112 of that Act). Where state laws are not applicable, it is still intended to have regards to relevant laws for example through inclusion of mitigations measures incorporated into this CEMP. These laws are identified below.		
Protection of the Environment Operations Act 1997 (POEO Act), and the Protection of the Environment Operations (General) Regulation 2009 (POEO (General) Regulations)	The POEO Act provides a range of controls with regard to air quality including requirements to maintain plant and equipment in proper and efficient condition and to operate plant and equipment in a proper and efficient manner. This includes the means of processing, handling, moving, storage and disposal of materials.	Section 7 – Environmental Control Measures
POEO Act and Protection of the Environment Operations (Clean Air) Regulation 2010 (Clean Air Regulation)	The object of the POEO Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment having regard to the need to maintain ecologically sustainable development. The Clean Air Regulation prescribe standards for certain groups of plant and premises to regulate industry's air emissions and impose requirements on the control, storage and transport of volatile organic liquids.	Section 7 – Environmental Control Measures
Ozone Protection Act 1989	This Act regulates or prohibits the manufacture, sale, distribution, conveyance, storage,	Section 7 – Environmental Control Measures

Legislation or regulation	Relevance	CEMP compliance provisions
	possession and use of ozone-depleting substances in NSW.	

4.1.2 Guidelines and standards

Guidelines and standards that are relevant to air quality management and this Plan are summarised in Table 5 below.

Table 5 Relevant guidelines and standards

Guidelines and standards
• AS 2922 Ambient Air Guide for Citing of Sampling Equipment
• AS 3580.1.1-2007 Methods for Sampling and Analysis of Ambient Air – Guide to Siting Air Quality Monitoring Equipment
• AS 3580.10.1-2003 Methods of Sampling Analysis of Ambient Air
• Air Quality Monitoring Criteria for Deposited Dust (DEC Guideline)
• AS/NZS ISO 14001:2014 – Environmental Management Systems
• Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC 2005)
• Clean Air for NSW Consultation Paper (OEH 2016)
• Green Star Rating System (Green Building Council of Australia)
• Liverpool Local Environmental Plan 2008 (NSW)
• Managing particles and improving air quality in NSW (EPA 2013)

4.2 Approvals and other specifications

Approvals and other specifications relevant to this CEMP include:

- Functional Specifications;
- Western Sydney Airport Plan (2016);
- Western Sydney Airport Environmental Impact Statement;
- WSA Sustainability Plan;
- WSA Community and Stakeholder Engagement Plan; and
- WSA Construction Plan.

4.3 Airport Plan Conditions

Conditions relevant to air quality management during construction are provided in Table 6. 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 6 Conditions relevant to air quality management

Condition No.	Condition	Timing	Responsibility
1.4	The Site Occupier must ensure that no CEMP is inconsistent with the approved Construction Plan	Ongoing	WSA

Condition No.	Condition	Timing	Responsibility
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 41 (Variation of Approved Plans) prior to commencement of any new phase.	Ongoing	WSA
5.3	In carrying out a Preparatory Activity, the Site Occupier must:	Prior to Main Construction Works	WSA
	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		
	not act inconsistently with any approved CEMP or the approved Construction Plan.		
10.1	The Site Occupier must not:	Prior to Main Construction Works	WSA
	Commence Main Construction Works until an Air Quality CEMP has been prepared and approved in accordance with this condition; or		
	Carry out any development described in Part 3 of the Airport Plan inconsistently with the approved Air Quality CEMP		
10.2	The Site Occupier must: Prepare, and Submit to an Approver for approval; an Air Quality CEMP in relation to the carrying out of the developments described in Part 3 of the Airport Plan.	Prior to Main Construction Works	WSA
10.3	The criteria for approval of the Air Quality CEMP are that an Approver is satisfied that: • in preparing the Air Quality CEMP, the Site Occupier has taken into account Table 28-10 in Chapter 28 of the EIS; and • the Air Quality CEMP complies with Table 28-11 in Chapter 28 of the EIS and is otherwise appropriate.	Prior to Main Construction Works	Approver
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:	Prior to Main Construction Works	Approver
	in preparing the plan, has:		
	consulted with any NSW Government agencies specified by the NSW Department of Premier and Cabinet; and		
	in the case of the Biodiversity CEMP, Biodiversity, Land and Safety OEMP, Soil and Water CEMP and Soil and Water OEMP, also consulted the Environment Department and OEH; and has provided: the Approver; and		

Condition No.	Condition	Timing	Responsibility
	each consulted agency, with an explanation of how any responses have been addressed.		
37 to 42	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

4.4 Environmental Impact Statement requirements

The requirements of air quality management to be taken into account and addressed during the construction phase of the Stage 1 development are included in the EIS, specifically Table 28-10.

A summary of these requirements and how they have been addressed in this Air Quality CEMP is presented in Table 7.

Table 7 Summary of air quality management requirements

EIS Reference	Topic	Summary	Air Quality CEMP Reference
Table 28-10	Performance Criteria	Compliance with the approved Air Quality CEMP; and	Section 3 – Objectives and targets
		Ensuring that air pollution remains within the accepted limits set out in the AEPR.	Section 3 – Objectives and targets
Table 28-10	Implementation framework	An Air Quality CEMP will be approved prior to commencement of Main Construction Works for the proposed airport. The CEMP will collate measures to mitigate and manage potential impacts on air quality and include cross-references to other environmental management plans where relevant. The Air Quality CEMP will as a minimum:	This Air Quality CEMP
		Detail the management and mitigation measures to be implemented, including those outlined in this Section	Section 7 – Environmental control measures
		Describe the process for managing complaints, stakeholder engagement, and emerging environmental management issues as they arise	Section 10.6 – Environmental incidents and complaints management
		Specify the process for monitoring implementation, reporting, and auditing	Section 10 – Environmental inspection, monitoring, auditing and reporting
		Identify the party responsible for implementing of the Air Quality CEMP	Section 9 – Environmental roles and responsibilities
Table 28-10	Monitoring	General monitoring requirements are set out in the AEPR. These include that:	-
		Monitoring must take place under direction of an appropriately qualified person;	Section 10 – Environmental inspection, monitoring, auditing and reporting
		The results for the monitoring must be kept in a written record	Section 10 – Environmental inspection, monitoring, auditing and reporting
		Additional monitoring requirements include that:	-
		Suitable locations for dust deposition, dust flux, or real-time PM_{10} continuous monitoring have been determined in consultation with the NSW Environment Protection Authority	Section 7 – Environmental control measures

EIS Reference	Topic	Summary	Air Quality CEMP Reference
		Baseline monitoring will commence at least three months before Main Construction Works commence	Section 7 – Environmental control measures
		Regular site inspections will be undertaken to monitor compliance with the dust management plan. Inspection results will be recorded, and the inspection log made available to the Department of Infrastructure and Regional Development upon request	Section 10 – Environmental inspection, monitoring, auditing and reporting
		More frequent site inspections by the person accountable for air quality and dust issues will be conducted onsite when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions	Section 10 – Environmental inspection, monitoring, auditing and reporting
Table 28-10	Auditing and reporting	General reporting requirements are set out under AEPR	-
		In addition, an annual report will be prepared and submitted to the Infrastructure Department in relation to compliance with the Air Quality CEMP for the period until the airport commences operations	Section 10.4 – Environmental reporting
		The community and stakeholder engagement plan provide for the development of a complaints log and includes specific measures for how complaints will be managed	Section 10.6 – Environmental incidents and complaints management
Table 28-10	Responsibility	Responsibilities include:	-
		The Air Quality CEMP will be prepared in consultation with the NSW Environment Protection Authority and NSW Health	Section 1.4 – Consultation requirements of this Plan
		The Air Quality 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 woks in accordance with the requirements of this Air Quality CEMP	Section 1.2 – Document Purpose Section 9 – Environmental 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 9 – Environmental roles and responsibilities

5 Existing environment

The following information is summarised from the EIS and refers to the Airport Site and surrounding environment. Refer to the EIS for more details.

For the purpose of 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 the management of air quality impacts refer to Section 7.

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 air emissions at these locations. Due to the density of sensitive receptors in the vicinity of the Airport Site, a representative selection comprising 152 of these sensitive receptors was made, locations for which have been provided in Appendix B. These sensitive receptor types include residences, schools, churches and other community infrastructure. Sensitive receptors from suburbs surrounding the Airport Site at varying distances were also included.

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 Figure 4. There have been no additional sensitive receivers identified since the undertaking of the EIS and as such, the existing environment described in the EIS is still considered accurate for the works to be undertaken.

5.2 Air quality records

Existing air quality has been characterised from air quality monitoring data collected over ten years (2005–2014) at monitoring stations operated by the NSW Office of Environmental and Heritage. These monitoring stations included Bringelly, Macarthur/Campbelltown West, Liverpool and Richmond, and recorded parameters such as nitrogen dioxide, particulate matter, sulphur dioxide and ozone.

Generally, air quality for the local area is good, except for isolated high pollution days or extreme events such as dust storms and bushfires. Uncontrolled combustion events such as bushfires will influence regional observations of PM_{10} and $PM_{2.5}$, and to a lesser extent, nitrogen oxides.

A summary of monitoring data considered applicable to the work activities covered by this CEMP collated over the period of 2005 to 2014 for the area Sydney West and Southwest is presented below in Table 8.

Table 8 Air quality monitoring results - Bringelly, Macarthur/Campbelltown West, Liverpool and Richmond

Pollutant	Averaging Period	NEPM Goals	Monitoring Results
		Maximum Concentration	Average Recorded Concentration (2005 – 2014)
National standards and goals for ambient air quality			
PM_{10}	1 day	50 µg/m^3	40 - 97 µg/m^3
	Annual	25 µg/m^3	15 - 25 µg/m^3
$PM_{2.5}$	1 day	25 µg/m^3	Liverpool: 22 - 268 µg/m^3 Richmond: 18 - 149 µg/m^3
	Annual	8 µg/m^3	Liverpool: 6 - 9 µg/m^3 Richmond: 4 - 8 µg/m^3
	1 day	228 µg/m^3	Bringelly: 5.1 – 9.2 µg/m^3 C' West: 5.7 – 9.9 µg/m^3
	Annual	60 µg/m^3	Bringelly: 0.3 – 1.2 µg/m^3 C' West: 1.2 – 1.4 µg/m^3

Since the completion of the EIS in 2015, ongoing monitoring has been undertaken. These monitoring stations will continue to be used throughout the construction phase with further details provided in Section 10. A summary of the data collected post-EIS is included in Table 9.

Table 9 Comparison on Measured Air Quality Data versus NEPM Goals and Historical Data

Pollutant	Averaging Period	NEPM Goals	Monitoring Results	Recorded Average Daily (µg/m3)			
		Maximum Concentration	Average Recorded Concentration (2005 – 2014)	North	South	East	West
National standards and goals for ambient air quality							
PM_{10}	1 day	50 µg/m3	40 - 97 µg/m3	314.1	80.2	29.4	92.5
	Annual	25 µg/m3	15 - 25 µg/m3	-	-	-	-
$PM_{2.5}$	1 day	25 µg/m3	Liverpool: 22 - 268 µg/m3	22.4	61.3	7	67.6
			Richmond: 18 - 149 µg/m3	-	-	-	-

*Values indicated in red exceed National Environmental Protection Measures (NEPM) air quality standards.

5.3 Wind speed and direction

The average wind speed across the five-year review period (2010-14) was 2.6 metres per second. The percentage of calm period with winds less than 0.5 metres per second during this period was nine per cent.

An analysis of the climatic data suggests that there is no strong relationship between the time of year and the monthly wind speed, although the monthly average wind speeds are generally less during autumn.

On an annual basis, the predominant winds at Badgerys Creek originate from the south-west, followed by the south-south-west and north. Very few winds originate from the north-west. Winds vary across seasons; during winter the majority of winds originate from the south-west while in summer they are more frequently from the north-east. A copy of the annual and seasonal wind rose for Badgerys Creek for the year 2014 is provided in Figure 2.

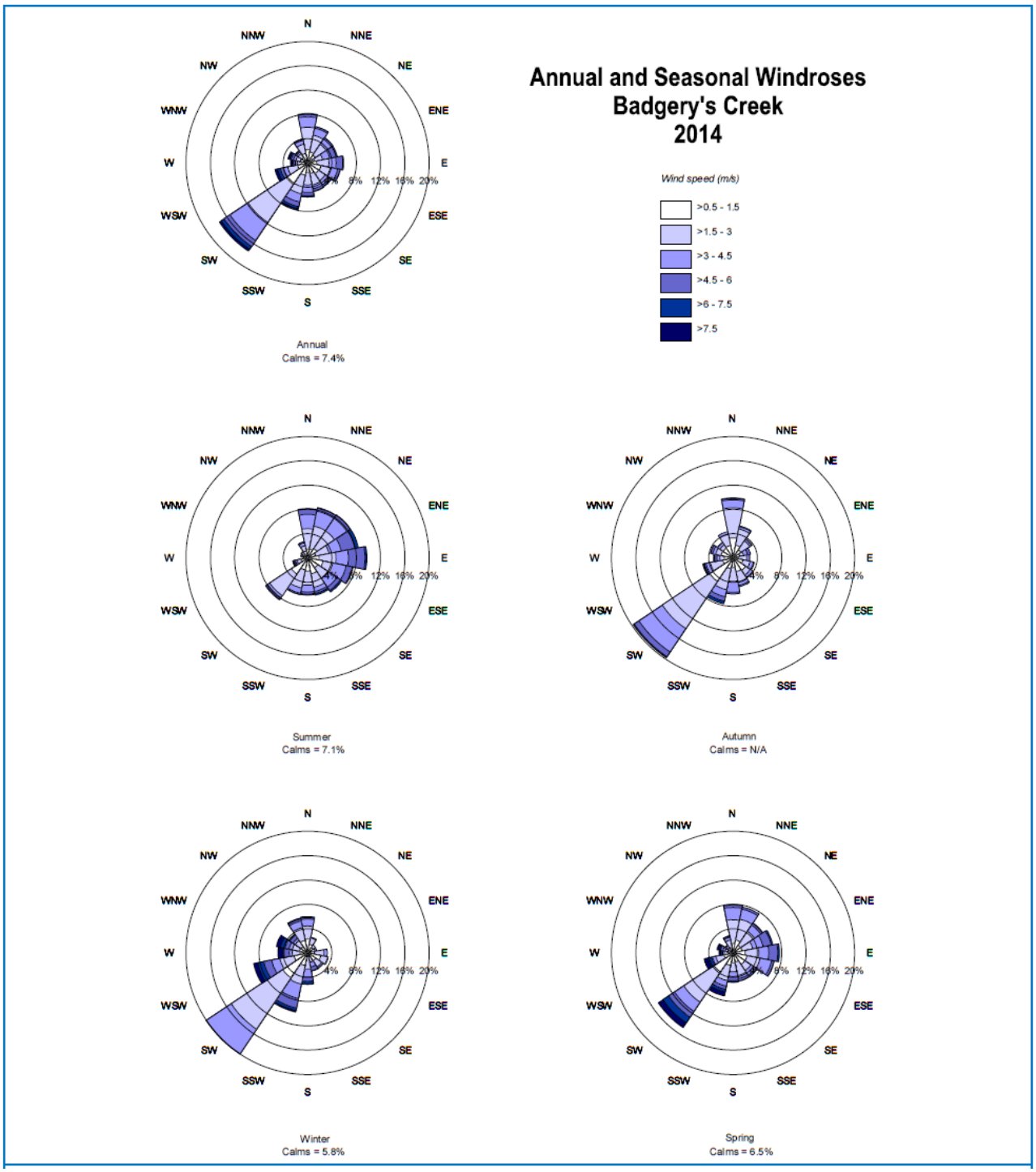


Figure 2 Annual and seasonal wind rose, Badgerys Creek 2014

5.4 Temperature, rainfall and humidity

The Airport Site hosts an automatic weather station operated by the Bureau of Meteorology. The weather station has recorded rainfall data at the Airport Site since 1998. Data is provided in Table 8. Average annual rainfall at the Airport Site is 676.6 millimetres (mm).

Climate and rainfall data have been updated since the EIS development. There is a strong seasonal variation in temperature at Badgerys Creek. During the data collection and review period for the EIS and in 2019, January was the hottest month while June and July were the coldest months as presented below in Table 10.

The rainfall data collected during the EIS indicates that February is the wettest month, with an average rainfall of 114 millimetres while July is the driest month, with an average rainfall of 30 millimetres. In 2019, the average rainfall in February is 342 millimetres while July keeps being the driest month.

In the EIS and 2019, the annual average relative humidity reading at Badgerys Creek was 73 per cent. The month with the highest relative humidity on average was June, at 79 per cent. September and October had the lowest relative humidity.

Table 10 Average monthly rainfall at the Airport Site*

Statistic	J	F	M	A	M	J	J	A	S	O	N	D
Mean monthly rainfall (mm) a	76	95	83	48	36	61	23	35	33	54	69	56
Highest monthly rainfall (mm) a	192	342	285	253	156	250	72	231	82	182	173	131
Lowest monthly rainfall (mm) a	1	13	21	2	2	2	0.4	1	1	0.4	8	0.0
Highest daily rainfall (mm) a	138	107	68	84	54	109	28	70	51	63	63	65
Evaporation (mm) b	173	128	116	76	50	38	38	56	75	120	146	154

Note: * All data has been rounded to the nearest decimal point (except for July, October and December Lowest monthly rainfall).

a. Data from Bureau of Meteorology automatic weather station

b. Data from Bureau of Meteorology Parramatta weather station, as the nearest representative location with available evaporation data.

5.5 Odour

The Airport Site is mostly isolated from other industry activities that have the potential to be odorous. The exception is the poultry industry with a number of broiler and egg-laying farms in the vicinity, particularly to the east of the Airport Site. Background odour was not included as part of the air quality assessment for the Project.

6 Air quality aspects and impacts

6.1 Construction activities

Construction of the Stage 1 development will result in dust emissions generated during both the earthworks and the construction of aviation infrastructure. Specific to the works covered by this CEMP (refer to Section 2 and Construction Plan Section 6), the likely activities that have the potential to impact on air quality include the following:

- Operation of heavy machinery including dozers, scrapers and graders;
- The loading and unloading of materials;
- Hauling on paved and unpaved roads; and
- Exposure of ground surfaces resulting in wind erosion.

In addition to the above, there will also be diesel particulate matter emissions (comprising $PM_{2.5}$ only) from the onsite equipment. Additionally, construction of the Stage 1 development will result in greenhouse gas emissions from the operation of construction equipment and vegetation clearing.

6.2 Risk assessment

A risk assessment has been undertaken as part of the review and development of this CEMP and in accordance with Environmental Aspects, Impact and Risk Procedure (Appendix D of the SEMF). The parts of the overall risk assessment relevant to Air Quality have been extracted and summarised in Table 11 applies 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 in chapter 7, Table 13.

Table 11 Air quality risk assessment

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level [2] pre-mitigation	Mitigation measure [1]	Risk level [2] post-mitigation	Management tools
1	Site establishment	Site and delivery vehicles travelling on unsealed roads	Dust generation	Stakeholder complaints and dust on public roads	B3 (Mod)	AQ_01 AQ_05 AQ_07 AQ_18	B2 (Low)	• Waste and Resources CEMP • Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Erosion and Sedimentation Control Plans (ESCPs) • Environmental Control Map (ECM)
2		Topsoil stripping for compound footprint	Dust generation	Dust leaving site boundary into nearby environmental conservation zone	C2 (Mod)	AQ_01 AQ_05 AQ_07 AQ_09 AQ_11 AQ_12 AQ_17 AQ_20	C1 (Low)	• Air Quality CEMP • Aboriginal Cultural Heritage CEMP (Top Soil Management Protocol) • Biodiversity CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • ESCPs • ECM
3		Construction and operation of compound	Dust and waste generation	Stakeholder complaints and dust leaving site boundary into nearby	C3 (Sig)	AQ_01 AQ_05 AQ_07	C2 (Mod)	• Air Quality CEMP • Biodiversity CEMP • EWMS

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level [2] pre-mitigation	Mitigation measure [1]	Risk level [2] post-mitigation	Management tools
		buildings and amenities		environmental conservation zone		AQ_18 AQ_22 AQ_24 AQ_25 AQ_26 AQ_27 AQ_32 AQ_33		• Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • ESCPs • ECM
4	Site establishment (continued)	Delivery of heavy plant	Dust generation and sediment tracking	Dust on public roads	C3 (Sig)	AQ_01 AQ_18	C2 (Mod)	• Waste and Resources CEMP • Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • ESCPs • ECM
5		Spraying weeds	Chemical drift	Damage to nearby vegetation	C4 (Sig)	AQ_01 AQ_02 AQ_17	C2 (Mod)	• Air Quality CEMP • Biodiversity CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • ESCPs

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level [2] pre-mitigation	Mitigation measure [1]	Risk level [2] post-mitigation	Management tools
								• ECM
6	Site establishment (continued)	General waste handling	Dust and waste materials blowing through site	Stakeholder complaints and dust leaving site boundary into nearby environmental conservation zone	B3 (Mod)	AQ_01 AQ_08 AQ_16	B2 (Low)	• Air Quality CEMP • Biodiversity CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
7	Earthworks	Constructing and operating site access roads	Dust generation	Stakeholder complaints and dust leaving site boundary into nearby environmental conservation zone	C4 (Sig)	AQ_01 AQ_05 AQ_07 AQ_09 AQ_11 AQ_12 AQ_17 AQ_18 AQ_20 AQ_21 AQ_22 AQ_28 AQ_29	C2 (Mod)	• Air Quality CEMP • Biodiversity CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level [2] pre-mitigation	Mitigation measure [1]	Risk level [2] post-mitigation	Management tools
8	Earthworks (continued)	Use of heavy plant / multiple plant use	Emissions	Air pollution and stakeholder complaints	C3 (Sig)	AQ_01 AQ_05 AQ_07 AQ_09 AQ_17 AQ_30 AQ_31 AQ_34 AQ_35 AQ_36 AQ_40	C2 (Mod)	• Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM • Dust Management and Vehicle and Equipment Emissions Plan
9		Bulk topsoil stripping	Dust generation	Dust leaving site boundary into nearby environmental conservation zone or local roads	D4 (High)	AQ_01 AQ_05 AQ_07 AQ_09 AQ_11 AQ_12 AQ_17	D3 (Sig)	• Air Quality CEMP • Aboriginal Cultural Heritage CEMP (Top Soil Management Protocol) • Biodiversity CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
10		Vegetation Clearing	Dust generation	Dust leaving site boundary into nearby environmental	D4 (High)	AQ_01 AQ_05 AQ_07	D3 (Sig)	• Air Quality CEMP • Biodiversity CEMP • EWMS

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level [2] pre-mitigation	Mitigation measure [1]	Risk level [2] post-mitigation	Management tools
				conservation zone or local roads		AQ_09 AQ_11 AQ_12 AQ_17		• Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
11	Earthworks (continued)	Stockpiling materials	Dust generation	Dust from stockpile leaving site boundary into nearby environmental conservation zone or local roads	D4 (High)	AQ_01 AQ_07 AQ_09 AQ_12 AQ_14 AQ_17	D2 (Mod)	• Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
12		Slope or embankment creation / stabilisation processes	Dust generation	Dust leaving site boundary into nearby environmental conservation zone or local roads	D4 (High)	AQ_01 AQ_07 AQ_09 AQ_12 AQ_17	D2 (Mod)	• Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
13	Utility realignment works	Potholing	Dust generation	Dust on public roads	C2 (Mod)	AQ_01 AQ_05 AQ_07	C1 (Low)	• Air Quality CEMP • EWMS • Soil and Water CEMP

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level [2] pre-mitigation	Mitigation measure [1]	Risk level [2] post-mitigation	Management tools
						AQ_17		• Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
14		Trenching	Dust generation	Dust leaving site boundary into nearby environmental conservation zone or local roads	C2 (Mod)	AQ_01 AQ_05 AQ_07 AQ_09 AQ_12 AQ_17	C1 (Low)	• Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
15	Bridge construction	Use of heavy plant / multiple plant use	Emissions	Air pollution and stakeholder complaints	B3 (Mod)	AQ_01 AQ_05 AQ_07 AQ_09 AQ_17	B2 (Low)	• Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
16		Bulk excavation / open excavations	Dust generation	Dust leaving site boundary into nearby environmental conservation zone or local roads	D3 (Sig)	AQ_01 AQ_05 AQ_07 AQ_09	D2 (Mod)	• Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level [2] pre-mitigation	Mitigation measure [1]	Risk level [2] post-mitigation	Management tools
						AQ_12 AQ_13 AQ_17		• Complaints Procedure • Induction • Area ESCPs • ECM
17	Bridge construction (continued)	Bridge piling	Dust generation	Dust leaving site boundary into nearby environmental conservation zone or local roads	C2 (Mod)	AQ_01 AQ_05 AQ_07 AQ_09 AQ_17	C1 (Low)	• Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM
18		Concrete sawing	Concrete dust generation	Dust leaving site boundary into nearby environmental conservation zone or local roads	C2 (Mod)	AQ_01 AQ_05 AQ_06 AQ_07 AQ_17	C1 (Low)	• Air Quality CEMP • EWMS • Soil and Water CEMP • Traffic and Access CEMP • Complaints Procedure • Induction • Area ESCPs • ECM

1 Refer to Table 13 for mitigation measures and controls

2 Derived from risk assessment process detailed in the SEMF Appendix D

6.3 Impacts

The potential for impacts on air quality was considered in Section 12 of the EIS. An assessment was undertaken of the potential sources detailed in Section 6.1. The findings are summarised in the sections below.

In addition to the inherent risks of specific construction activities creating the potential to generate dust, several other environment factors also affect the likelihood of dust emissions. These include:

- Wind direction – determines whether dust and suspended particles are transported in the direction of the sensitive receivers. This has been addressed in Section 5.3, with the predominant annual wind direction being from the southwest, particularly during the seasons of winter and autumn;
- Wind speed – governs the potential suspension and drift resistance of particles. This has been addressed in Section 5.3;
- Rainfall or dew – rainfall or heavy dew that wets the surface of the soil and reduces the risk of dust generation. Rainfall patterns in the area of Badgerys Creek is detailed further Section 5.4, indicating higher rainfall expectation within the months of February, March and November with mean averages exceeding 100 mm/month;
- Effectiveness of protective measures; and
- Adjacent land uses and activities that may create dust resulting in a cumulative impact on air quality.

Accordingly, project personnel involved in the activities above need to consider the factors effecting emissions to air in consultation with their environmental representatives to ensure appropriate mitigation measures are adopted.

6.4 Earthworks

The EIS predicted dust impacts during the earthworks will be at or below the air quality assessment criteria for each of the reported air quality parameters, both incrementally as a result of the Project and cumulatively when assessed with background concentrations and modelled inputs of other projects. The assessment found that while the predicted concentrations remain low at all offsite residential receptors, the nature of the plume spread for the 24-hour and annual averaging periods is highest to the north-east and south-west of the Airport Site, consistent with the prevailing winds measured at Badgerys Creek.

Refer to Appendix A Dust management and vehicle and equipment emissions plan for more information.

6.5 Construction greenhouse gas emissions

The EIS reported that the two main sources of greenhouse gas emissions will be the operation of construction equipment and vegetation clearing. Greenhouse gas emissions generated during construction of the Stage 1 development are presented below in Table 12. As above, the greenhouse gas emissions calculations were based on the entire scope for construction activities.

The Stage 1 Development construction activities covered by this CEMP are expected to generate smaller impacts consistent with the reduced scale of the works compared to the overall construction phase. The same level of mitigation measures and controls will apply as indicated further below.

Table 12 Summary of greenhouse gas emissions for Early Earthworks

Scope	Source	Fuel type	Quantity	Emissions (t CO_2-e)
1	Equipment	Transport diesel oil	4 ML	10,880
1	Vegetation clearing	N/A	110 H	12,100
Total				**22,980**

Section 7 provides a suite of mitigation measures that will be implemented to avoid or minimise emissions to air quality.

Table 13 Summary of greenhouse gas emissions for Bulk Earthworks

Scope	Source	Fuel type	Quantity	Emissions (t CO_2-e)
1	Earthmoving Equipment	Transport diesel oil	35 ML	61,814
1	Vegetation clearing	N/A	73.5 kt	134,873
Total				**196,687**

7 Environmental control measures

Mitigation and management measures that will be implemented during construction are detailed below in Table 14 and are consistent with those provided in Tables 28-10 and 28-11 in Chapter 28 of the EIS, as per Condition 10 (Section 3.10.2) 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 14 Environmental control measures

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
GENERAL					
AQ_01	Training will be provided to all project personnel, including relevant sub-contractors on sound air quality control practices and the requirements from this Plan through inductions, toolboxes and targeted training.	Pre-construction Construction	All personnel will be inducted before commencing works.	All Contractors	Good Practice
AQ_02	The application of pesticides will be modified, reduced or controlled during high or unfavourable wind conditions where wind can carry pesticides outside of the defined treatment area.	Construction	Meteorological information will be used to assess wind conditions.	All Contractors	Good Practice
AQ_03	Ensure there is no burning of any materials on site.	Construction	All personnel will be inducted before commencing works.	All Contractors	Good Practice
DUST MANAGEMENT					
AQ_04	Dust management measures will be implemented to mitigate the impacts of dust during construction, including the following:	Pre-construction Construction	Dust Management and Vehicle and Equipment Emissions Plan (Appendix B)	All Contractors	EIS Table 28-11

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
			ECM to include dust management details for specific activities/areas. All personnel will be inducted and provided with ongoing training.		
AQ_05	Avoiding site run-off of water or mud to reduce the potential for track-out dust emissions.	Pre-construction Construction	ECM to include access/egress controls All personnel will be inducted and provided with ongoing training.	All Contractors	EIS Table 28-11
AQ_06	Only using cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays.	Pre-construction Construction	Construction equipment will be scheduled prior to undertaking the works.	All Contractors	EIS Table 28-11
AQ_07	Ensuring adequate water will be made available on the site for effective dust and particulate matter suppression and mitigation, using non-potable water where possible.	Pre-construction Construction	Non-potable water sources will primarily be used to meet this requirement. Non-potable water sources will include stormwater runoff captured in sediment dams or existing dams on site or through agreement from adjacent landowners. Options to use Sydney Water recycled water are being investigated. However, potable water may be supplied from existing assets operated by Sydney Water. Groundwater is not currently proposed to be utilise as a water source.	All Contractors	EIS Table 28-11

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
			Refer to the Soil and Water Management Plan.		
AQ_08	Using enclosed chutes and conveyors and covered skips where appropriate.	Pre-construction Construction	Where applicable, select appropriate plant/equipment to minimise dust generation. All personnel will be inducted and provided with ongoing training.	All Contractors	EIS Table 28-11
AQ_09	Minimising drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment, and using fine water sprays on such equipment wherever appropriate.	Pre-construction Construction	Where applicable, select appropriate plant/equipment to minimise dust generation while moving spoil. All personnel will be inducted and provided with ongoing training.	All Contractors	EIS Table 28-11
AQ_10	Making equipment readily available on-site to clean up spillages as soon as reasonably practicable after the event	Pre-construction Construction	Equipment will be stocked at different locations across the site. It will be restocked as it is used.	All Contractors	EIS Table 28-11
DUST IMPACTS FROM EARTHWORKS					
AQ_11	Vegetation clearing will be staged where possible to minimise the area and time that surfaces are exposed. Minimise stockpiling of material. Stockpiles will be located away from sensitive receivers where practicable.	Pre-construction Construction	Vegetation clearing will be scheduled ahead of time and will be done in combination with the location of sensitive receivers. Appendix A - Dust management and vehicle and equipment emissions plan	All Contractors	EIS Table 28-11

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
AQ_12	Exposed surfaces with no scheduled work will be treated to minimise dust generation. Exposed surfaces will be stabilised progressively using the most practical site-specific methods, including watering and geo-fabrics for short-term exposure and emulation spray, spray grass, soil compaction and revegetation for longer term exposed areas or final finishes. Revegetate earthworks and exposed areas or soil stockpiles as soon as practical.	Pre-construction Construction	Surface treatment details to be included on the ECM for the work. This could include the use of hessian, mulches or tackifiers to cover exposed areas as soon as possible after completion of earthworks where it is not possible to re-vegetate or cover with topsoil. Temporary areas that are not disturbed or used (>10 days) are to be stabilised to managed dust. All personnel will be inducted and provided with ongoing training. Appendix A - Dust management and vehicle and equipment emissions plan	All Contractors	EIS Table 28-11
DUST IMPACTS FROM OTHER MAIN CONSTRUCTION WORKS					
AQ_13	Avoiding scrabbling (roughening of concrete surfaces) where practicable.	Pre-construction Construction	Construction works will be scheduled ahead of undertaking the works.	All Contractors	EIS Table 28-11
AQ_14	Storing sand and other aggregates in bunded areas and not allowing them to dry out unless required for purposes.	Pre-construction Construction	Storage areas will be determined in combination with the site layout design and documented on the ECM	All Contractors	EIS Table 28-11
AQ_15	Delivering bulk cement and other fine powder materials in enclosed tankers and storing them in silos with suitable emission control systems to prevent	Pre-construction Construction	Deliveries will be organised and scheduled ahead of time. Training will be provided to all drivers and delivery personnel.	All Contractors	EIS Table 28-11

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
	escape of material and overfilling during delivery.				
AQ_16	Sealing and appropriately storing bags of any fine powder materials.	Pre-construction Construction	Storage and handling will be documented on the ECM. All personnel will be inducted and provided with ongoing training.	All Contractors	EIS Table 28-11
AQ_17	Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase off-site dust generation.	Construction	Meteorological conditions will be continuously monitored.	All Contractors	Good practice
DUST TRACK OUT					
AQ_18	Using water-assisted dust sweeper(s) on the access and local roads to remove, as necessary, any material tracked out of the site. This may require the sweeper to be continuously in use.	Construction	Access roads and sweeper requirements documented on the ECM. All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	EIS Table 28-11
AQ_19	Avoiding dry sweeping of large areas.	Construction	All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	EIS Table 28-11
AQ_20	Sealing high use haul roads and regularly inspecting and making necessary repairs to the surface as soon as reasonably practicable.	Construction	Haul roads and maintenance requirements documented as applicable on the ECM. All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	EIS Table 28-11
AQ_21	Recording all inspections of haul routes and any subsequent action in a site log book.	Construction	Recorded in site diary.	All Contractors	EIS Table 28-11

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
			All personnel will undertake inductions and reiterated through ongoing site training.		
AQ_22	Regularly cleaning and damping down hard surfaced haul routes with fixed or mobile sprinkler systems or mobile water bowsers.	Construction	Haul roads/surfaces and maintenance requirements documented as applicable on the ECM. All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	EIS Table 28-11
AQ_23	Implementing a wheel washing system (with rumble grids to dislodge accumulated dust and mud) prior to leaving the site.	Construction	This will be determined in combination with the site design layout and detailed on the ECM.	All Contractors	EIS Table 28-11
AQ_24	Providing an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	Construction	This will be determined in combination with the site design layout and detailed on the ECM.	All Contractors	EIS Table 28-11
AQ_25	Locating site access points as far as practicable from sensitive receptors.	Construction	This will be determined in combination with the site design layout and detailed on the ECM.	All Contractors	EIS Table 28-11
AQ_26	Hardstand areas and surrounding public roads will be cleaned, as required, using methods including brooms, bobcat attachments or street sweepers.	Construction	Maintenance requirements will be shown on relevant ECMs. All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	Good practice
AQ_27	Measures implemented to minimise dust, soil or mud from being deposited by vehicles on public	Construction	Applicable management measures will be shown on ECMs.	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
	roads. This will be achieved by implementing mitigation measures such as stabilised site access (rumble grids, concrete and/or large aggregate) at entry/exit points. Manual cleaning will also be carried out where appropriate. In the event of any spillage or tracking, the spilt material will be removed immediately and in accordance with the environmental incident classification and reporting procedure.		All personnel will undertake inductions and reiterated through ongoing site training.		
AQ_28	Vehicle movement will be confined to designated haul roads and areas. These roads will have speed limits of 40 km/h in order to reduce dust generation. Reduced speed limit may be implemented where dust generation persists.	Construction	A traffic management plan will be prepared to comply with this.	All Contractors	Good Practice
AQ_29	All loaded haulage trucks will be covered where there is a risk of release of dust or other materials on public roads.	Construction	All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	Good Practice
VEHICLE AND EQUIPMENT EMISSIONS					
AQ_30	All vehicles will be switched off when not in operation. Where practical lower vibration generating items of excavation plant and equipment shall be used.	Construction	Dust Management and Vehicle and Equipment Emissions Plan (Appendix B) All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	EIS Table 28-11

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
AQ_31	Engines of plant parked next to residents will be switched off when not in operation.	Construction	Dust Management and Vehicle and Equipment Emissions Plan (Appendix B). All personnel will undertake inductions and reiterated through ongoing site training.	All Contractors	EIS Table 28-11
AQ_32	Avoid the use of diesel- or petrol-powered generators and instead use mains electricity or battery powered equipment, where practicable.	Construction	Dust Management and Vehicle and Equipment Emissions Plan (Appendix B). Construction equipment will be ordered before the works are to be undertaken to ensure the appropriate equipment is available.	All Contractors	EIS Table 28-11
AQ_33	Implement measures to support and encourage sustainable travel for construction workers to and from the airport site, including public transport, shuttle busses, cycling, walking, and car-sharing.	Construction	Induction training Tool box talks to encourage sustainable travel to and from the site.	All Contractors	EIS Table 28-11
AQ_34	Daily monitoring of vehicle and plant is to be undertaken as a pre-start inspection.	Construction	Before any vehicles / plant enter the construction site, they must provide confirmation of their daily pre-start inspection.	All Contractors	Good Practice
AQ_35	Exhaust systems of construction plant, vehicles and machinery will be	Construction	Before any vehicles / plant enter the construction site, they	All Contractors	Good Practice

ID	Measure / Requirement	When to implement	How to implement	Responsibility	Reference
BEC: Bulk Earthworks Contract EEW: Early Earthworks MI: Material Importation All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
	maintained in accordance with manufacturer's specifications to ensure that excessive visible exhaust emissions do not persist under normal operational loads of the plant and machinery.		have to provide confirmation of their daily pre-start inspection.		
AQ_36	Periodic visual checks will be undertaken to ensure ongoing compliance, typically weekly. Where practicable, vehicles will be fitted with pollution reduction devices	Construction	Before any vehicles / plant enter the construction site, they must provide confirmation of their daily pre-start inspection.	All Contractors	Good Practice
AQ_37	Material brought to site will be in bulk from the suppliers, where practicable	Construction	Construction material will be ordered before the works are to be undertaken to ensure the appropriate equipment is available.	All Contractors	Good Practice
AQ_38	Material will be sourced from local suppliers, where practicable	Construction	Material will be ordered before the works are to be undertaken to ensure the local suppliers are available.	All Contractors	Good Practice
AQ_39	No use of ozone-depleting substances is to occur.	Construction	Procurement processes and checks during inspections. Ensure that the relevant providers of goods and services do not use ozone depleting substances.	All Contractors	Legal requirement
AQ_40	Develop and implement a construction logistics plan to manage the sustainable delivery of goods and materials to the airport site.	Construction	Construction Logistics Plan	All Contractors	EIS Table 28-11

8 Air quality criteria

The air quality criteria applicable for use as identified in the EIS are principally those defined in the NSW EPA Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, which accounts for various pollutant criteria and averaging period from multiple sources, including the NEPM-AAQ and NERDDC. They are summarised in Table 15. Where relevant, AEPR criteria are also listed.

Table 15 Air quality monitoring criteria applicable to the airport

Pollutant	Criterion[(a)]	Averaging period	Source
Total suspended particulate matter (TSP)	90 µg/m^3	1 year	NSW EPA, AEPR
Particulate matter < 10 µm (PM_{10})	50 µg/m^3	24 hours(c)	NSW EPA, NEPM-AAQ
	25 µg/m^3	1 year	NSW EPA, NEPM-AAQ
Particulate matter < 2.5 µm ($PM_{2.5}$)	25 µg/m^3	24 hours	NEPM-AAQ
	20 µg/m^3 (by 2025)	24 hours	NEPM-AAQ
	8 µg/m^3	1 year	NEPM-AAQ
	7 µg/m^3 (by 2025)	1 year	NEPM-AAQ
Deposited dust – Incremental	2 g/m^2/month	Annual	NERDDC
Deposited dust – Cumulative	4 g/m^2/month	Annual	NERDDC

ppm = parts per million; pphm = parts per hundred million; µg/m^3 = micrograms per cubic metre; mg/m^3 = milligrams per cubic metre.

NERDDC 1988, Air Pollution from Surface Coal Mining: Measurement, Modelling and Community Perception, Project No. 921, National Energy Research Development and Demonstration Council, Canberra

Any exceedance of the above criteria will be reported to the Infrastructure Department in accordance with Section 10.4.

9 Environmental roles and responsibilities

The key environmental management roles and responsibilities for the construction phase of the work are detailed in Section 4.5 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.

10 Environmental inspection, monitoring, auditing and reporting

Monitoring, inspection and auditing will be undertaken to measure effectiveness and facilitate continuous improvement of air quality management.

General environmental monitoring, inspection and auditing requirements are summarised in Table 16 of the WSA SEMF.

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

10.1 Environmental inspections

WSA environmental inspections

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

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

- Observation of dust generation from specific construction activities including those from vehicle tracking and excavation works;
- Observation of excessive visible exhaust emission from plant and machinery under normal operational loads;
- The presence / generation of any odours associated with the work activities; and
- Plant and machinery left idling whilst unused for extended periods of time (i.e. 30 mins).

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

Contractor environmental inspections

Regular site inspections will be undertaken to monitor compliance with this Plan at active, exposed work sites. Inspection results will be recorded, and the inspection log made available to Infrastructure Department upon request. Any exceedance of air quality criteria will be reported in the monthly report, discussed at the Environmental Coordination meeting and appropriate remedial action will be taken.

More frequent site inspections by the person accountable for air quality and dust issues will be conducted onsite when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

The Contractor's Environmental Manager and/or Environmental Coordinators will undertake inspections in accordance with the Contractor Environmental Management Framework. The contractor's 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.

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 air quality 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-works inspection.

10.2 Air quality 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 relevant air quality monitoring experience and / or qualifications; and
- The results of the monitoring must be kept in a written record.

Specific air quality monitoring requirements, including timing and responsibilities, are included in Table 15 below.

Table 16 Air quality monitoring requirements

Reference	Requirement	Timing	Responsibility
AQ_M_01	Real time monitoring will be conducted at suitable locations for dust deposition and dust flux. This will be determined in consultation with the NSW EPA for the WSA monitoring locations. Contractors will determine monitoring locations based on work fronts. Phone and /or email alerts will be delivered to the relevant personnel.	Pre-construction and during construction	WSA Environment Manager All Contractors
AQ_M_02	Weather data at the premises, including rainfall measured and recorded in millimetres per 24-hour period at the same time each day from the time that the site office is established	As required	All Contractors
AQ_M_03	Baseline monitoring conducted, prior to commencement of Main Construction Works. Ongoing monitoring to continue to be undertaken as per Section 10.2.1	October 2017 – September 2018r 2018 During construction	WSA Environment Manager
AQ_M_04	Regular site inspections, at a minimum weekly, will be undertaken to monitor compliance with the dust management plan. Inspection results will be recorded included in the monthly report.	During construction	WSA Environment Manager All contractors
AQ_M_05	Daily visual inspection and during high wind events	Pre-construction and during construction	All Contractors

Where a non-conformance is detected, or monitoring results are outside of the expected range, the non-conformance process described in Section 10.6 will be implemented.

10.2.1 Stage 1 Development Air Quality monitoring program

Air quality monitoring has been undertaken since October 2017 up until the present at the Airport Site for the purpose of obtaining air quality data. Baseline air monitoring quality data includes monitoring from the EIS

and before September 2018 when EEW started. Details of the methodology and sampling locations (Air Quality Monitoring Program) are provided in the sections below.

WSA will continue to implement the Air Quality Monitoring Program on a monthly basis in addition to any contractor specific monitoring as detailed in Section 10.2.3. Air quality monitoring sites and monitoring network are adequate for the current bulk earthworks. Monitoring has been undertaken confirming existing mitigation measures are adequate.

The monitoring data will be represented in monthly reports. This will provide a basis to assess the data against the targets and allow for a simple process in identifying any exceedances. If exceedances are encountered additional measures will be put in place including:

- Review and modify work practices as appropriate;
- Using additional water carts;
- Using adhesive polymer to bind the top surface layer;
- Reducing speeds of site plant; and
- Shutting down earthwork operations where required.

All environmental monitoring equipment will be calibrated as required by the manufacturer's specifications. Certificate of calibration currency can be made available upon request, with specific details to be provided in the annual reporting (refer to Section 10.4).

Dust deposition

Deposited matter refers to any dust that falls out of suspension in the atmosphere. Deposited dust is measured in accordance with AS/NZS 3580.10.1:2016 - *Methods for sampling and analysis of ambient air Method 10.1: Determination of particulate matter—Deposited matter—Gravimetric method*. A five-litre gauge with a 150 mm funnel is places on a two-metre high stand. The gauge is left onsite for approximately one (1) month (30 days +/- two days) and then the sample is sent to a laboratory for analysis. The number of insoluble solids over the monitoring period are reported by the laboratory.

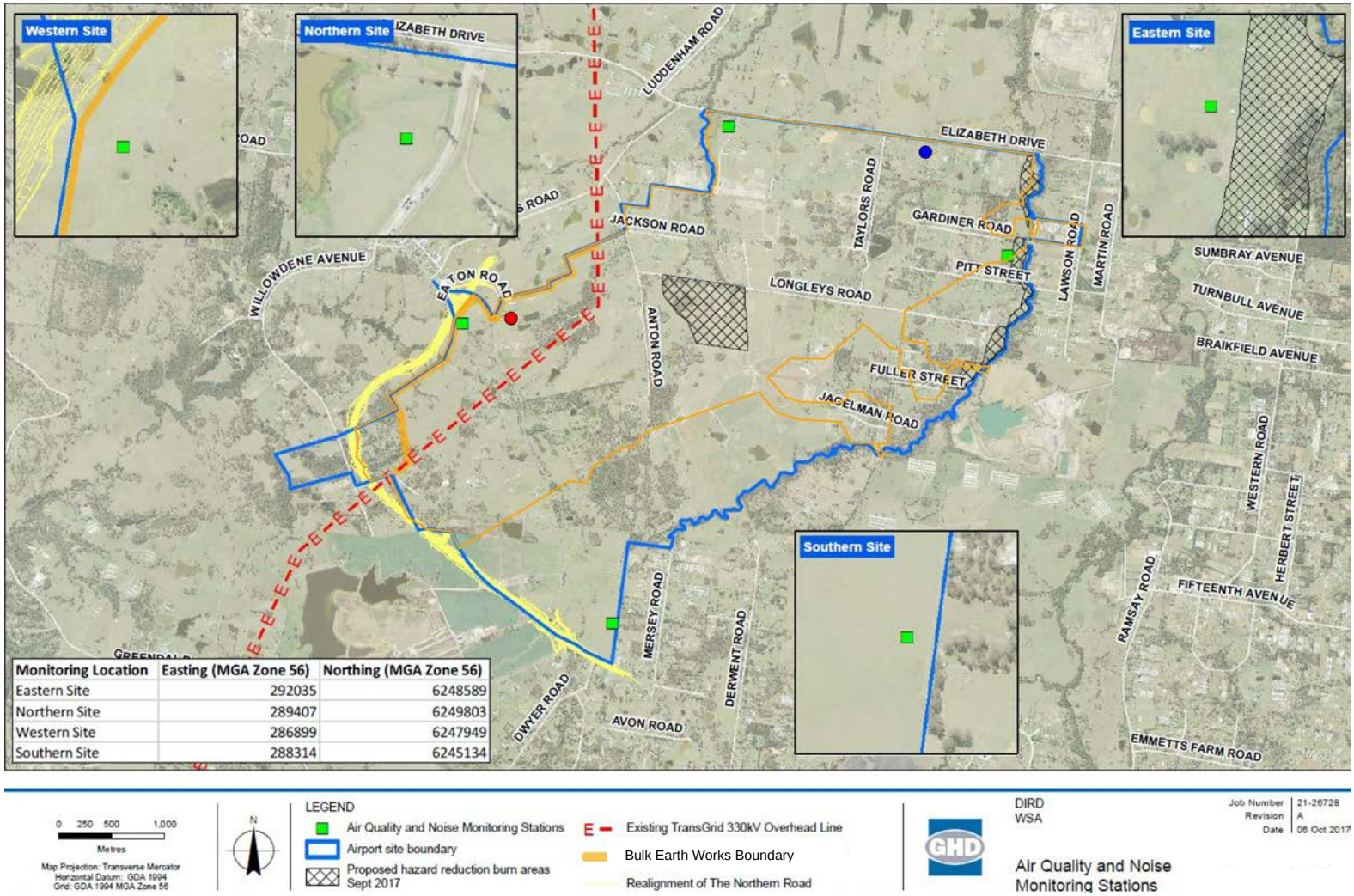
Particulate concentration

DMP 7200 real time particle counters sample real time $PM_{2.5}$ and PM_{10}. The DMP adopts two methods for measuring particulate mass concentration: particle counting and gravimetric analysis. The units measure the particulate concentration through 90º Mie scattering principle.

Air quality monitoring station locations

The location of the air-monitoring stations is provided overleaf in Figure 3.

Figure 3 Air quality monitoring station location plan



Monitoring Location	Easting (MGA Zone 56)	Northing (MGA Zone 56)
Eastern Site	292035	6248589
Northern Site	289407	6249803
Western Site	286899	6247949
Southern Site	288314	6245134

10.2.2 Additional monitoring for adverse weather

Additional inspections may be required during adverse weather conditions, such as dry periods (greater than one month) and high winds (greater than 30km/hr). Real time and forecasted weather conditions (from BOM) along with real – time monitors (>5 monitors on the site at any one time) will be continuously monitored during the project, particularly prior to weekends. Where required, adjustment to work practices will be made during these periods (e.g. reduction in activities, deployment of additional water carts.).

All monitoring equipment will be calibrated as required by the manufacturer's specifications. Certificate of calibration currency can be made available upon request, with specific details to be provided in the annual reporting (refer to Section 10.4).

10.2.3 Contractors air quality monitoring program

Real time monitoring will be conducted by each contractor at suitable locations for real time PM10, PM2.5, dust deposition and dust flux. Phone and/or email alerts will be delivered to the relevant personnel.

Contractor is to provide WSA with a monthly summary of all air quality monitoring undertaken and advise of compliance with criteria.

10.3 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.

10.4 Environmental reporting

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

In addition, a summary of reporting requirements required under this Air Quality CEMP (including environmental reporting requirements under the Airport Plan specific to this Air Quality CEMP) is provided below in Table 17.

Table 17 Air quality reporting and record keeping

Action	Scope	Timing / Frequency	Responsibility
Annual reporting	Unless otherwise agreed in writing by an Approver, an annual report will be prepared in relation to compliance with this Air Quality CEMP. In accordance with Condition 39 (2) 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 Infrastructure Department with a copy to the Environment Department. The report must remain on the website for a period of at least 12 months.	Annually	WSA Environment Manager
NEPM	Compliance with the air quality criteria as detailed in section 6 (including the relevant NEPM requirements) will be included as part of the Annual Report.	Annually	WSA Environment Manager

Action	Scope	Timing / Frequency	Responsibility
Greenhouse gas emissions (NGER)	Refer to Sustainability Plan when approved. In the absence of an approved Sustainability Plan, NGERS will be reported in the Annual Report.	Annually	WSA Environment Manager
Monitoring compliance reporting	Undertaking monitoring as required by this Air Quality CEMP. Contractor is to provide WSA with a monthly summary of all air quality monitoring undertaken and advise of compliance with criteria. Monitoring will be undertaken against the criteria outlined in section 8.	Monthly	All Contractors
Complaints reporting	Recording of complaints and stakeholder interactions in accordance with Community and Stakeholder Management Plan.	As required	WSA Environment Manager WSA Community and Stakeholder Manager All Contractors
Environmental Site Register (required under the 6.02(3) of the AEPR)	Environmental Site Register to be kept and maintained to include written record of environmental conditions of the Airport and its environmental management generally. The register is to include the results of monitoring required under section 10.2 and a record of any exceptional incidents that cause excessive pollution and the action taken to resolve the situation.	As required	All
Shut-down inspections	Inspection of contractor works including status of environmental controls prior to shut-down of site for an extended period (i.e. more than 2 days).	Prior to site shut-down	All Contractors
General environmental inspection	Inspection of environmental management controls on site and sighting of site documentation as required by the contractor's CEMP.	Weekly	WSA
General environmental inspection	Inspection of environmental management controls and site documentation for contractor works (as required by the contractor's CEMP).	As per Contractor environmental management system (at least weekly)	All Contractors
Post-rainfall inspection	Inspection of environmental controls following a rainfall event exceeding 10 mm in any 24-hour period.	Within 24 hours of the rainfall event (excluding Sundays and public holidays)	All Contractors
Reporting pollution incidents	For the management and reporting requirements of all environmental incidents, refer to section 6 of the SEMF.	As required	All

Action	Scope	Timing / Frequency	Responsibility
	Report pollution incidents resulting in offsite impacts to the NSW Environment Protection Authority – refer to WSA Environmental Non-conformance Classification and Reporting Procedure.		
Pollution and or excessive noise reporting	In accordance with the AEPR, WSA must give an airport environment officer for the airport, within 14 days, a written report if monitoring results indicate pollution, or excessive noise, occurring as a result of the undertaking of the works associated with the Stage 1 development. The trigger for a 'pollution event' as per the Airports (Environment Protection) Regulations 1997 is provided in the relevant schedules of the AEPR.	As required	WSA
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 SEMF.	As required	WSA All Contractors

10.5 Review of approved plans

WSA will review each approved plan at least every five years (from the date of approval) as required by the Airport Plan. A review will also be completed annually to ensure that it continues to meet the approval criteria. Details of the review will be included in the annual report (refer to Section 8.3 of the SEMF). 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.

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 to refer to Section 5 of the SEMF).

10.6 Environmental Incidents and complaints management

The management and reporting of environmental incidents 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 Community and Stakeholder Engagement Plan.

11 Competence, training and awareness

To ensure this Air Quality 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 competence, training and awareness requirements will be implemented as detailed in Section 5 of the SEMF.

12 References

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

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

NERDDC 1988, Air Pollution from Surface Coal Mining: Measurement, Modelling and Community Perception, Project No. 921, National Energy Research Development and Demonstration Council, Canberra

NSW Department of Environment and Conservation (DEC) (now NSW Department of Planning and Environment), 2005. *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW*

NSW Office of Environment and Heritage (OEH), 2016. *Clean Air for NSW Consultation Paper*

Standards Australia 2001. *Australian and New Zealand environmental management international standard (AS/NZS ISO 14001).*

Appendix A

Dust management, vehicle and equipment emissions plan

Assess the Situation

- Review weather forecast daily for potential high winds (>20km/hr) at Horsley Park (www.weatherzone.com.au) [EC].
- Consult with SS and other subcontractors for strategies to minimise dust [EC].
- The need for and type of dust controls will be assessed prior to works being undertaken [SS].
- The implementation of dust and emission controls will be progressive and continual during the various stages of construction of the temporary site facility [SS/EC].

STOP DUST GENERATING WORK if winds exceed 20km/hr (10min average) and air quality controls are not sufficient to mitigate dust generation.

Legend
Contractor Responsibilities
SS – Site Supervisor
EC – Environmental Coordinator
EM – Environment Manager

Re-assess the situation

Implement Air Quality Controls

Dust management plan [SS]

- Avoiding site runoff of water or mud to reduce the potential for track-out dust emissions
- Only using cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays
- Ensuring adequate water will be made available on the site for effective dust and particulate matter suppressions and mitigation, using non-potable water where possible
- Using enclosed chutes and conveyors and covered skips
- Minimising drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment, and using fine water sprays on such equipment wherever appropriate
- Making equipment readily available on-site to clean up spillages as soon as reasonably practicable after the event
- Measures to reduce dust impacts from earthworks and other works, as outlined in Table 7-1 of this plan, including but not limited to:
  - Vegetation clearing will be staged where possible to minimise the area and time that surfaces are exposed.
  - Minimise stockpiling of material. Stockpiles will be located away from sensitive receivers where practicable.
- Measures to reduce dust track out, as outlined in Table 7-1 of this plan, including but not limited to:
  - Sealing high use haul roads, regularly inspecting and making necessary repairs to the surface as soon as reasonably practicable.
  - Implementing a wheel washing system (with rumble grids to dislodge accumulated dust and mud) prior to leaving the site.
  - Avoiding dry sweeping of large areas.

Vehicles and equipment emissions plan

- Requiring vehicle operators to switch off engines when not in use
- Avoiding the use of diesel or petrol powered generators and instead using mains electricity or battery powered equipment, where practicable
- Considering appropriate vehicle speeds on sealed and unsealed roads
- Construction logistics plan to manage the sustainable delivery of goods and materials to the airport site, includes the following measures:
  - Material brought to site will be in bulk from the suppliers, where practicable
  - Material will be sourced from local suppliers, where practicable.

  Further sustainable practices to manage the delivery of goods and material to the airport site are detailed in the Sustainability Plan
- Measures to support and encourage sustainable travel for construction workers to and from the airport site, including public transport, shuttle buses, cycling, walking, and car-sharing are outlined in Section 2.2.2: Vehicle Movement Plans of the Traffic and Access CEMP
- Measures to reduce vehicle and equipment emissions, as outlined in Table 7-1 of this plan.

Observe Effectiveness of Controls

- If visible dust observed leaving site, re-assess the situation and potentially implement additional controls. [SS]
- If a dust complaint is received, re-assess the situation and potentially implement additional controls. [SS/EM]
- Bring any significant air quality issues to the attention of the EC (in the first instance) or the EM [SS]

Monitoring & Recording

- SS to monitor daily for tracking of mud on public roads, ensuring the integrity of the access/egress points and haul roads to ensure loose material not being tracked out. Outcomes of this monitoring are to be recorded in the SS daily diary (or similar).
- SS to record details of observations regarding visible dust emissions in SS daily diary (or similar).

1. Introduction

Objectives

- To describe the minimum mandatory requirements for the management of air quality associated with construction activities.

Training

- All personnel are to undertake Project inductions identifying their environmental and compliance obligations under the Conditions for the Project.
- Obligations and responsibilities relevant to air quality management will also be included in daily pre-start or activity-specific pre-start briefings, toolbox talks or targeted environmental training as appropriate.

2. Standards and Guidelines

- Air Quality Construction Environmental Management Plan (AQCEMP)
- NSW EPA Local Government Air Quality Toolkit, Visual Guide: Dust from urban construction sites

3. Air Quality Management

The following are mitigation and management measures to address impacts on air quality from dust and vehicle and equipment emissions.

Dust Management Plan

- Avoiding site runoff of water or mud to reduce the potential for track-out dust emissions;
- Only using cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays;
- Ensuring adequate water will be made available on the site for effective dust and particulate matter suppressions and mitigation, using non-potable water where possible;
- Using enclosed chutes and conveyors and covered skips;
- Minimising drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment, and using fine water sprays on such equipment wherever appropriate;
- Making equipment readily available on-site to clean up spillages as soon as reasonably practicable after the event;
- Measures to reduce dust impacts from earthworks and other works, as outlined in Table 7-1 of this plan, including but not limited to:
  - Vegetation clearing will be staged where possible to minimise the area and time that surfaces are exposed; and
  - Minimise stockpiling of material. Stockpiles will be located away from sensitive receivers where practicable.
- Measures to reduce dust tracking out, as outlined in Table 4 of this plan, including but not limited to:
  - Sealing high use haul roads, regularly inspecting and making necessary repairs to the surface as soon as reasonably practicable;

- Implementing a wheel washing system (with rumble grids to dislodge accumulated dust and mud) prior to leaving the site; and
- Avoiding dry sweeping of large areas.

Vehicle and Equipment Emissions Plan

- Requiring vehicle operators to switch off engines when not in use;
- Avoiding the use of diesel- or petrol-powered generators and instead using mains electricity or battery powered equipment, where practicable;
- Considering appropriate vehicle speeds on sealed and unsealed roads;
- Construction logistics plan to manage the sustainable delivery of goods and materials to the airport site, includes the following measures:
  - Material brought to site will be in bulk from the suppliers, where practicable; and
  - Material will be sourced from local suppliers, where practicable.

  Further sustainable practices to manage the delivery of goods and material to the airport site are detailed in the Sustainability Plan.
- Measures to support and encourage sustainable travel for construction workers to and from the airport site, such as public transport, shuttle buses, cycling, walking, and car-sharing are outlined in Section 2.2.2 of the Traffic and Access CEMP; and
- Measures to reduce vehicle and equipment emissions, as outlined in Table 4 of this plan.

4. Complaints Management

Record all dust and air quality complaints in accordance with the complaints management system.

5. Incident Management

Any exceptional incident which causes dust/emissions, either on-site or in close proximity to the site, is to be recorded in the Foreman's daily diary and immediately reported to the Site Supervisor (SS). The SS to report the matter to the Environment Manager and Construction Manager.

Appendix B

Sensitive receptors

Figure 4 Sensitive receptors

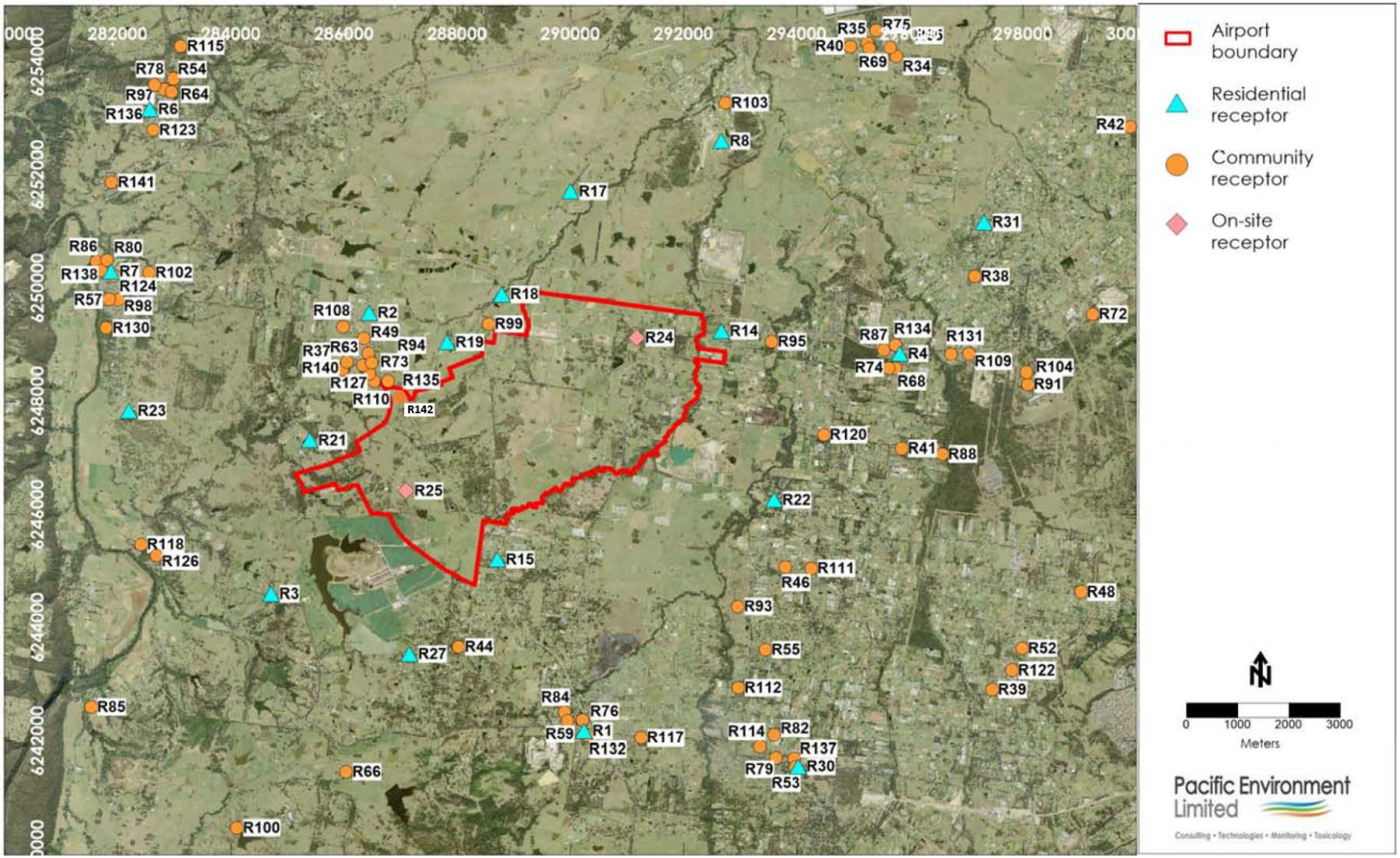


Table 18 Sensitive receptors

ID	Receptor location	Type	ID	Receptor location Type	
R1	Bringelly	Residential	R75	Trinity Catholic Primary School	Community
R2	Luddenham	Residential	R76	Bringelly Public School	Community
R3	Greendale, Greendale Road	Residential	R78	Mulgoa Public School	Community
R4	Kemps Creek	Residential	R79	Rossmore Public School	Community
R6	Mulgoa	Residential	R80	Wallacia Public School	Community
R7	Wallacia	Residential	R82	Bellfield College - Junior Campus	Community
R8	Twin Creeks, Cnr Twin Ck Drive & Humewood Place	Residential	R84	Bringelly Park	Community
R14	Lawson Road, Badgerys Creek	Residential	R85	Bents Basin State Conservation Reserve and Gulguer Nature Reserve	Community
R15	Mersey Rd, Greendale	Residential	R86	Blaxland Crossing Reserve	Community
R17	Luddenham Road	Residential	R87	Bill Anderson Reserve	Community
R18	Cnr Adams & Elizabeth Drive	Residential	R88	Kemps Creek Nature Reserve	Community
R19	Cnr Adams & Anton Road	Residential	R91	Western Sydney Parklands	Community
R21	Cnr Willowdene Ave and Vicar Park Lane	Residential	R93	Rossmore Grange	Community
R22	Rossmore, Victor Ave	Residential	R94	Freeburn Park	Community
R23	Wallacia, Greendale Rd	Residential	R95	Overett Reserve	Community
R24	Badgerys Creek 1 NE	On-site	R97	Mulgoa Park	Community
R25	Badgerys Creek 2 SW	On-site	R98	Wallacia Bowling and Recreation Club	Community
R27	Greendale, Dwyer Rd	Residential	R99	Hubertus Country Club	Community
R30	Rossmore residential	Residential	R100	Sugarloaf Cobbitty Equestrian Club	Community
R31	Mt Vernon residential	Residential	R102	Panthers Wallacia	Community
R34	Emmaus Residential Aged Care	Community	R103	Twin Creeks Golf and Country Club	Community
R35	Mamre After School and Vacation Care	Community	R104	Sydney International Shooting Centre	Community
R36	Head Start After School Care	Community	R108	Luddenham Showground	Community
R37	Schoolies at Mulgoa	Community	R109	Kemps Creek Sporting and Bowling Club	Community
R38	Do-re-mi Day Care Centre	Community	R110	St James Luddenham	Community
R39	Little Amigos Austral Early Learning Centre	Community	R111	Lin Ying temple	Community
R40	Little Smarties Childcare Centre	Community	R112	Vat Ketanak Khmer Kampuchea Krom	Community
R41	The Grove Academy	Community	R114	Anglican Church Sydney Diocese	Community
R42	Horsley Kids	Community	R115	Anglican Parish of Mulgoa	Community
R44	Bringelly Child Care Centre	Community	R117	Bringelly Vineyard Church	Community
R46	Clementson Drive Early Educational Centre	Community	R118	Free Church of Tonga	Community
R48	Kids Korner West Hoxton Early Learning Centre	Community	R120	Our Lady Queen of Peace	Community
R49	Luddenham Child Care Centre	Community	R122	St Anthony	Community
R52	The Frogs Lodge	Community	R123	St Marys Church	Community

ID	Receptor location	Type	ID	Receptor location Type	
R53	Rossmore Community Preschool	Community	R124	Wallacia Christian Church	Community
R54	Mulgoa Preschool	Community	R126	St Francis Xavier Church	Community
R55	Jillys Educational Childcare Centre	Community	R127	Luddenham Uniting Church	Community
R57	Wallacia Progress Hall	Community	R130	Hopewood Health Retreat	Community
R59	Bringelly Community Centre	Community	R131	Science of the Soul Study Centre	Community
R63	Luddenham Progress Hall	Community	R132	Bringelly shops	Community
R64	Mulgoa Hall	Community	R134	Kemps Creek shops	Community
R65	Emmaus Catholic College	Community	R135	Luddenham shops	Community
R66	University of Sydney Farms	Community	R136	Mulgoa shops	Community
R68	Christadelphian Heritage College Sydney	Community	R137	Rossmore shops	Community
R69	Mamre Anglican School	Community	R138	Wallacia Shops	Community
R72	Irfan College	Community	R140	Holy Family Catholic Primary and Church	Community
R73	Luddenham Public School	Community	R141	Edmund Rice Retreat and Conference Centre	Community
R74	Kemps Creek Public School	Community	R142	Experience Centre and Site Accommodation	Community