Appendix B4

Air Quality Management Sub-plan

M4-M5 Link Mainline Tunnels

February 2019

THIS PAGE LEFT INTENTIONALLY BLANK

Contents

Tables

Appendices

Document control

Approval and authorisation

Title	M4-M5 Link Mainline Tunnels Air Quality Management Sub-plan
Document No/Ref	M4M5-LSBJ-PRW-EN-MP01-PLN-0004-05
Document Path	

Version control

Revision	Date	Description
01	16 August 2018	For DPE approval
02	3 September 2018	For DPE approval
03	25 October 2018	For DPE approval following minor comments
04	5 February 2019	Minor updates following Project Modification and inclusion of DDMP
05	27 February 2019	Minor updates following Project Modification and inclusion of DDMP – For DPE Approval

Internal review

	Name	Position	Date	Signed/Authorised
Originator(s)	[redacted]			
Review				
Authorised				

Note:

From Revision 01 Document Number has changed from M4M5-LSBJ-PRW-GEN-EV01-PLN-0005 (previous revisions) to M4M5-LSBJ-PRW-EN-MP01-PLN-0004.

Glossary/ Abbreviations

Abbreviations	Expanded text
AQMP	Air Quality Management Sub-plan
AWS	Automatic Weather Station
BOM	Australian Government Bureau of Meteorology
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997*
CLMP	Contaminated Land Management Plan
CoA	Conditions of Approval
CSSI	Critical State Significant Infrastructure
DDMP	Dust Deposition Monitoring Program
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
ER	Environmental Representative
EU	European Union
EWMS	Environmental Work Method Statements
GREP	NSW Government Resource Efficiency Policy
G36	Roads and Maritime Services QA Specifications G36 Environmental Protection (August 2014)
ISCA	Infrastructure Sustainability Council of Australia
LGA	Local Government Area
LSBJV	Lendlease Samsung Bouygues Joint Venture
M4 East	M4 East Motorway

Abbreviations	Expanded text
M4-M5 Link	A component of the WestConnex program of works, which includes the construction and operation of Stage 1: M4-M5 Link Main Tunnels and Stage 2: Rozelle Interchange.
NEPC	National Environment Protection Councils
NEPM	National Environmental Protection Measure
New M5	A component of the WestConnex program of works, located from Kingsgrove to St Peters
NSW	New South Wales
OAQMP	Operational Air Quality Management Plan
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
PBR	Pyrmont Bridge Road site at Annandale/Camperdown
PIRMP	Pollution Incident Response Management Plan
PM	Particulate matter
$PM_{2.5}$	Particulate matter less than or equal to 2.5 micrometres in diameter
PM_{10}	Particulate matter less than or equal to 10 micrometres in diameter
POEO Act	*Protection of the Environment Operations Act 1997*
Project, the	M4-M5 Link Main Tunnels
REMM	Revised Environmental Management Measure (from SPIR)
Roads and Maritime	Roads and Maritime Services
Secretary	Secretary of DPE (or delegate)
SEMP	Site Establishment Management Plan
SMC	Sydney Motorway Corporation (formerly WestConnex Delivery Authority)
SPIR	Submissions and Preferred Infrastructure Report
SSWMP	Construction Soil and Surface Water Management Plan
US EPA	United States Environmental Protection Agency (US EPA)
WestConnex program of works	A program of works that includes the M4 Widening, King Georges Road Interchange Upgrade, M4 East, New M5 and WestConnex M4-M5 Link projects

1 Introduction

1.1 Context

This Air Quality Management Sub Plan (AQMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for M4-M5 Link Mainline Tunnels (the Project). This Plan also includes the Dust Deposition Monitoring Program (DDMP) prepared for the Project.

This AQMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the WestConnex M4-M5 Link Environmental Impact Statement (EIS), the revised environmental management measures (REMM) listed in the WestConnex M4-M5 Link Submissions and Preferred Infrastructure Report (SPIR), the WestConnex M4-M5 Link Mainline Tunnel Modification report (September 2018) and applicable guidance and legislation.

1.2 Project background

An environmental impact statement (EIS) (AECOM 2017) assessed the impacts of construction and operation of the Project on air quality, within Chapter 9.

The EIS identified the potential for minor impacts on air quality during construction typically associated with dust. Chapter 9 of the EIS, Sections 9.3 and 9.10 also acknowledge there is potential for crystalline silica emissions to occur during tunnel excavation. However, this is primarily relevant to occupational exposure and will be managed by LSBJV's Safety Team. The EIS concluded that any potential air quality impacts associated with construction of the project could be managed by environmental mitigation and management measures which are outlined in Table 6-1.

Please refer to Section 1.3 of CEMP for Project Description.

1.3 Scope of the Sub-plan

The scope of this Plan is to describe how Lendlease Samsung Bouygues Joint Venture (LSBJV) propose to manage and protect air quality during construction of the Project.

This Plan includes both pro-active as well as reactive management measures. It also includes mitigation strategies to minimise the impact of dust, offensive odour, and other air pollutants on the surrounding environment, including adjacent properties and sensitive places.

Operational air quality and operation measures do not fall within the scope of this Plan and are not included within this Plan.

The Plan will be implemented for the duration of construction.

1.4 Environmental management systems overview

The environmental management system overview is described in Section 1.5 of the CEMP.

2 Purpose and objectives

2.1 Purpose

The purpose of this AQMP is to describe how the LSBJV proposes to manage and protect air quality during construction of the Project.

2.2 Objective

The key objective of the AQMP is to ensure all CoA, REMM and licence/permit requirements relevant to air quality are described, scheduled and assigned responsibility as outlined in:

- The EIS prepared for WestConnex M4-M5 Link
- The SPIR for WestConnex M4-M5 Link
- The Modification report for WestConnex M4-M5 Link Mainline Tunnel (September 2018)
- Conditions of Approval granted to the Project on 17 April 2018 and as modified on 25 February 2019
- Roads and Maritime QA specifications G36 Environmental Protection (August 2014) (Roads and Maritime G36 Specifications)
- The Project's Environmental Protection Licence (EPL)
- All relevant legislation and other requirements described in Section 3.1 of this Plan.

2.3 Environmental performance outcome and targets

The desired environmental performance outcome for air quality, as outlined and addressed in the EIS, is to design, construct and operate the Project in a manner that minimises air quality impacts (including nuisance dust and offensive odour) to minimise risks to human health and the environment to the greatest extent practicable.

The targets presented in Table 2-1 have been established as part of this Plan, to achieve this environmental performance outcome that relates to the management of air quality during construction of the Project. The Project has also established key performance indicators (KPIs) for these targets. These have been derived from the following sources:

- EIS Appendix A
- Conditions of Approval granted to the project on 17 April 2018
- Environmental Protection Licence (EPL# 21149)
- Infrastructure Sustainability Council of Australia (ISCA)
- EIS/SPIR REMMs
- Internal LLE Environmental Management System (EMS)

Table 2-1 KPIs for air quality

Target / KPI number	Target	KPI	Records	Source
1	Ensure full compliance with the relevant legislative	No repeat no-conformances	LLE703A Environmental Inspection	CoA A1

Target / KPI number	Target	KPI	Records	Source
	requirements, CoA and REMM		Checklist (internal document) / audits	
2	Comply with EPL air quality parameters	No repeat non-conformances	LLE703A Environmental Inspection Checklist (internal document) / audits / Environmental Representative (ER) inspection and report	EPL
3	Ensure complaints from the community and stakeholders are managed in accordance with the Complaints Management System, as detailed within the Community Communication Strategy (CCS)	An investigation into construction air quality related complaints will commence within one business day of being received	Complaints register	Internal EMS
4	Ensure construction plant, vehicles and machinery do not cause continuous visible emissions that exceed the criteria set within the updated NSW EPA Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (NSW EPA 2016) (NSW EPA Approved Methods), ie emissions must not be continuously visible for more than 10 seconds	Any plant identified as having continuously visible exhaust emissions for more than 10 seconds to be stood down from construction operations	LLE703A Environmental Inspection Checklist (internal document) Daily Pre-Start Inspections	NSW EPA Approved Methods Internal EMS
5	Weekly documented inspections to be undertaken by the LSBJV environmental team members to	Environmental inspections to be completed and recorded weekly during construction	LLE703A Environmental Inspection Checklist (internal document)	Internal EMS

Target / KPI number	Target	KPI	Records	Source
	identify and action any air quality issues			
6	Effective management to ensure construction activities are undertaken in a way that minimises dust from the site. Visible dust from site should be responded to immediately	At all times	LLE703A Environmental Inspection Checklist (internal document) Monitoring registers and records	EIS Appendix A
7	If construction controls fail, the clean up of any spoil, spillage or sediment trackage to be removed promptly following identification	At all times	LLE703A Environmental Inspection Checklist (internal document)	Internal EMS
8	Minimise the generation of offensive odours	At all times	LLE702A Environmental Incident Reports (internal document) Construction Compliance Reports	Internal EMS
9	Reduce emissions of dust out of the door openings of acoustic sheds	At all times	LLE703A Environmental Inspection Checklist (internal document)	REMM AQ1
10	No recurring or major exceedances of air emission or air quality goals	At all times	Monitoring records	Infrastructure Sustainability Council of Australia (ISCA) Dis-4
11	Dust deposition monitoring during the construction phase of the project performed in accordance with the Dust Deposition Monitoring Program (DDMP)	Compliance with DDMP	Dust deposition monitoring reports	CoA

3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation

Legislation relevant to air quality management for the Project include:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Protection of the Environment Operations (Clean Air) Regulation 2010* (POEO Clean Air Regulation).

Relevant provisions of the above legislation are explained in Appendix [A1] of the CEMP.

3.1.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this plan include:

- National Environment Protection Councils (NEPC) – National Environment Protection Measure (NEPM) for Ambient Air Quality Guidelines (AAQNEPM)
- AS 3580.1.1-2007 Methods of Sampling Analysis of Ambient Air. Part 1.1 Guide to Siting Air Monitoring Equipment
- AS 3580.10.1-2003 Methods of Sampling Analysis of Ambient Air. Determination of Particulate Matter – Deposited Matter - Gravimetric Method
- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA 2016) (EPA Approved Modelling and Assessment Methods)
- Roads and Maritime QA Specification G36 – Environmental Protection (Management System) (August 2014)
- Roads and Maritime QA Specifications G38 – Soil and Water Management (Soil and Surface Water Management Plan)
- Air Quality Monitoring Criteria for Deposited Dust (DEC Guideline)
- NSW Government Resource Efficiency Policy (OEH 2014) (GREP)
- EPA Approved Methods (DEC 2007)
- Managing Urban Stormwater: Soils and Construction, Volume 1 (Landcom 2004) and Volume 2 (DECC 2008) (the “Blue Book”).

3.2 Air quality criteria

This section specifies the air quality monitoring criteria during the construction of the Project. Other monitoring requirements relevant to management of air quality are outlined in 7.3 of the Plan. Table 3-1 outlines the air quality monitoring criteria for the Project.

Table 3-1 Air quality monitoring criteria for construction phase of the Project

Item	Frequency	Standards	Reporting	Responsibility
Rainfall monitoring	Daily	Weather station	Monitoring results	Environment and Sustainability Manager
Dust deposition monitoring	Dust deposition monitoring throughout the construction phase	NSW EPA Approved Methods EPA Approved Modelling and Assessment Methods Dust deposition gauges will be located in proximity to each of the constructions compounds listed below. Precise locations for the gauges will be determined in accordance with the above guidelines and in consultation with the relevant landowner, where necessary: • Wattle Street Ramps, Haberfield • Northcote Street, Haberfield • Parramatta Road, Ashfield/Haberfield • Pyrmont Bridge Road, Camperdown/Annandale • Campbell Road, St Peters.	Dust deposition monitoring reports	Environment and Sustainability Manager

Refer to Section 4.15 of the CEMP for a site description of each compound.

3.3 Minister's Conditions of Approval

The CoA relevant to this Plan are listed in Table 3-2 below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-2 Conditions of Approval relevant to the AQMP

<table>
<tr><th>CoA No.</th><th>Condition Requirements</th><th>Document Reference</th><th>How Addressed</th></tr>
<tr><td>C4</td><td>The following CEMP Sub-plans must be prepared in consultation with relevant authorities identified for each CEMP Sub-plan and be consistent with the CEMP referred to in the EIS:
<table>
<tr><th></th><th>Required CEMP Sub-plan</th><th>Relevant authority(s) and council(s) to be consulted for each CEMP Sub-plan</th></tr>
<tr><td>(d)</td><td>Air Quality</td><td>EPA and relevant council(s)</td></tr>
</table></td><td>This Plan</td><td>This AQMP has been prepared in accordance with this condition and describes how LSBJV propose to manage waste during construction of the project.</td></tr>
<tr><td rowspan="3">C5</td><td>The CEMP Sub-plans must state how:</td><td></td><td></td></tr>
<tr><td>(a) the environmental performance outcomes identified in the EIS and SPIR as modified by these conditions will be achieved</td><td>Section 2.3
Table 2-1</td><td>This Plan was prepared in accordance with the environmental performance outcomes identified in the EIS and SPIR and is evidenced primarily in Section 2.3 and Table 2-1.</td></tr>
<tr><td>(b) the mitigation measures identified in the EIS and SPIR as modified by these conditions will be implemented</td><td>Table 6-1</td><td>The implementation of air quality mitigation and management measures identified in the EIS and SPIR are listed in Table 6-1.</td></tr>
</table>

CoA No.	Condition Requirements	Document Reference	How Addressed
	(c) the relevant terms of this approval will be complied with, and	Section 3.3	Details regarding how LSBJV propose to comply with the relevant terms of approval are listed in this Table and in Appendix A.
	(d) issues requiring management during construction (including cumulative impacts), as identified through ongoing environmental risk analysis, will be managed.	Section 5.3 Table 6-1 Environmental Risk Assessment Workshop (Section 3.2.1 of CEMP)	Air quality issues requiring management during construction of the Project have been identified through the EIS, SPIR and Environmental Risk Assessment Workshop. These issues have been detailed in Section 5.3 of this Plan. Environmental risk analysis will be ongoing and regularly reviewed in accordance with Section 3.9 to Section 3.13 of the CEMP to ensure effective management of waste. Mitigation and management measures for these issues are listed in Table 6-1.
C6	The CEMP Sub-plans must be endorsed by the ER and then submitted to the Secretary for approval no later than one (1) month prior to the commencement of the construction activities to which they apply.	Section 2.2 of the CEMP	This AQMP (Revision 1) was endorsed by the Lead ER, on 20 August 2018 (Letter ref: 17021-LT-ED-004_0).
C7	Any of the CEMP Sub-plans may be submitted to the Secretary along with, or subsequent to, the submission of the CEMP.	Section 2.2 of the CEMP	This Plan has been submitted for approval to DPE prior to the final submission of the CEMP for DPE approval.

CoA No.	Condition Requirements	Document Reference	How Addressed
C8	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Secretary. The CEMP and CEMP Sub-plans, as approved by the Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction. Where the CSSI is being staged, construction of that stage is not to commence until the relevant CEMP and CEMP Sub-plans have been endorsed by the ER and approved by the Secretary.	Section 2.2 of the CEMP	Construction will not commence until the CEMP and all CEMP Sub-plans have been approved by DPE. The CEMP and Sub-plans will be implemented for the duration of construction.
C9(e)	The following Construction Monitoring Programs must be prepared in consultation with the relevant authorities identified for each Construction Monitoring Program to compare actual performance of construction of the CSSI against predicted performance. (e) Dust Deposition Monitoring Program: EPA	Section 2.3 of the DDMP (Appendix B)	The DDMP has been prepared in accordance with this condition and describes how LSBJV propose to conduct dust deposition monitoring during construction of the Project. The DDMP was provided to the NSW Environment Protection Agency (EPA) in accordance with CoA C9(e), on 27 February 2019. However, the EPA have provided advice to LSBJV that it is their policy not to review environmental management plans or monitoring programs.

CoA No.	Condition Requirements	Document Reference	How Addressed
C10	Each Construction Monitoring Program must provide: (a) details of baseline data available; (b) details of baseline data to be obtained and when;	Section 3.1 of the DDMP (Appendix B)	Dust deposition levels baseline data are not available for the study area. The EPA criteria as detailed in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (2016) will be used in place of baseline data, as detailed in the DDMP.
	(c) details of all monitoring of the project to be undertaken; (d) the parameters of the project to be monitored; (e) the frequency of monitoring to be undertaken; (f) the location of monitoring;	Section 3.2 of the DDMP (Appendix B)	The details of monitoring to be undertaken by the project, the parameters to be monitored, the frequency of monitoring and the identification of monitoring locations and described in Section 3.2 of the DDMP.
	(g) the reporting of monitoring and analysis results against relevant criteria; (h) details of the methods that will be used to analyse the monitoring data;	Section 5.3 and Section 5.5 of the DDMP (Appendix B)	Section 5.3 and Section 5.5 of the DDMP details the reporting of monitoring and analysis against relevant criteria as well as the methods that will be used to analyse the monitoring data.
	(i) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and	Section 5.3 of the DDMP (Appendix B)	Procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory are presented in Section 5.3 of the DDMP.

CoA No.	Condition Requirements	Document Reference	How Addressed
	(j) any consultation to be undertaken in relation to the monitoring programs.	Section 2.3 of DDMP (Appendix B)	Section 2.3 of the DDMP details the consultation undertaken during the development of the Program and also the ongoing consultation identified during construction.
C13	The Construction Monitoring Programs must be developed in consultation with the relevant authorities as identified in Condition C9.	Section 2.3 of the DDMP (Appendix B)	The DDMP has been prepared in accordance with this condition and describes how LSBJV propose to manage depositional dust during construction of the Project. The DDMP was provided to the NSW Environment Protection Agency (EPA) in accordance with CoA C9(e), on 27 February 2019. However, the EPA have provided advice to LSBJV that it is their policy not to review environmental management plans or monitoring programs.
C16	The Construction Monitoring Programs, as approved by the Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Secretary, whichever is the greater.	Section 1.2 of the DDMP (Appendix B)	The DDMP will be implemented for the duration of construction as detailed in Section 1.2 of this Program.
C17	The results of the Construction Monitoring Programs must be submitted to the Secretary, and relevant regulatory authorities, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	Section 5.5 of the DDMP (Appendix B)	Section 5.5 of the DDMP details the reporting requirements and the frequency required for this reporting.

Please refer to Appendix A for all other CoA relevant to the development of this Plan.

3.4 Revised Environmental Management Measures

Refer to Appendix A for all REMMs relevant to the development of this Plan.

3.5 Consultation

This plan was provided to EPA, City of Sydney and Inner West Council in accordance with CoA C4 (d) for review and comment.

Refer to Section 2 of the CEMP for consultation requirements relating to the CEMP and all Sub-plans.

Ongoing consultation with relevant councils and other stakeholders, including any unique local receivers, may be undertaken for particular issues pertaining to the Project's impact on air quality. Community feedback and complaints relating to air quality will be dealt with in accordance with the CCS and the Complaints Management System.

4 Existing Environment

Emissions to the atmosphere during construction that could result in adverse impacts to air quality typically consist of dust and particulates, and gases. Factors influencing the current background concentration and potential dispersion of emissions associated with the Project, within and adjacent to the Project corridor, are summarised in the following sections.

4.1 Key reference documents

The key reference documents for this section are:

- Chapter 9 of the EIS (AECOM 2017)
- Volume 2C (Part A) Appendix I: Technical working paper: Air quality – Main report (August 2017) (the Technical working paper)
- Department of Environment, Climate Change and Water, 2010 Current air quality in New South Wales – A technical paper supporting the Clean Air Forum 2010
- Institute of Air Quality Management, 2014. Guidance on the assessment of dust from demolition and construction
- NSW Office of Environment and Heritage, 2015. New South Wales Air Quality Statement 2014
- Permanent International Association of Road Congress, 2008. Road tunnels: a guide to optimising the air quality impact upon the environment.

4.2 Regional and local context

Based on a review of existing land uses in the vicinity of the Project footprint, the existing air quality area is considered to be characteristic of an urban environment. The Project is generally located in the inner west region of Sydney within the Inner West and City of Sydney LGAs. The Project traverses the suburbs of Ashfield, Haberfield, Leichardt, Rozelle, Annandale, Stanmore, Camperdown, Newtown and St Peters.

Existing land use and development within and around the Project footprint contains a mix of residential, commercial and industrial with pockets of open space (refer to Section 12.2.1 of Chapter 12 of the EIS).

The largest waterbodies are located close to the White Bay compound (ie White Bay and Rozelle Bay) and towards the eastern end of the Project, near Sydney Airport (Alexandra Canal at St Peters). Dobroyd Canal (Iron Cove Creek) at Haberfield and Johnstons Creek at Annandale are also located nearby the Project footprint.

There are several major transport corridors and other infrastructure located in or next to the Project footprint, including Victoria Road, City West Link, Parramatta Road, the Princes Highway, Sydney Trains' suburban railway network, and the Inner West Light Rail line corridor. The air quality levels are typical of a highly urbanised environment in close proximity to congested, arterial road networks.

4.3 Air quality records

The Air Quality Technical Working Paper in Section 7.7 concludes that overall construction dust is unlikely to represent a significant ongoing problem. Any potential impacts would be managed in accordance with requirements and mitigation measures outlined in this Plan. Any effects would be temporary and relatively short-lived, and would only arise during dry weather within the wind blowing towards a receptor, at a time when dust is being generated and mitigation measures are

not being fully effective. The likely scale of this would not normally be considered sufficient to change the conclusion that with mitigation measures (refer to Section 6) the effects would not be considered significant.

Section 4.4 summarises climatic factors expected to influence dust-generating air quality impacts associated with the construction of the Project.

4.4 Rainfall, temperature and wind

4.4.1 Rainfall and temperature

The historical records from the Bureau of Meteorology (BoM) weather station at Canterbury Racecourse (site number 066194), have been selected in the EIS to reflect the potential rainfall and temperature conditions as it is broadly representative of the Project area. The annual average daily maximum and minimum temperatures are 23.0 degrees and 12.3 degrees, respectively. On average, January is the hottest month with an average daily maximum temperature of 27.6 degrees. July is the coldest month, with average daily minimum temperature of 5.8 degrees. The wettest month is April, with 111 millimetres failing over eight rainy days. The average annual rainfall is 971 millimetres over an average of 85 rain days per year. Table 4-1 provides the long-term average climate summary for Canterbury Racecourse Automatic Weather Station (AWS).

Table 4-1 Long-term average climate summary for Canterbury Racecourse (AWS)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean daily maximum temperature (°C)												
27.6	27.2	26.0	23.4	20.6	18.1	17.5	19.0	21.9	23.5	24.8	26.3	23.0
Mean daily minimum temperature (°C)												
18.3	18.3	16.5	12.8	9.3	7.1	5.8	6.5	9.5	12.1	14.9	16.7	12.3
Mean monthly rainfall (mm)												
85.2	99.1	74.6	111.0	81.1	108.2	59.5	66.8	46.8	59.0	78.7	64.8	970.9
Mean rain days per month (number)												
8.0	7.6	7.6	7.8	6.9	8.8	6.6	5.3	5.1	6.1	8.1	6.8	84.7

Source: BoM (2017) Climate average for Station: 066194; Commenced: 1995 – last record January 2017; Latitude: 33.91°S; Longitude: 151.11°E

Table 4-1 shows that rainfall is typically higher during summer and autumn months, and the beginning of winter. Winter and spring months are generally drier periods during the year. Climatic factors such as prolonged dry weather, combined with high winds, can increase the likelihood of dust particulate emissions.

4.4.2 Wind

Data relevant to dispersion modelling such as wind speed, wind direction, temperature and cloud cover were obtained for the following:

- OEH meteorological stations:
  - Chullora
  - Earlwood

- Rozelle
- BoM meteorological stations:
  - Canterbury Racecourse AWS (Station No. 066194)
  - Fort Denison (Station No. 066022)
  - Sydney Airport AMO (Station No. 066037)
  - Sydney Olympic Park AWS (Archery Centre) (Station No. 066212)

Data collected shows a high level of year-on-year consistency in the annual average wind speed and annual percentage of calms at each meteorological station. The wind speeds at the BoM Fort Denison and BoM Sydney Airport station were relatively high, with annual averages of 4.2–4.4 metres per second and 5.5–5.37 metres per second, respectively. This is reflective of the exposed nature of these stations and their proximity to large coastal waterbodies; Sydney Harbour and Botany Bay respectively. Wind speeds at Chullora, Earlwood and Rozelle were the lowest, with annual averages of 1.7–2.3 metres per second, 1.3–1.6 metres per second and 1.7–1.8 metre per second. Wind speeds at Canterbury Racecourse were towards the middle of the range for all stations with an annual average of 3.2–3.3 metres per second.

There was also a year-on-year consistency in the annual percentage of periods of calm at each station, although the values at the OEH Chullora and Earlwood stations showed an increasing trend between 2009 and 2015. There were few calm conditions at Fort Denison and Sydney Airport.

Annual and seasonal wind roses created for all seven stations show that the wind patterns at most stations were reasonably consistent from year-to-year, with some slight variation in the seasonal distribution between 2009 and 2015. However, there were some exceptions to this. For example, at the OEH Chullora station the wind patterns between 2009 and 2011 had a general west-south-westerly dominance, but between 2012 and 2015 there was significant change in wind pattern - both annually and by season – with very dominant north-easterly/south-westerly winds not seen in the earlier year. The winter wind roses in particular showed a shift in the dominant winds from mostly westerlies in 2009 to 2011 to south-westerlies in 2012 to 2015.

Wind speed and wind direction influence pollutant concentration and thus the air quality impacts from the construction of the Project. For example, non-buoyant sources, such as road traffic, tend to have the highest concentrations under low wind speed conditions. However, wind-blown dust will increase PM concentrations in the air with increasing wind speed.

Although wind direction varies slightly from year-to-year, due to the urban environment that surrounds the Project (ie temporary ancillary construction facilities will be fenced and much of the works will be underground); wind direction will not be a factor that greatly influences air quality management. The main stockpile at the construction compound closest to a coastal environment (Campbell Road, St Peters), and thus the highest wind speeds, will be fully enclosed within a building/warehouse. Temporary localised stockpiles will be present next to the exhaust shaft opening, air supply shaft and within the cut and cover civil area. These will be managed in accordance with control measures listed in Table 6-1. Other measures, as outlined in Section 6 of this Plan, will be implemented to manage any potential meteorological impacts on air quality.

4.5 Soil Characteristics

The Soil Landscapes of the Sydney 1:100,000 Sheet 9130 (NSW Department of Conservation and Land Management 1989) indicates that the Project footprint is underlain by four soil landscapes. The characteristics and erosion/mass movement potential of each soil type are described in Table 4-2.

Table 4-2 Soil landscape characteristics and erosion potential

Soil landscape	Characteristics	Erosion/mass movement potential
Residual Blacktown	• Occurs on gently undulating rises on Wianamatta Group Shales • Poorly drained.	No appreciable erosion occurs on this landscape as most of the surface is covered by buildings, structures, roads, etc.
Erosional Gymea	• Occurs on undulating to rolling rises and low hills on Hawkesbury Sandstone • Localised steep slopes • High soil erosion hazard.	The soil is generally stabilised by urban infrastructure across the study area, despite the majority of remnant vegetation having been removed.
Colluvial Hawkesbury	• Occurs on rugged, rolling to very steep hills on Hawkesbury Sandstone • Extreme soil erosion and mass movement hazard.	The ground surface is generally stabilised by urban infrastructure across the study area.
Disturbed Terrain	• Terrain extensively disturbed by human activity, including complete disturbance, removal or burial of soil • Variable relief of slopes.	Erosion hazard varies according to site characteristics including slope, aspect and exposure. The ground surface within the study area is generally stabilised by urban infrastructure.

5 Environmental aspects and impacts

5.1 Construction activities

Emissions to the atmosphere during construction that could result in adverse impacts to air quality are typically divided into two categories. These are:

- Dust and particulates
- Gaseous.

Key aspects of the Project that could result in dust and particulate emissions include:

- Building demolition at temporary and permanent ancillary facility sites
- General earthworks
- Vegetation clearing
- Earthworks
- Drilling, excavation and benching
- Surface mining and blasting (Note: if proposed for the Project)
- Roadheader operations
- Operating plant and equipment, crushing and screening
- Cutting, grinding, sawing activities
- Operation of concrete / asphalt agitators
- Erection of demountable buildings at temporary and permanent ancillary facility sites
- Removal of redundant utilities and installation of new utilities
- Removal of loosened material from tunnelling construction works
- Topsoil/material handling including stockpiling, material and spoil loading and material and spoil haulage
- Vehicular movements over unpaved surface (including unsealed access roads)
- Wind erosion of exposed areas and temporary stockpiles
- Archaeological testing, heritage salvation and conservation works (if required)
- Treatment of contaminated sites (if required).

Air emissions, other than dust, which may be generated by construction activities include:

- Vehicle and plant exhaust emissions
- Odours/gases released during:
    - Excavations of organic or contaminated materials
    - Excavation/piling at the Campbell Road, St Peters site (former Alexandra Landfill site)
    - Sealing works
    - Groundwater treatment.

Refer also to the Aspects and Impacts Register included in Appendix A2 of the CEMP.

5.2 Factors likely to affect dust generation and impacts

In addition to the inherent risks of specific construction activities creating the potential to generate dust, a number of other 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
- Wind speed – governs the potential suspension and drift resistance of particles
- Soil type – more erodible soil types have an increased soil or dust erosion potential
- Soil moisture – increased soil moisture reduces soil and dust erosion potential
- Rainfall or dew – rainfall or heavy dew that wets the surface of the soil and reduces the risk of dust generation.

Project related factors that have the potential to affect the likelihood of dust emissions include:

- The size of the site
- Proximity of the construction area to sensitive receivers
- Duration and nature of construction activities
- The number, type and condition of plant and equipment being used
- The duration of use of each item of plant and equipment
- Appropriate operation and maintenance of plant and equipment
- Compliance of plant and equipment with relevant emission standards
- Adequacy of mitigation measures applied to reduce or eliminate dust and offensive odour.

5.3 Impacts

The potential for impacts on air quality will depend on a number of factors. Primarily impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction may occur during work establishment, earthworks, spoil handling, storage and transport and due to plant and vehicle movement and emissions. These are covered in more detail in the following sections. Notwithstanding, as the Project has minimal surface works and the majority of spoil handling will occur within acoustic sheds, along with the implementation of control measures identified in Table 6-1, dust impacts on surrounding receivers are expected to be minimal.

5.3.1 Worksite establishment

The potential impacts related to overall management of air quality during worksite establishment include:

- Dust generation due to:
  - Vegetation clearance, clearing and grubbing
  - Stockpiling of topsoil and mulched vegetation
  - Demolition of buildings and associated infrastructure (asbestos is not addressed in this plan; refer to Asbestos Management Plan)
  - Wind erosion of exposed surfaces and stockpiles
  - Wheel-generated dust from vehicular traffic on unsealed roads and works site access points.
- Particulate matter ($PM_{2.5}$/PM_{10}) generation due to:
  - Operation of construction vehicles, plant and equipment

- Dust generation activities set out above.

5.3.2 Earthworks

The potential impacts related to overall management of air quality during earthworks include:

- Dust generation due to:
  - Drilling
  - Operation of excavators, front end loaders, bulldozers, dump trucks and other plant on exposed surfaces
  - Tunnelling
  - Loading/unloading trucks with spoil and aggregate (including dust generation from within the acoustic sheds)
  - Wind erosion of exposed surfaces and stockpiles
  - Wheel-generated dust from vehicular traffic on unsealed roads and work site access points.
- Particulate matter ($PM_{2.5}$/PM_{10}) generation due to:
  - Operation of construction vehicles and plant
  - Dust generation activities set out above.

5.3.3 Spoil handling, storage and transport

The potential impacts related to overall management of air quality during spoil handling, storage and transport include:

- Dust generation due to:
  - Spoil stockpiles
  - Spoil haulage (uncovered loads)
  - Wheel-generated dust from heavy vehicle movements around construction sites and along haulage routes
- Particulate matter ($PM_{2.5}$/PM_{10}) generation due to:
  - Operation of construction vehicles and plant
  - Dust generating activities set out above.

5.3.4 Plant and vehicle movement and emissions

The potential impacts related to overall management of air quality related to plant and vehicle movement and emissions include:

- Dust generation (wheel generated) from:
  - Construction vehicles
  - Construction equipment, generators and other plant.
- Particulate matter ($PM_{2.5}$/PM_{10}) generation due to:
  - Operation of construction vehicles and plant
  - Dust generating activities set out above.

Some impacts on air quality by the Project have been described in the EIS. Chapter 9 of the EIS, SPIR and this plan provide provides a suite of mitigation measures that will be implemented to avoid or minimise those impacts.

5.3.5 Excavation at Campbell Road, St Peters

A minor portion of the Campbell Road ancillary facility will be located within the former Alexandria Landfill. This site formerly formed part of the New M5 Project Footprint, prior to being handed to LSBJV for the purpose of construction of the Project. In order to minimise potential impacts of construction in this area, major excavations have been designed to occur under the former 'Bradfield Mountain' with non-intrusive activities, being the location of site sheds and car parking, to occur in the area of the former Alexandria Landfill.

In addition to this strategic layout, the following CoAs as identified in Table 5-1 are required to be implemented to ensure the appropriate management of this site, including the potential for methane and odorous gasses.

Table 5-1 Conditions of approval relevant to excavation at Campbell Road, St Peters

CoA	CoA	LSBJV Action
E181	A Site Contamination Report, documenting the outcomes of Phase 1 and Phase 2 contamination assessments of land upon which the CSSI is to be carried out, that is suspected, or known to be, contaminated must be prepared by a suitably qualified and experienced person in accordance with guidelines made or approved under the Contaminated Land Management Act 1997 (NSW).	A Site Contamination Report (SCR) will be prepared documenting the outcomes of Phase 1 and Phase 2 contamination assessments undertaken at the Campbell Road site, as required under this condition.
E182	If a Site Contamination Report prepared under Condition E181 finds such land contains contamination, a site audit is required to determine the suitability of a site for a specified use. If a site audit is required, a Site Audit Statement and Site Audit Report must be prepared by a NSW EPA Accredited Site Auditor. Contaminated land must not be used for the purpose approved under the terms of this approval until a Site Audit Statement is obtained that declares the land is suitable for that purpose and any conditions on the Site Audit Statement have been complied with.	On confirmation of contamination, a Site Audit will be utilised to determine the suitability of this site for the use as a construction area, including placement of site sheds and excavation. This will be undertaken by an appropriately qualified and accredited Site Auditor as required under this condition. This document will include relevant mitigations to ensure appropriate management of all contamination, including methane and/or other potentially offensive odours and any conditions will be implemented for the purpose of construction.
E183	A copy of the Site Audit Statement and Site Audit Report must be submitted to the Secretary and relevant council for information no later than one (1) month prior to the commencement of operation.	A copy of the Site Audit Statement and Site Audit Report will be submitted in accordance with this condition.

6 Environmental control measures

All reasonably practicable environmental control measures will be implemented to minimise the emission of dust and other air pollutants during the construction of the Project. Specific measures and requirements to meet the objectives of this AQMP to address impacts on air quality, including the REMMs provided in the SPIR, are outlined in Table 6-1.

Table 6-1 Air quality management and mitigation measures

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
Planning							
AQ1	Regular communication to be carried out with WestConnex projects under construction in close proximity to ensure that measures are in place to manage cumulative dust impacts.	All sites	CCS	Construction	Foreman	CoA C4 (d) REMM AQ2	CEMP Section 3.7 CCS
AQ2	Ensure air quality risks are considered as part of the development of construction area plans/designs.	All sites		Construction	Engineers Designers	Best practice	Construction area plans/designs
AQ3	All construction activities will be planned and carried out to avoid where practicable, or minimise, the generation of dust and vehicle emissions.	All sites		Construction	Foreman Engineers	Best practice	Construction area plans/designs
Incident management							
AQ4	All incidents which cause or are likely to cause material harm to the environment are to be immediately reported to the EPA and other authorities as per the Pollution Incident Response Management Plan (PIRMP).	All sites		Construction	Environment and Sustainability Manager Foreman	POEO Act	LLE702 Environmental Incident Report (internal document)

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
AQ5	Display the name and contact details of person(s) accountable for air quality and dust issues at the boundaries of each construction area. Display also the head or regional office contact information.	All sites	Project Hoarding	Construction	Area Manager Foreman	Best practice	Section 3.3 of the CEMP CCS
Dust management							
AQ6	Construction activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation.	All sites		Construction	Environment and Sustainability Manager Foreman	REMM AQ4	Daily Pre-Start Inspections
AQ7	Appropriate measures to reduce potential dust generation, such as the use of water carts, sprinklers, dust screens and surface treatments, will be implemented within Project sites as required. These controls will also be implemented to reduce the emission of dust out of the door openings of acoustic sheds.	All sites	Water carts, sprinklers, dust screens, sheds and surface treatments	Pre-construction Construction	Area Manager Foreman	REMM AQ5 REMM AQ1	Daily Pre-Start Inspections
AQ8	Access roads within Project sites will be maintained and managed to reduce dust generation.	All sites	Street sweeper Sealed surfaces (eg chip seal, concrete,	Construction	Foreman	REMM AQ6	Daily Pre-Start Inspections

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
			asphalt and soil binders specific to haul roads) Wheel washes / or rumble grids				
AQ9	Where reasonable and feasible, appropriate control methods will be implemented to minimise dust emissions from the Project site.	All sites	Gurneys Hoses Sprinklers	Construction	Project Manager Environment and Sustainability Manager Foreman Engineer	REMM AQ7	LLE703A Environmental Inspection Checklist (internal document)
AQ10	Storage of materials that have the potential to result in dust generation will be minimised within Project sites at all times.	All sites	Site enclosures Soil binders	Construction	Foreman Engineers	REMM AQ8	LLE703A Environmental Inspection Checklist (internal document)
AQ11	Construction activities may be modified, reduced or controlled during high or unfavourable wind conditions if they have the potential to increase the emission of dust.	All sites	Weather Station	Construction	Environment and Sustainability Manager Foreman	Best practice	Daily Pre-Start Inspections

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
AQ12	During high wind and/or dry conditions, programming of dust generating activities is to be considered in order to reduce nuisance to neighbouring properties.	Wattle St Northcote St Site Campbell Rd Parramatta Rd sites PBR	Engineers	Construction	Foreman	Best practice	Daily Pre-Start Inspections
AQ13	Suitable dust suppression and/or collection techniques will be used during cutting, grinding or sawing activities likely to generate dust in close proximity to sensitive receivers.	Wattle St Northcote St Site Parramatta Rd sites Campbell Rd PBR	Sucker truck	Construction	Foreman	REMM AQ13	LLE703A Environmental Inspection Checklist (internal document) Environmental Audit Checklists
AQ14	The potential for dust generation will be considered during the handling of loose materials. Equipment will be selected and handling protocols developed to minimise the potential for dust generation.	Wattle St Northcote St Site PBR Campbell Rd	Sucker truck Sprinklers	Construction	Environment and Sustainability Manager Foreman	REMM AQ14	LLE703A Environmental Inspection Checklist (internal document)
AQ15	All loaded spoil haulage trucks and other Project-related heavy vehicles carrying materials with the potential to result in dust generation will be	All sites	Trailer covers	Construction	Environment and Sustainability Manager	REMM AQ15	LLE703A Environmental Inspection Checklist

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
	covered to prevent dust emissions during transport in accordance with relevant road regulations.				Foreman		(internal document) Environmental Audit Checklists
AQ16	Demolition activities will be planned and carried out to minimise the potential for dust generation.	Parramatta Rd sites PBR	Gurneys Hoses	Construction	Project Manager Engineer Environment and Sustainability Manager Foreman	REMM AQ16	Daily Pre-Start Inspections LLE703A Environmental Inspection Checklist (internal document)
AQ17	Adequate dust suppression will be applied during all demolition works required to facilitate the Project.	Parramatta Rd sites PBR	Sprinklers Soil binders Gurneys Hoses	Construction	Engineer Foreman	REMM AQ17	LLE703A Environmental Inspection Checklist (internal document) Environmental Audit Checklists
Dust generation - mitigation specific to earthworks and tunnel works							
AQ18	Areas of soil exposed during construction will be minimised at all times to reduce the potential for dust	All sites	Soil binders and cover crop	Construction	Environment and	REMM AQ19 Best practice	LLE703A Environmental Inspection

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
	generation. Exposed areas will be revegetated as soon as reasonable and feasible.		Staging work Geofabric		Sustainability Manager Forman		Checklist (internal document) Environmental Audit Checklists
AQ19	Exposed soils will be temporarily stabilised during weather conditions conducive to dust generation and prior to extended periods of inactivity to minimise dust generation.	All sites	Soil binders	Construction	Environment and Sustainability Manager Forman	REMM AQ20	LLE703A Environmental Inspection Checklist (internal document) Environmental Audit Checklists
AQ20	Exposed soils will be permanently stabilised as soon as practicable following disturbance to minimise the potential for ongoing dust generation.	Wattle St Northcote St Site PBR Campbell Rd	Soil binders Revegetation Landscaping Hardstand	Construction	Environment and Sustainability Manager Forman	REMM AQ21	LLE703A Environmental Inspection Checklist (internal document) Environmental Audit Checklists
AQ21	Ensure fine materials are stored and handled to minimise dust.	Wattle St Northcote St Site	Sprinklers Soil binders	Construction	Forman	REMM AQ23	LLE703A Environmental Inspection Checklist

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
		PBR Campbell Rd	Geofabrics/plastics				(internal document) Environmental Audit Checklists
AQ22	All sealed surfaces within sites and site accesses will be managed to reduce dust generation and sediment tracking onto roads.	All sites	Street sweeper Wheel washes Rumble grids, wetting systems, segregation (clean/dirty areas)	Construction	Project Manager Environment and Sustainability Manager Forman	REMM AQ24	LLE703A Environmental Inspection Checklist (internal document) Environmental Audit Checklists
AQ23	Controls such as wheel washing systems and rumble grids will be installed at all site exits to prevent deposition of loose material on sealed surfaces outside Project sites to reduce potential dust generation. A regular review of the effectiveness of wheel washes and rumble grids will be undertaken throughout construction.	All sites	Wheel washes/rumble grids	Pre-construction Construction	Engineer Project Manager	REMM AQ25	Construction area plans/designs LLE703A Environmental Inspection Checklist (internal document)
AQ24	Stockpile management will be implemented to control dust, odour,	Wattle St	Water carts	Construction	Foreman	REMM CM05 REMM RW11	Refer to SSWMP

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
	cross contamination, erosion and sedimentation.	Northcote St Site PBR Campbell Rd	Stockpile compaction Soil binders				
AQ25	Ensure that stockpiles of materials with the potential to result in dust emissions outside of acoustic sheds for greater than five days are adequately protected and managed to reduce potential dust generation as soon as practicable.	Wattle St Northcote St Site PBR Campbell Rd	Soil binders Geofabrics/plastics	Construction	Foreman	REMM AQ22 EPL O5.8	Daily Pre-Start Inspections LLE703A Environmental Inspection Checklist (internal document)
AQ26	Haul roads will be treated with water carts and monitored during earthworks operations, ceasing works if necessary during high winds where dust controls are not effective.	Wattle St Northcote St Site Campbell Rd PBR	Water carts	Construction	Foreman	REMM AQ12	LLE703A Environmental Inspection Checklist (internal document) Environmental Audit Checklists
AQ27	Sweep (not wash into drains) accumulated sediment from public roads; remove mud from wheels and	All sites	Street sweepers	Construction	Foreman	Best practice	LLE703A Environmental Inspection Checklist

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
	bodies of haulage plant before they enter public roads.						(internal document)
AQ28	Long term stockpiles of top soil will have cover crop established. Long term stockpiles of all other material will be appropriately covered to prevent air quality impacts.	Northcote St Site Campbell Rd	Seed cover Geofabrics/ plastics	Construction	Engineer	Best practice REMM RW11	Construction area plans/designs Refer to SSWMP
AQ29	Areas surrounding tunnel door sheds and portals will be will be managed to ensure that dust generation is minimised.	Wattle St Northcote St Site PBR Campbell St	Water carts Wetting systems Segregation (clean/dirty areas)	Construction	Foreman	REMM AQ1	LLE703A Environmental Inspection Checklist (internal document)
AQ30	Dust generation from tunnelling activities will be minimised through the implementation of a dust extraction and filtration system.	Wattle St Northcote St Site PBR Campbell St	Dust extraction and filtration system	Construction	Foreman	REMM AQ1	LLE703A Environmental Inspection Checklist (internal document)
AQ31	Tunnel works are to have a dedicated dust collection and ventilation system. During tunnel construction, air would be ventilated through a filter until such that discharged air meets the	Wattle St Northcote St Site PBR Campbell St	Dust extraction and filtration system	Construction	Environment and Sustainability Manager	Best practice	LLE703A Environmental Inspection Checklist (internal document)

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
	requirements of the POEO (Clean Air) Regulations (as amended)."						
Operating vehicle/machinery and sustainable travel							
AQ32	All construction vehicles and plant will be inspected regularly and maintained to ensure that they comply with relevant emission standards.	All sites		Construction	Environment and Sustainability Manager Plant manager Foreman	REMM AQ9 Series 700	Plant and equipment records
AQ33	Engine idling will be minimised when plant is stationary, and plant will be switched off when not in use to reduce emissions.	All sites		Construction	Foreman Plant Operators	REMM AQ10	LLE703A Environmental Inspection Checklist (internal document)
AQ34	The use of mains electricity will be favoured over diesel or petrol-powered generators where practicable to reduce site emissions.	All sites		Construction	Procurement team	REMM AQ11	Procurement assessment records
AQ35	Construction plant and equipment will be operated and maintained to maximise efficiency and reduce emissions, with construction planning used to minimise vehicle wait times and idling onsite and	All sites		Construction	Plant Manager Foreman	REMM GHG4	Plant and equipment records

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
	machinery turned off when not in use.						
Odour							
AQ36	In the event of uncovering waste with a noxious odour, or detection of nuisance odours (nuisance to workers or confirmed beyond landfill boundaries), construction personnel will, investigate and report the odour source to the Environment and Sustainability Manager for further investigation and implementation of management measures as required.	All sites	Application of odour suppressants	Construction	Foreman Area Manager Engineers Environment and Sustainability Manager	Best practice	Induction material
Other							
AQ37	Ensure that Project specific control measures are communicated and documented into work plans.	All sites	Environmental Work Method Statements (EWMS)	Construction	Project Manger Environment and Sustainability Manager	Best practice	EWMS
AQ38	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.	All sites	Environmental Work Method Statements (EWMS)	Construction	Foreman	Best practice	EWMS

ID	Measure/Requirement	Relevant sites	Resources needed	When to implement	Responsibility	Reference	Evidence
AQ39	Outcomes and recommendations of the Soil Contamination Report and Site Audit Statement will be implemented.	All sites (as applicable)	Soil Contamination Report Site Auditor Statement	Pre-construction Construction	Project Manager Environment and Sustainability Manager Foreman	CoA E181 CoA E182	EWMS
AQ40	All site personnel must report observations of release of dust from the premises to supervisory staff so that appropriate management measures can be implemented.	All sites		Pre-construction Construction	All staff	EPL	Informal site observations LLE703A Environmental Inspection Checklist (internal document)

Refer to Section 4.15 of the CEMP for figure and description of all temporary construction ancillary facilities (relevant sites column, Table 6-2).

7 Compliance management

7.1 Roles and responsibilities

The LSBJV Project Team's organisational structure and overall roles and responsibilities are outlined in Section 3.3 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 6 of this Plan.

7.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to air quality issues. The induction training will address elements related to air quality management including:

- Requirements of this Plan
- Applicable and relevant legislative requirements
- Roles and responsibilities for air quality management
- Typical construction activities that may impact air quality and associated environmental mitigation and management measures
- Incident response procedure.

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in air quality management. Examples of training topics would include:

- Potential sources of dust, emissions and other air pollutants
- Impacts to the environment and surrounding community
- Planning and preparedness for high wind events and dust risk periods
- Erosion and sediment controls installation methods.

Further details about staff induction and training are outlined in Section 3.5 of the CEMP.

7.3 Monitoring and inspection

Visual monitoring and inspections

Regular monitoring and inspections will be carried out during construction in accordance with the LLE703 Environmental Monitoring and Inspection procedure (internal document). Monitoring and inspections will include, but are not limited to:

- Daily site inspections by the Foreman and environmental team to identify and action any air quality issues related to:
    - Visible dust emissions
    - Implementation and effectiveness of all dust controls
    - Minimising gaseous emissions
    - No continuous visible vehicle/plant/equipment emissions for longer than 10 seconds as per the POEO Clean Air Regulation
    - No mud tracking off-site; check main exit/entry points and material on public roads
    - No detectable offensive odours and gases (eg inspection of potential odour sources including freshly disturbed areas, open stockpiles, water treatment plants, waste skips, etc)

- 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 the site office is established
- Weather forecast (eg rainfall) will be checked daily to allow for proactive dust management actions to be implemented.

- Documented site inspections by the Foreman and environmental team while construction works are occurring. The frequency of these inspections is to be reflective of the risk associated with potential impacts. The objectives of the inspections are to identify and action any air quality issues related to:
  - Visual monitoring of dust and gaseous emissions
  - Haul road integrity to be maintained
  - Any other relevant mitigation measures listed in Table 6-1 Air quality management and mitigation measures. An adaptive approach to dust management will be implemented, where mitigation measures will be amended and improved if they are found not be meeting the required outcomes.
- Pre-use plant inspections will be conducted and recorded to ensure that plant is in good working order and ensure no continuous visible emissions for longer than 10 seconds.

The weekly site inspections, required actions and ongoing issues will be recorded and actioned appropriately within agreed timeframes by relevant Project personnel. These inspections are to be recorded on LLE703A Environmental Inspection Checklist (internal document).

Additional requirements and responsibilities in relation to inspections are documented in Section 3.9.1 and Section 3.9.2 of the CEMP.

Dust Deposition Monitoring Program

Dust deposition monitoring will be undertaken in accordance with the DDMP (Appendix B). Dust deposition monitoring will be carried out throughout the construction phase in accordance with the NSW EPA Approved Methods and EPA Approved Modelling and Assessment Methods.

Dust deposition gauges will be located in proximity to each of the constructions compounds listed below. Precise locations for the gauges will be determined in accordance with the above guidelines and in consultation with the relevant landowner, where necessary:

- Wattle Street ramps, Haberfield
- Northcote Street, Haberfield
- Parramatta Road, Ashfield/Haberfield
- Pyrmont Bridge Road, Camperdown/Annandale
- Campbell Road, St Peters.

The DDMP provides detailed inspection criteria including:

- Parameters to be monitored
- Type and frequency of monitoring
- Monitoring methodology.

The Environment and Sustainability Manager for the Project will be responsible for reporting the results, as agreed with relevant regulatory agency and as per EPL specifications. Licences and permits.

An EPL has been obtained for the scheduled activity of “road construction” and issued on 8 October 2018 (EPL# 21149). EPL conditions relating to air quality will be complied with.

7.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, CoA and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 3.9.3 of the CEMP.

7.5 Reporting

Project reporting requirements relevant to the management of air quality are identified in Table 7-1.

Table 7-1 Reporting requirements

Item	Frequency	Standards	External reporting	Responsibility
Incidents and exceedances	As required	As required by the EPL, PIRMP, approval, RMS Environmental Incident Classification and Reporting procedure, and RMS Environment incident report.	Appropriate authority ER	Environment and Sustainability Manager, Foreman or delegate
Complaints	As notified	Communication, notification and complaints handling requirements regarding air quality matters will be managed through the Complaints Management System and the CCS.	As requested by the Secretary of DPE EPA ER	Environment and Sustainability Manager, Foreman or delegate
GREP	Annually (before 31 July) and on completion of construction	Reporting on the conformity, or otherwise, of mobile non-road diesel and plant equipment used for the Work Under deed with the relevant United States Environment Protection Authority (US EPA), European Union (EU) standards or approved equivalent emission standards. The report will be prepared in accordance with the GREP "Clean Air data management tool", which details the types of diesel plant and equipment that are to be included and excluded.	RMS	Project Manager Environment and Sustainability Manager

Item	Frequency	Standards	External reporting	Responsibility
DDMP	Bi-annual	Data summary reports presenting tabulated dust deposition monitoring data collected during the reporting period. Dust deposition monitoring results will be presented and performance criteria exceedances will be highlighted. Applicable management responses will be documented.	EPA DPE	Environment and Sustainability Manager

All other legislative reporting requirements and responsibilities are documented in Section 3.9.5 of the CEMP.

For incident management and emergency management process refer to Section 3.8 of the CEMP.

8 Review and improvement

8.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets
- Review contractual and legislative requirements.

8.2 AQMP update and amendment

The processes described in Section 3.9 to Section 3.13 of the CEMP may result in the need to update or revise this Plan.

Only the Environment and Sustainability Manager, or delegate, has the authority to change any of the environmental management documentation. The ER can approve minor amendments to the Plan.

Any reviews to the AQMP will be in accordance with the process outlined in Section 1.5 of the CEMP.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 3.11.2 of the CEMP.

Appendix A – Other Conditions of Approval and Revised Environmental Management Measures relevant to this Plan

Other Conditions of Approval relevant to the development of this Plan

CoA No.	Condition Requirements	Document Reference
E1	In addition to the performance outcomes, commitments and mitigation measures specified in the documents listed in Condition A1, all reasonably practicable measures must be implemented to minimise the emission of dust and other air pollutants during the construction and operation of the CSSI.	Table 6.1
E181	A Site Contamination Report, documenting the outcomes of Phase 1 and Phase 2 contamination assessments of land upon which the CSSI is to be carried out, that is suspected, or known to be, contaminated must be prepared by a suitably qualified and experienced person in accordance with guidelines made or approved under the *Contaminated Land Management Act 1997* (NSW).	Section 5.3.5 Table 6-1 AQ39
E182	If a Site Contamination Report prepared under Condition E181 finds such land contains contamination, a site audit is required to determine the suitability of a site for a specified use. If a site audit is required, a Site Audit Statement and Site Audit Report must be prepared by a NSW EPA Accredited Site Auditor, Contaminated land must not be used for the purpose approved under the terms of this approval until a Site Audit Statement is obtained that declares the land is suitable for that purpose and any conditions on the Site Audit Statement have been complied with.	Section 5.3.5 Table 6-1 AQ39
E183	A copy of the Site Audit Statement and Site Audit Report must be submitted to the Secretary and relevant council for information no later than one (1) month prior to the commencement of operation.	Section 5.3.5

Revised Environmental Management Measures relevant to the development of this Plan

Outcome	Ref REMM #	Commitment	Timing	AQMP Reference
Legislative compliance and air quality management	AQ1	A Construction Air Quality Management Plan will be developed and implemented to monitor and manage potential air quality impacts associated with the construction of the Project. The management plan will include controls required to reduce the emission of dust from the acoustic sheds. The Plan will be implemented for the duration of the construction.	Construction	This Plan Table 6.1 AQ7
Legislative compliance and air quality management	AQ2	Regular communication to be carried out with other WestConnex projects under construction in close proximity to ensure that measures are in place to manage cumulative dust impacts.	Construction	Table 6.1 AQ1
Dust management	AQ3	Regular site inspections will be conducted to monitor potential dust issues. The site inspections, required actions and ongoing issues will be recorded and actioned appropriately within agreed timeframes by relevant Project personnel.	Construction	Section **Error! Reference source not found.**
Dust management	AQ4	Construction activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation.	Construction	Table 6.1 AQ6
Dust management	AQ5	Measures to reduce potential dust generation, such as the use of water carts, sprinklers, dust screens and surface treatments, will be implemented within Project sites as required.	Construction	Table 6.1 AQ7

Outcome	Ref REMM #	Commitment	Timing	AQMP Reference
Dust management	AQ6	Access roads within Project sites will be maintained and managed to reduce dust generation.	Construction	Table 6-1 AQ8
Dust management	AQ7	Where reasonable and feasible, appropriate control methods will be implemented to minimise dust emissions from the Project site.	Construction	Table 6-1 AQ9
Dust management	AQ8	Storage of materials that have the potential to result in dust generation will be minimised within Project sites at all times.	Construction	Table 6-1 AQ10
Emission management	AQ9	All construction vehicles and plant will be inspected regularly and maintained to ensure that they comply with relevant emission standards.	Construction	Table 6-1 6 AQ33
Emission management	AQ10	Engine idling will be minimised when plant is stationary, and plant will be switched off when not in use to reduce emissions.	Construction	Table 6-1 AQ33
Emission management	AQ11	The use of mains electricity will be favoured over diesel or petrol-powered generators where practicable to reduce site emissions.	Construction	Table 6-1 AQ34
Dust management	AQ12	Haul roads will be treated with water carts and monitored during earthworks operations, ceasing works if necessary during high winds where dust controls are not effective.	Construction	Table 6-1 AQ26
Dust management	AQ13	Suitable dust suppression and/or collection techniques will be used during cutting, grinding or sawing activities likely to generate dust in close proximity to sensitive receivers.	Construction	Table 6-1 AQ13

Outcome	Ref REMM #	Commitment	Timing	AQMP Reference
Dust management	AQ14	The potential for dust generation will be considered during the handling of loose materials. Equipment will be selected and handling protocols developed to minimise the potential for dust generation.	Construction	Table 6-1 AQ14
Dust management	AQ15	All loaded spoil haulage trucks and other Project-related heavy vehicles carrying materials with the potential to result in dust generation will be covered to prevent dust emissions during transport in accordance with relevant road regulations.	Construction	Table 6-1 AQ15
Dust management	AQ16	Demolition activities will be planned and carried out to minimise the potential for dust generation.	Construction	Table 6-1 AQ16
Dust management	AQ17	Adequate dust suppression will be applied during all demolition works required to facilitate the Project.	Construction	Table 6-1 AQ17
Dust management	AQ19	Areas of soil exposed during construction will be minimised at all times to reduce the potential for dust generation.	Construction	Table 6-1 AQ18
Dust management	AQ20	Exposed soils will be temporarily stabilised during weather conditions conducive to dust generation and prior to extended periods of inactivity to minimise dust generation.	Construction	Table 6-1 AQ19
Dust management	AQ21	Exposed soils will be permanently stabilised as soon as practicable following disturbance to minimise the potential for ongoing dust generation.	Construction	Table 6-1 AQ20

Outcome	Ref REMM #	Commitment	Timing	AQMP Reference
Dust management	AQ22	Ensure that stockpiles of materials with the potential to result in dust emissions are adequately protected and managed to reduce potential dust generation.	Construction	Table 6-1 AQ25
Dust management	AQ23	Ensure fine materials are stored and handled to minimise dust.	Construction	Table 6-1 AQ21
Dust management	AQ24	All sealed surfaces within sites and site accesses will be managed to reduce dust generation and sediment tracking onto roads.	Construction	Table 6-1 AQ22
Dust management	AQ25	At the commencement of establishment of Project ancillary facilities, controls such as wheel washing systems and/or rumble grids will be installed at all site exits to prevent deposition of loose material on sealed surfaces outside Project sites to reduce potential dust generation.	Construction	Table 6-1 AQ23
Dust management	CM05	Stockpile management procedures will be implemented to control dust, odour and cross contamination.	Construction	Table 6-1 AQ24
Emission management	GHG4	Construction plant and equipment will be operated and maintained to maximise efficiency and reduce emissions, with construction planning used to minimise vehicle wait times and idling onsite and machinery turned off when not in use.	Construction	Table 6-1 AQ35
Stockpile management	RW11	Spoil stockpiles will be provided with appropriate environmental controls and managed to reduce potential impacts associated with dust generation, erosion and sedimentation.	Construction	Table 6-1 AQ24 and AQ28

Appendix B – Dust Deposition Monitoring Program

Appendix B

Dust Deposition Monitoring Program

M4-M5 Link Mainline Tunnels

February 2019

THIS PAGE LEFT INTENTIONALLY BLANK

Contents

Tables

Figures

Document control

Approval and authorisation

Title	M4-M5 Link Mainline Tunnels Dust Deposition Monitoring Program
Document No/Ref	M4M5-LSBJ-PRW-EN-MP01-PLN-0025-B
Document Path	

Document status

Revision	Date	Description
A	5 February 2019	First draft for LSBJV review
B	5 February 2019	Draft for EPA, SMC RMS and ER review
C	27 February 2019	Prepared for DPE approval

1 Introduction

1.1 Context

This Dust Deposition Monitoring Program (DDMP or Program) has been prepared for the construction stage of the M4-M5 Link Mainline Tunnels (the Project). The Program forms Appendix B of the Air Quality Management Sub-plan (AQMP).

The DDMP addresses the requirements of the Minister's Conditions of Approval (CoA) as modified 25 February 2019, the WestConnex M4-M5 Link Environmental Impact Statement (EIS), the revised environmental management measures (REMM) listed in the WestConnex M4-M5 Link Submissions and Preferred Infrastructure Report (SPIR) and all applicable guidance and legislation.

1.2 Scope of the dust deposition monitoring program

The scope of this DDMP is to describe how Lendlease Samsung Bouygues Joint Venture (LSBJV) propose to monitor potential dust deposition impacts during the construction of the Project. Operational monitoring and operation measures do not fall within the scope of the construction phase and therefore are not included within the processes contained within the DDMP.

2 Purpose and objectives

2.1 Purpose

The purpose of the DDMP is to describe how LSBJV propose to monitor dust deposition during construction of the Project. LSBJV will monitor the extent and nature of potential impacts relating to dust deposition during construction of the Project.

The DDMP will be implemented to monitor the effectiveness of dust mitigation measures applied during the construction phase of the Project. Monitoring of dust deposition will be undertaken to identify potential impacts and ensure a comprehensive management regime can be implemented to address those impacts and manage local air quality.

This Program provides details of the dust deposition monitoring network, frequency of monitoring, and test parameters. This DDMP supplements the AQMP, which itself is an appendix of the Construction Environmental Management Plan (CEMP).

2.2 Objectives

The key objective of the DDMP is to ensure all CoA, REMM, and licence/permit requirements relevant to dust deposition monitoring are described, scheduled, and assigned responsibility as outlined in:

- The EIS prepared for WestConnex M4-M5 Link
- The SPIR prepared for WestConnex M4-M5 Link
- The Modification report for WestConnex M4-M5 Link Mainline Tunnel (September 2018)
- Conditions of Approval granted to the Project on 17 April 2018 and as modified on 25 February 2019
- Roads and Maritime specifications G36, G38 and G40
- The Project's Environment Protection Licence (EPL)
- All relevant legislation and other requirements described in Section 3 of the AQMP.

2.3 Consultation

This Program is required to be provided to the NSW Environment Protection Agency (EPA) in accordance with CoA C9(e). This Program was provided to the NSW Environment Protection Agency (EPA) in accordance with CoA C9(e), on 27 February 2019. However, the EPA have provided advice to LSBJV that it is their policy not to review environmental management plans or monitoring programs. Refer to Section 2 of the CEMP for consultation requirements relating to the CEMP and all sub-plans.

Ongoing consultation with relevant councils and other stakeholders, including any unique local receivers, may be undertaken for particular issues pertaining to the Project's impact in relation to dust deposition. Community feedback and complaints relating to dust deposition will be dealt with in accordance with the Community Communication Strategy and Complaints Management System. This DDMP was provided to the EPA for review and comment.

3 Dust deposition monitoring

3.1 Baseline monitoring

3.1.1 Overview

Baseline monitoring data for dust deposition was not undertaken during the EIS. Additionally; a review of the EPA's Sydney air quality monitoring stations identified that the EPA do not measure dust deposition as part of their air quality monitoring program. Therefore, no baseline data for dust deposition can be presented.

The EPA criteria of 4g/m²/month as detailed in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (2016) will be used in place of baseline data.

3.2 Construction monitoring

3.2.1 Overview

Dust deposition gauges record airborne dust which can be derived from construction activities, and provide a useful measure of changing local air quality. A total network of five dust deposition gauges will be installed for the project (refer to Figure 3-1 for dust deposition monitoring locations). Data from these gauges enables determination of dust deposition levels at the relevant ancillary facility.

3.2.2 Performance criteria

The EPA expresses dust deposition criteria in two ways. Firstly; in terms of an acceptable increase in dust deposition over the existing background/baseline deposition levels. As background/baseline dust deposition levels are not available this criterion has not currently been adopted.

The second criteria is a measure of maximum total dust deposition levels. This criterion has currently been adopted for the Project. The long-term (annual average) EPA criteria for depositional dust that apply to the Project are provided in Table 3-1.

Table 3-1 Long-term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum total[1] deposited dust level
Deposited dust	Annual	4g/m²/month

[1] Total impact (i.e. concentrations due to the Project plus background concentrations due to other sources)

Monitoring will be undertaken for the duration of construction.

It should be noted that as the Project is located in an urban environment, and in the absence of background/baseline data, there is potential that existing deposited dust levels may already be in exceedance of the criteria listed in Table 3-1. Regardless, in the event that the above trigger is observed, a review will be initiated to determine the significance of the exceedance(s) and possible causes. The review will assess the dust deposition data, recent weather records, and recent activities or recorded air quality control incidents occurring at the relevant ancillary facility. In addition; the review will also identify what, if any, dust minimisation improvements can be made.

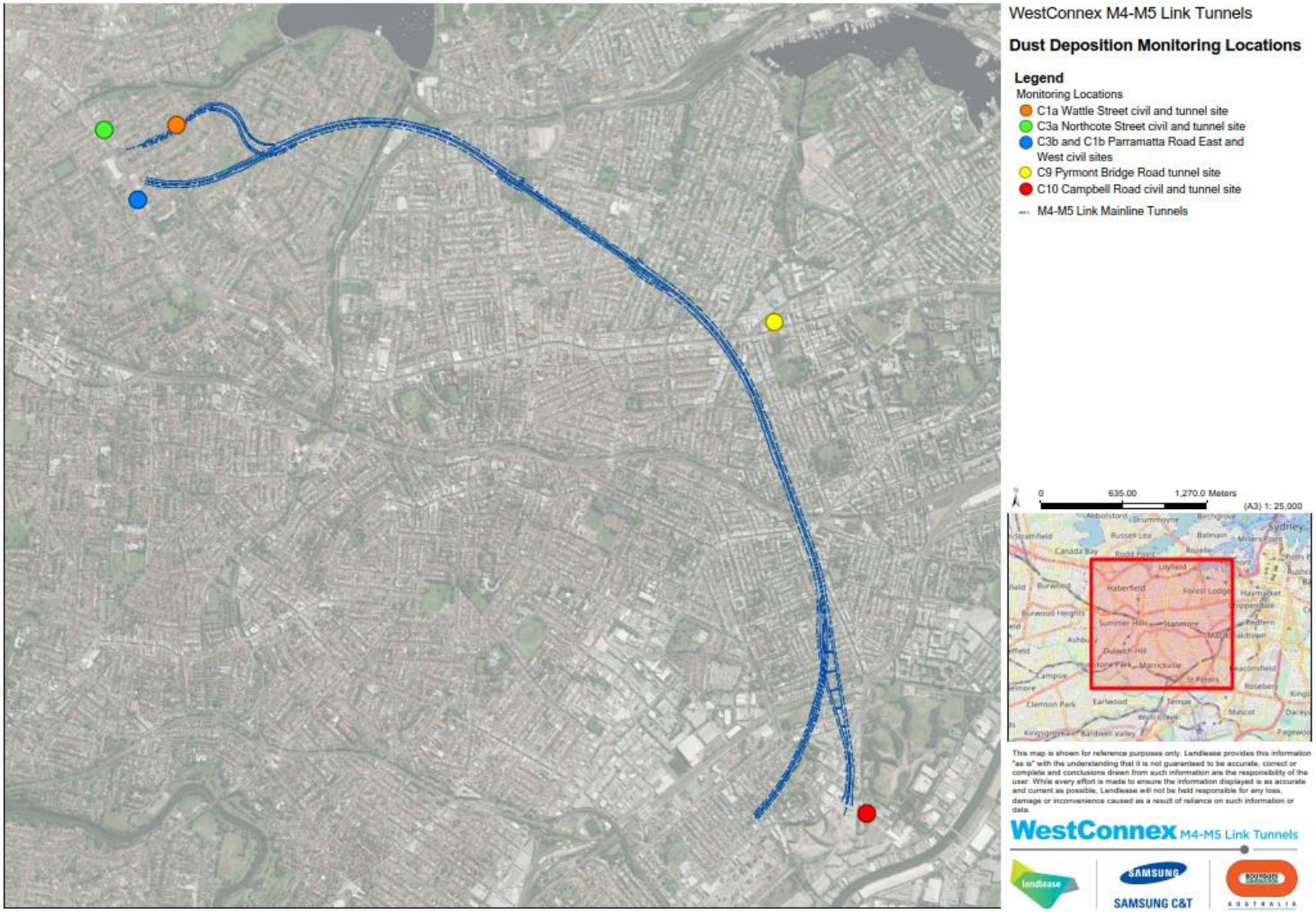

Figure 3-1 Dust deposition monitoring locations

4 Monitoring methodology / Sampling protocol

4.1 Monitoring location selection

Monitoring will be undertaken using dust deposition gauges located at each of the Project ancillary facilities, as identified in Figure 3-1. The specific locations for each of the sampling locations will be selected in accordance with AS/NZS 3580.1.1 2016, *Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment*, as far as practicable. The requirements of AS/NZS 3580.1.1 2016 are outlined in Table 4-1 below.

Table 4-1 Locating criteria

Pollutant	Type of Monitoring station	Height above ground	Other locating criteria (minimum requirements)[1]
Deposited matter	Peak, neighbourhood and background	1.8-2.2m	• Clear sky angle 120° • Unrestricted airflow of 360° around sample gauge • 10m from nearest object or tree dripline • 5m from road • No boiler or incinerator flues nearby

[1] As detailed in AS/NZS 3580.1.1 2016, where these distances are not possible justification will be provided as to site selection.

4.2 Sample collection and laboratory analysis

The dust deposition gauges will be collected, and replaced, from site every 30 ± 2 days and then analysed for insoluble solids. Analysis will be undertaken by a National Association of Testing Authorities (NATA) accredited laboratory. Monitoring for depositional dust must comply with AS/NZS 3580.10.1-2016, *Methods for sampling and analysis of ambient air – Determination of particulates – Deposited Matter – Gravimetric Method* and the NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (2016).

4.3 Quality Assurance and documentation

Quality assurance and control protocols during sampling and recording parameters will be undertaken every 30 ± 2 days (each sampling event) in accordance with AS/NZS 3580.10.1-2016, *Methods for sampling and analysis of ambient air – Determination of particulates – Deposited Matter – Gravimetric Method* to ensure the integrity of the dataset.

Samples are to be transported to a NATA-accredited laboratory under documented chain-of-custody protocols.

Field results will be checked for accuracy before leaving the site and errors or discrepancies will be cross-checked and further investigation initiated if required.

Monitoring records will be maintained in accordance with the appropriate standard.

4.4 Meteorological monitoring

Meteorological monitoring is being undertaken using data from the Bureau of Meteorology weather station at Sydney Airport AMO, Sydney (Observatory Hill) and Canterbury Racecourse AWS. This is consistent with the *Approved Methods of the Sampling and Analysis of Air Pollutants in NSW* (DEC, 2006). This is considered to provide representative weather data for the project including; including wind speed and direction, solar radiation, humidity, rainfall and temperature.

5 Compliance management

5.1 Roles, responsibility, and training

The LSBJV Project Team's organisational structure and overall roles and responsibilities are outlined in Section 3.3 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in the AQMP.

All employees, contractors and utility staff working on site will undergo site induction and targeted training relating to air quality management issues, detailed in the AQMP.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

5.2 Monitoring and inspection

Sections 3 and 4 of this DDMP provide detailed criteria including:

- Dust deposition monitoring locations
- Parameters/analytes to be monitored
- Type of monitoring
- Frequency of monitoring
- Monitoring methodology.

LSBJV's Environmental Management System internal documents relevant to this DDMP are:

- LLE702A - Environmental Incident Report (internal document)
- LLE702B - Environmental Incident Investigation (internal document)
- LLE703A - Environmental Inspection Checklist (internal document)
- LLE703B - Environmental Observation Report (internal document)
- LLE703C - Environmental Improvement Notice (internal document)

Additional requirements and responsibilities in relation to inspections are documented in Section 3.9.1 and Section 3.9.2 of the CEMP.

5.3 Data analysis and management response

Results from the construction monitoring program will be compared with the assessment criteria and with previous results.

Monthly monitoring results for dust deposition will be compared against the assessment criteria (Table 3-1), and reported in the construction compliance monitoring reports (Section 5.5). If the assessment criteria are exceeded, a review will be initiated to determine the significance of the exceedance(s) and possible causes. The review will assess the dust deposition data, recent weather data, and recent activities or air quality incidents occurring at the relevant ancillary facility site.

5.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this Program, CoA, and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 3.9.3 of the CEMP.

5.5 Reporting

During construction, dust deposition data will be collected, tabulated and assessed against performance criteria.

Reporting requirements associated with the Program for the construction phase of the Project are presented in Table 5-1.

Table 5-1 Reporting requirements

Schedule (during construction)	Requirements	Recipient (relevant authority)
Dust Deposition Monitoring Reports (every six months)	Data summary reports presenting tabulated dust deposition monitoring data collected during the reporting period. Dust deposition monitoring results will be presented and performance criteria exceedances will be highlighted. Applicable management responses will be documented.	EPA DPE

6 Review and improvement

6.1 Continuous improvement

Monitoring data will be reviewed throughout the construction period to provide potential requirements to increase, or decrease, the number of sampling locations and/or the analytical suites. Alterations to monitoring locations, analytical suites, or frequencies will be reported in the Dust Deposition Monitoring Reports (Section 5.5).

Continuous improvement of this Program will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets (detailed in Section 2.2), and the Project performance outcomes of the EIS for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

6.2 DDMP update and amendment

The processes described in Section 3.9 to Section 3.13 of the CEMP may result in the need to update or revise this Program.

Revisions of this Program will be in accordance with the process outlined in Section 1.5 of the CEMP.

A copy of the updated Program and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 3.11.2 of the CEMP.

7 References

AECOM, 2017. WestConnex M4-M5 EIS Technical Working Paper: Air Quality, August 2017.

AS/NZS 3580.1.1 2016, Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment.

AS/NZS 3580.10.1-2016, Methods for sampling and analysis of ambient air – Determination of particulates – Deposited Matter – Gravimetric Method.

DEC, 2006. Approved Methods of the Sampling and Analysis of Air Pollutants in NSW.

EPA, 2016. Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.