CONSTRUCTION AIR QUALITY MANAGEMENT PLAN

Moorebank Precinct East Stage 1, Package 2

07 JULY 2021

SYDNEY INTERMODAL TERMINAL ALLIANCE

Moorebank Precinct East, Stage 1, Package 2

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REVISIONS

Revision	Date	Description	Prepared by	Approved by
0	04/05/16	Draft issue to SIMTA	[redacted]	
1	15/06/16	Addressed comments from SIMTA		
2	24/01/17	Update CoA for consultation		
3	06/04/17	Updated to reflect DPE comments		
4	27/04/17	Updated to reflect DPE comments		
5	21/06/17	Updated in response to DP&E Approval Letter dated 9 May 2017		
6	26/10/17	Update of figures to reflect revised construction boundary in accordance with IMEX RfMA 003		
7	09/11/2018	Revisions associated with the internal environmental and sustainability audit, RfMA 005, 007 & 008		
8	11/01/2018	Minor updates associated with 'non-conformance,' 'non-compliance' and 'corrective and preventative actions'		
9	8/07/2019	Revisions associated with RfMA 011		
10	22/10/2019	Minor revision associated with RfMA 016 – Moorebank Precinct EPL updates		
11	27/11/2019	Revisions associated with DotEE review		
12	29/11/2019	Update following additional DotEE comments		
13	07/07/2021	Revision associated with Disused Rail Spur removal		

ACRONYMS AND DEFINITIONS

Terms	Explanation
AADT	Annual average total daily traffic flow
Approved Methods	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (Department of Environment and Conservation, 2007)
AQIA	Air Quality Impact Assessment
CAQMP	Construction Air Quality Management Plan
CEMP	Construction Environmental Management Plan
CCoA	Commonwealth Conditions of Approval
CMM	Commonwealth Mitigation Measures
CoC	Conditions of Consent
CPCoA	Concept Plan Conditions of Approval
DNSDC	Defence National Storage and Distribution Centre
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
DURS	Disused Rail Spur
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
EPA	Environment Protection Authority
ERA	Environmental Risk Analysis
FCMM	Final Compilation of Mitigation Measures
IMT	Intermodal Terminal Facility
KPIs	Key Performance Indicators
MIC Proposal	Moorebank Intermodal Terminal Project
MPE	Moorebank Precinct East as approved by the Concept Plan (MP_10_0913)
MPE Site	The site at Moorebank as approved by the Concept Plan (MP_10_0913)
MPE Stage 1, Package 1	The construction of the Rail Link connecting the Southern Sydney Freight Line to the IMEX, traversing across the Boot land, RailCorp Land, Moorebank Avenue, the MPW Golf Course, Georges River, and Glenfield Waste Facility
MPE Stage 1, Package 2	Construction of the IMEX Terminal (Figure 1) including the following key components: 1. Truck processing, holding and loading areas - entrance and exit from Moorebank Avenue 2. Rail loading and container storage areas – installation of four rail sidings with adjacent container storage area serviced by manual handling equipment initially and overhead gantry cranes progressively 3. Administration facility and associated car parking- light vehicle access from Moorebank Avenue
MPE Stage 1 Project	The whole of the land to which the MPE Stage 1 Project approval SSD 6766 relates including both MPE Stage 1 Package 1, and MPE Stage 1 Package 2.

Terms	Explanation
MPE Stage 2 Project Site	The whole of the land to which the MPE Stage 2 Project approval SSD 7628 relates
NEPM	National Environment Protection Measure
NO_2	Nitrogen dioxide
Non-compliance	An occurrence, set of circumstances, or development that results in a non-compliance or is non-compliant with Development Consent SSD 6766 Conditions of Consent or EPBC Act Approval (EPBC 2011/6229) Conditions of Approval but is not an incident
Non-conformance	Observations or actions that are not in strict accordance with the CEMP and the aspect specific sub-plan.
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter with aerodynamic diameter of 2.5 microns or less
PM_{10}	Particulate Matter with aerodynamic diameter of 10 microns or less
RSoC	Revised Statement of Commitments
SIMTA	Sydney Intermodal Terminal Alliance
SME	School of Military Engineering
SSD	State Significant Development
TSP	Total Suspended Particulates
USEPA	United States Environmental Protection Agency

COMPLIANCE MATRICES

Table 1 Ministers Conditions of Consent (CoC)

CoC	Requirement	Document Reference
E10	The Applicant shall notify the Secretary and relevant public authorities of any incident with actual or potential significant on-site or off-site impacts on human health or the biophysical environment within 24 hours of becoming aware of the incident. The Applicant shall provide full written details of the incident to the Secretary within seven days of the date on which the incident occurred.	Section 7.1.3
E14	The Applicant shall carry out all feasible and reasonable measures to minimise dust generated by the Development.	Table 18, AQ1 to AQ27
E15	During construction, the Application shall ensure that all loaded vehicles entering or leaving the site have their loads covered; and all loaded vehicles leaving the site are cleaned of dirt, sand and other materials before they leave the site, to avoid tracking these materials on public roads.	Table 18, AQ21, AQ23
E33	Prior to the commencement of construction, or as otherwise agreed by the Secretary, the Applicant shall prepare and implement a Construction Environmental Management Plan (CEMP). The CEMP is to be prepared in consultation with the EPA, OEH, NSW Office of Water, DPI Water, DPI Fisheries, and the relevant Council, for the approval of the Secretary. The CEMP shall outline the environmental management practices and procedures that are to be followed during construction. The CEMP is to be prepared in accordance with the *Guideline for the Preparation of Environmental Management Plans* (Department of Infrastructure, Planning and Natural Resources, 2004). The Secretary shall consider the comments of the Office of Strategic lands in its consideration of the CEMP. The CEMP shall include, but not necessarily be limited to:	
	a) a description of activities to be undertaken during construction;	Section 1
	b) statutory and other obligations that the Applicant is required to fulfil during construction, including approvals, consultations and agreements required from authorities and other stakeholders under key legislation and policies;	Table 1 to Table 7, Section 2
	c) a description of the roles and responsibilities for relevant employees involved in construction, including relevant training and induction provisions for ensuring that employees, including contractors and sub-contractors, are aware of their environmental and compliance obligations under these conditions of approval;	Section 7.3
	d) an environmental risk analysis to identify the key environmental performance issues associated with construction; and	Section 4
	e) details of how environmental performance would be managed and monitored to meet acceptable outcomes, including what actions will be taken to address identified potential adverse environmental impacts. In particular, the following environmental performance issues shall be addressed in the CEMP:	Section 5, Section 6
	(i) measures to monitor and manage dust emissions including dust from stockpiles, traffic on unsealed internal roads and materials tracking from construction sites onto public roads.	Section 5, Section 6

CoC	Requirement	Document Reference
E34	As part of the CEMP for the SSD, the Applicant shall prepare and implement:	
	e) a Construction Air Quality Management Plan to detail how impacts on local air quality will be minimised and managed. The Plan shall be developed in consultation with the EPA, and shall include, but not necessarily be limited to:	Section 5
	(i) identification of sources (including stockpiles and open work areas) and quantification of airborne pollutants;	Section 4.1
	(ii) key performance indicators for local air quality during construction;	Section 1.3
	(iii) details of monitoring methods, including location, frequency and duration of monitoring;	Section 6
	(iv) mitigation measures to minimise impacts on local air quality;	Section 5
	(v) procedures for record keeping and reporting against key performance indicators;	Section 7.1
	(vi) provisions for implementation of additional mitigation measures in response to issues identified during monitoring and reporting; and	Section 6.2.5
	(vii) mechanisms for the monitoring, review and amendment of this plan.	Section 7.6

Table 2 Final Compilation of Mitigation Measures (FCMM)

FCMM	Requirement	Document Reference
2A	The Air Quality Management Plan (AQMP) (or equivalent) will be further progressed and incorporated into the CEMP for the Proposal. In accordance with the AQMP, the following will be addressed in the CEMP:	
	• Procedures for controlling/ managing dust	Section 5
	• Roles, responsibilities and reporting requirements	Section 7.3
	• Contingency measures for dust control where standard measures are deemed ineffective	Section 6.2.5
	• Specifically, the AQMP (or equivalent) will prescribe the use of water carts for dust suppression on unsealed travel routes and areas where scrapers and graders are operating	Table 18, AQ16
2C	The Proponent will undertake an air quality monitoring programme during the initial phases of both construction and operation of the Proposal, including:	
	• Nuisance dust	Section 6
	• Air emissions – PM_{10} and nitrogen dioxide	Section 6

Table 3 Concept Plan Conditions of Approval (CPCoA)

Concept Approval	Requirement	Document Reference
2.2	Any future Development Application shall include a comprehensive air quality impact assessment for each stage of the proposal, including:	
	e) A comprehensive air quality management plan that includes at least the following information:	Applicable to operation phase
	i. Explicit linkage of proposed emission controls to the site specific best practice determination assessment and assessed emissions;	Section 5.2
	ii. The timeframe for implementation of all identified emission controls;	Table 18
	iii. Proposed key performance indicator(s) for emission controls;	Section 1.3
	iv. Proposed means of air quality monitoring including location (on and off-site), frequency and duration;	Section 6.2
	v. Poor air quality response mechanisms;	Section 6.2.5
	vi. Responsibilities for demonstrating and reporting achievement of key performance indicator(s);	Section 7.3
	vii. Record keeping and complaints response register; and	Section 7.1, Section 7.4
	viii. Compliance reporting.	Section 7.1

Table 4 Revised Statement of Conditions (RSoC)

RSoC	Requirement	Timing	Document Reference
Air Quality	The Proponent will undertake an air quality monitoring programme during the initial phases of both construction and operation of the SIMTA site in accordance with the Air Quality Impact Assessment and including: • Nuisance Dust • Air Emissions – PM_{10} and Nitrogen dioxide.	Within 12 months of commencing operation and within 12 months of operating at an annual throughput of 500,000 TEU and 1,000,000 TEU	PM_{10}/ dust monitored during construction (Section 6.2) Nitrogen dioxide not monitored during construction (Section 6.2.1)
	The Proponent commits to the preparation of a Construction Environmental Management Plan prior to the construction of each stage to provide air quality and dust management/ mitigation procedures to be adopted during each of the construction phases of the development.	Prior to construction	Section 5

Table 5 Commonwealth Conditions of Approval (CCoA)

Commonwealth Condition	Requirement	Document Reference
7	For the better protection of Commonwealth land, the person taking the action must engage a ***suitably qualified expert(s)*** to prepare a Construction Environment Management Plan (CEMP), for the approval of ***the Minister***. The CEMP must include in relation to construction of the proposed facility:	
	b) identification and quantification of all potential impacts associated with noise, vibration, air quality, traffic, light spill, hydrological changes, contamination, and indigenous heritage (including cumulative impacts associated with the separately approved but related and adjacent intermodal terminal facility project, EPBC approval (2011/6086)) upon Commonwealth land. Consideration must be given to people and communities at SME, DNSDC, Defence housing, and the environment more generally in neighbouring bushland areas. Of note, the air quality assessment must quantify all emissions of $PM_{2.5}$ and PM_{10} arising from project-related sources identified in the EIS.	Section 4.1
	d) refined details (including implementation timeframes) for the mitigation measures outlined in the ***EIS*** (sections 7.4.2, 7.4.3, 7.4.6, 7.4.7, 7.4.8 and 7.4.9) and summarised at Annexure A[2];	Table 18
	f) identification of the trigger values and criteria for all matters mentioned in condition 7(b) (excluding light spill, land contamination and indigenous heritage) that will be adopted for monitoring and managing potential impacts to Commonwealth land;	Section 6.2.5

Commonwealth Condition	Requirement	Document Reference
	g) details of a comprehensive monitoring program (including locations, frequency and duration) for: i. validating the anticipated impacts associated with condition 7(b); and ii. determining the effectiveness of proposed mitigation/ management measures;	Section 6
	h) provisions to revise the approved CEMP in response to monitoring associated with condition 7(g) including, details of response/ contingency mechanisms to address any exceedances of the relevant trigger values;	Section 6.2.5
	i) evidence of consultation with ***Defence*** regarding the adequacy of proposed mitigation measures in particular, those measures to mitigate potential light spill impacts upon residential dwellings within ***SME*** outside of ***standard construction hours***; and	Section 1.4
	j) details of a complaints handling procedure.	Section 7.4

Table 6 Commonwealth Mitigation Measures (CMM)

Issue	Mitigation Measure	Document Reference
Air	**Construction** A Construction Environmental Management Plan will be prepared prior to construction. This document will include provisions covering air quality management and mitigation, and will be implemented through good site environmental practice.	
	<u>Dust management</u> • Increasing the moisture content of the soil/surface to reduce emissions from site clearing, particularly during dry and windy conditions.	Table 18, AQ5, AQ6, AQ12, AQ16
	• Modifying work practices during periods of adverse weather.	Table 18, AQ1
	• Limiting and staging clearing of designated footprint required for construction.	Table 18, AQ2
	• Completing rehabilitation as quickly as possible.	Table 18, AQ3
	• Minimising the number of stockpiles on-site and number of work faces on stockpiles.	Table 18, AQ27
	• Modifying work practices during periods of high winds.	Table 18, AQ1
	• Limiting and staging clearing of designated footprint required for construction.	Table 18, AQ2
	• Completing rehabilitation as quickly as possible.	Table 18, AQ3
	• Minimising the number of stockpiles on-site and number of work faces on stockpiles.	Table 18, AQ27
	• Use of water sprays for dusty activities such as ballast dumping and compacting.	Table 18, AQ6
	• Modify or cease demolition activities during periods of adverse weather (hot, dry and windy conditions).	Table 18, AQ13
	• Using water sprays with earthmoving equipment during road construction.	Table 18, AQ16
	• Modifying work practices during periods of high winds and/or dry conditions by limiting scraper/ grader activity.	Table 18, AQ17
	• Confining all on-site vehicles to a designated route and enforcing speed limits.	Table 18, AQ15, AQ18
	• Modifying work practices during periods of high winds and/or dry conditions by engaging a water truck to spray travel routes.	Table 18, AQ16
	• Controlling and reducing trip frequency and distance by coordinating delivery and removal of materials to avoid unnecessary trips, where possible.	Table 18, AQ19
	• Cleaning dirt that has been tracked onto sealed roads as soon as practicable. Dirt track-out should be managed using shaker grids and/or wheel cleaning.	Table 18, AQ21, AQ22

Note. Mitigation measures as summarised at Annexure A of the CCoA are the Commonwealth Mitigation Measures (CMM) in Table 6

Table 7 Air Quality Impact Assessment (AQIA)

Item	Requirement	Document Reference
AQIA	<u>Clearing, site preparation and excavation</u> The contractor would deploy water carts periodically during construction to ensure exposure areas and topsoils/ subsoil are kept moist. Other controls that will be implemented as necessary are: • Modifying working practices by limiting clearing, stripping and spoil handling during periods of adverse weather (hot, dry and windy conditions) and when dust is seen leaving the site. • Limiting the extent of clearing of vegetation and topsoil to the designated footprint required for construction and appropriate staging of any clearing.	Table 18, AQ1, - AQ3
	<u>Demolition of existing structures</u> Where possible, materials and structures will be dampened using water sprays prior to demolition. During adverse weather (hot, dry and windy conditions), consideration will be given to modify demolition activities when dust is seen leaving the site. Special consideration, including boundary monitoring will need to be given to the demolition of buildings containing asbestos in accordance with relevant guidelines and legislation.	Table 18, AQ12 – AQ14
	<u>Haulage and heavy plant and equipment movements</u> Mitigation measures implemented for construction include: • Operation of a water cart on all unsealed internal roadways and travel routes. • All vehicles on-site should be confined to a designated route with a speed limit of 20 km/hr enforced • Trips and trip distances should be controlled and reduced where possible, for example by coordinating delivery and removal of materials to avoid unnecessary trips. • Dirt track-out should be managed using shaker grids and/ or wheel cleaning. Dirt that has been tracked onto public roads should be cleaned as soon as practicable. • All trucks delivering fill or leaving the site with spoil material will have their load covered.	Table 18, AQ15 – AQ25
	<u>Wind erosion</u>	Table 18,

Item	Requirement	Document Reference
	Wind erosion from exposed ground should be limited by avoiding unnecessary vegetation and topsoil clearing and limiting to the minimum footprint required. Wind erosion from temporary stockpiles will be limited by minimising the number of work faces on stockpiles and through temporary stabilisation (compaction of surface, water sprays, seeding, veneering).	AQ26 – AQ28
	<u>Site environmental responsibility</u> During construction, environmental management will be the responsibility of the construction contractor. The Construction Manager (CM) will be responsible for the day to day operation of the site, including the implementation of dust controls. The CM will: • Oversee the implementation of environmental management plans and policies. • Consider and advise senior management on compliance obligations. • Have the authority to recommend reasonable steps to manage adverse impacts. • Have the authority to recommend cessation of activities on-site. The management and reporting of environmental aspects will be the responsibility of the CM, with specific tasks delegated to on-site personnel. All site personnel will undergo appropriate induction training and individual responsibilities for ensuring that procedures are adhered to will be clearly identified. The relevant roles and responsibility should be outlined in the Construction Environmental Management Plan.	Section 7.3
	<u>Construction dust monitoring</u> Visual checks would be made and reported on an environmental inspection report. The daily visual checks will: • Inspect and report on excessive dust being generated at source (wheel generated dust, scrapers/ graders, dozers, excavators, wind erosion). • Inspect and report on water cart activity and effectiveness. • Inspect and report on dust leaving the site. Non-conformance (dust leaving the site) would be reported immediately to the CM or management.	Section 6.1

Table 8 Infrastructure Sustainability Council of Australia (ISCA) requirements

ISCA Credit Reference	Requirement	Document Reference
Dis-4	Measures to minimise adverse impacts to local air quality during construction and operation have been identified and implemented.	Section 5
	Monitoring of air emissions and/or air quality is undertaken at appropriate intervals and in response to complaints during construction and operation.	Section 6
	Monitoring and modelling demonstrates no recurring or major exceedances of air emission or air quality goals.	Section 3
	Monitoring and modelling demonstrates no exceedances of air emission or air quality goals.	Section 3

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1 INTRODUCTION

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 1 of the Moorebank Precinct East (MPE) Project, including the rail link (Package 1) and Intermodal Terminal Facility (Package 2) on 12 December 2016 (SSD 6766). The construction and operation of the MPE Stage 1 project was subject to an appeal in September 2017 (Appeal Number 2017/00081889). The approval was upheld and revised Conditions of Consent (CoC) were released on 13 March 2018.

This Construction Air Quality Management Plan (CAQMP) has been developed to manage impacts to air quality during the construction of Package 2 of the MPE Stage 1 Project (hereafter referred to as the Project).

Within this plan, a strategy has been established to demonstrate the contractor's approach to the management of air quality. The CAQMP also accounts for requirements of the MPE Stage 1 Project Environmental Impact Statement (EIS) *[Appendix M – SIMTA Intermodal Terminal Facility – Stage 1 – Air Quality Impact Assessment].*

This CAQMP addresses the relevant requirements of the Project Approvals, including the EIS, Submissions Report and Minister's Conditions of Consent (CoC), and the applicable guidelines and standards specific to the management of air quality impacts during construction of the Project.

1.1 Background and Scope

The MPE Project site is located approximately 27 kilometres (km) south-west of the Sydney Central Business District (CBD) and approximately 26 km west of Port Botany and includes the former Defence National Storage and Distribution Centre (DNSDC) site.

The MPE Project involves the development of an intermodal facility, including warehouse and distribution facilities, freight village (ancillary site and operational services), stormwater, landscaping, servicing and associated works on the eastern side of Moorebank Avenue, Moorebank. It is to be developed in three key stages:

- Stage 1 - Construction of the Intermodal Terminal Facility (IMT) and Rail link
- Stage 2 - Construction of warehouse and Distribution Facilities
- Stage 3 - Extension of the IMT and completion of Warehouse and Distribution Facilities.

Stage 1 of the MPE Project comprises, and will be constructed across, two packages:

- Package 1: The Rail Link (not included within this CAQMP) includes a connection to the IMT facility, and traverses across Moorebank Avenue, Anzac Creek and Georges River prior to connecting to the Southern Sydney Freight Line (SSFL).
- Package 2 (Figure 1): The IMT Facility (subject of this CAQMP) includes the following key components:
    - Truck processing, holding and loading areas - entrance and exit from Moorebank Avenue
    - Rail loading and container storage areas – installation of four rail sidings with adjacent container storage area serviced by manual handling equipment initially and overhead gantry cranes progressively
    - Administration facility and associated car parking- light vehicle access from Moorebank Avenue
- Removal of the Disused Rail Spur (DURS) and rehabilitation of the land containing the DURS as required by CoC C23B of the MPE Stage 1 Consent (as amended by the court decision on 13 March 2018).

The layout of the IMT facility generally comprises operational areas, an administration area, rail sidings, utilities and drainage infrastructure, landscaping and signage. The operational areas of the IMT facility consist of the primary and secondary container loading / unloading areas and container storage areas, and the truck holding area. Within these areas containers would be stacked up to five high.

1.1.1 Removal of Disused Rail Spur

As a result of the NSW Land and Environment Court Order of 13 March 2018, the MPE Stage 1 Consent was amended to include the removal of the DURS as CoC 23B.The DURS removal works involve the removal of the DURS and associated infrastructure, followed by the remediation and rehabilitation of the DURS footprint. Remediation of the site will be covered by the existing “Boot Land” Environmental Management Plan (EMP) prepared by GHD and dated May 2016. This EMP includes procedures for managing unexpected finds, water and sediment monitoring, reporting and record keeping.

Management measures in this CAQMP are considered appropriate to manage the DURS construction activities.

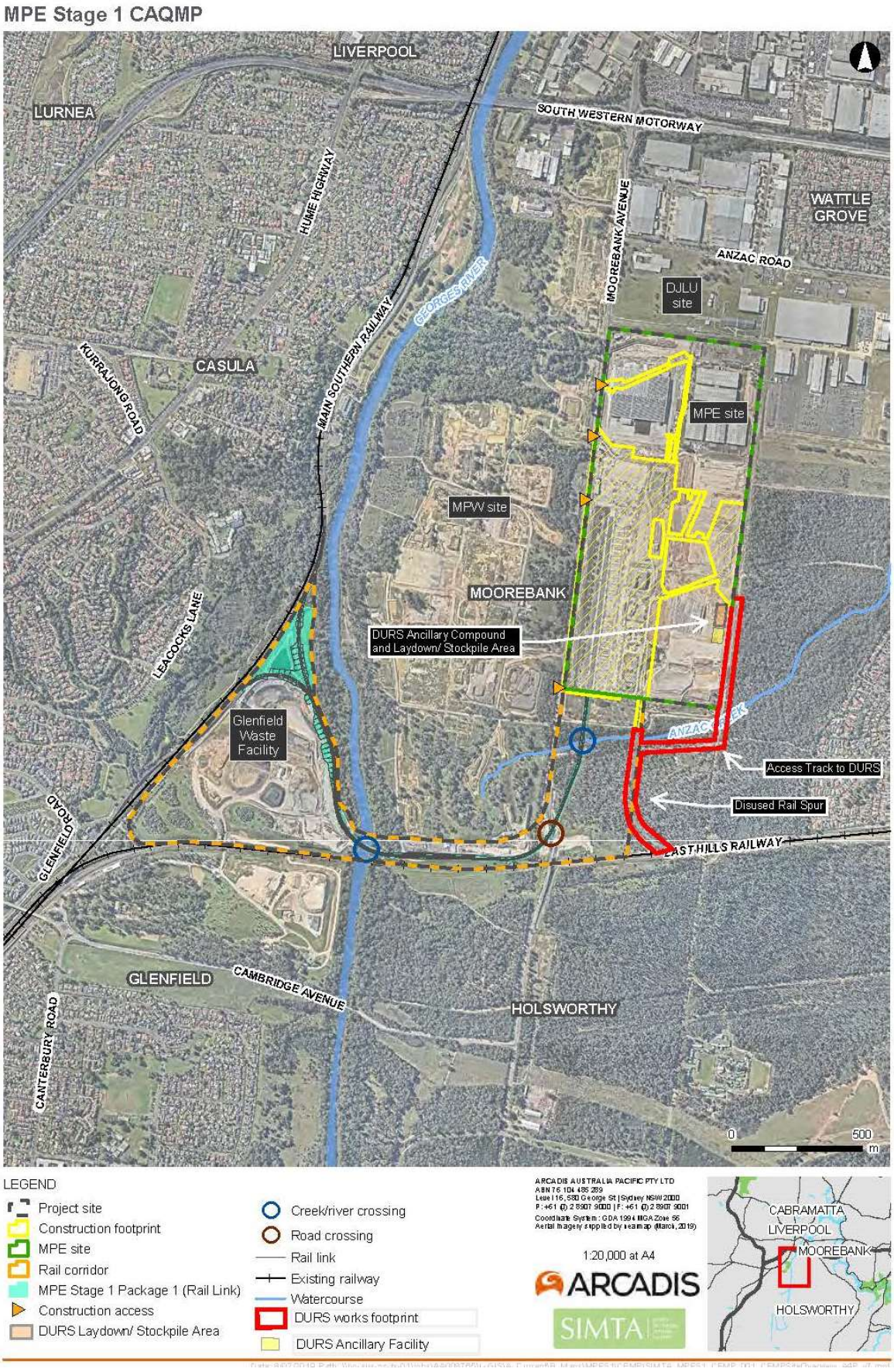

Figure 1 MPE Stage 1, Package 2 Site Overview

1.1.2 Environmental Planning Approval

The MPE Stage 1 Project has been assessed by the Department of Planning and Environment (DP&E) under Division 4.7 (Division 4.1 prior to March 2018) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as State Significant Development (SSD). The Planning Assessment Commission (PAC) granted Approval for the MPE Stage 1 Project on 12 December 2016 and is subject to the Minister's Conditions of Consent (CoC, 18 December 2016 (ref SSD-6766)). The MPE Stage 1 Project, its impacts, consultation and mitigation were documented in the following suite of documents:

- State Significant Development Application SSD 6766 (as amended in the Land and Environment Court 13 March 2018).
- SIMTA Intermodal Terminal Facility – Stage 1 – Environmental Impact Statement (Hyder Consulting Pty Ltd, May 2014)
- SIMTA Intermodal Terminal Facility – Stage 1 – Response to Submissions (Hyder Consulting Pty Ltd, September 2015)
- SIMTA Intermodal Terminal Facility – Stage 1 – Air Quality Impact Assessment, prepared by Environ Australia Pty Ltd on behalf of Hyder Consulting Pty Ltd (ENVIRON Australia Pty Ltd, May 2015)
- SIMTA Intermodal Terminal Facility – Stage 1 – Preliminary Construction Environmental Management Plan (Hyder Consulting Pty Ltd, 2015).

1.2 Purpose and Application

Within the submission of planning approval for the MPE Stage 1, Environ Australia Pty Ltd undertook an Air Quality Impact Assessment (AQIA) (ENVIRON Australia Pty Ltd, May 2015). SIMTA have developed this CAQMP based on the initial AQIA, and to address the project approvals as outlined in Section 1.1.2.

This plan provides methods to measure and reduce the impact to air quality by the contractor during the construction of the Project, including all contractor and consultant partners.

Specifically, the purpose of this CAQMP is to:

- Manage air quality in accordance with the Project approval documents (as outlined in Section 1.1.2)
- Review and consider the AQIA (Appendix M of EIS) during the construction phase of Package 2 of the MPE Stage 1 Project
- Ensure that through the use of best practice, impacts of air quality are minimised.

Tables 1 to 7 demonstrate compliance and conformance against the requirements. This Plan also addresses applicable guidelines and standards related to dust emissions and management during the Project.

1.3 Objectives and Targets

This CAQMP provides the basis for the management of air quality (specifically dust issues) and to minimise risk of impact during the Project. The construction methodology has been designed to minimise, mitigate and manage generation of dust and other air quality emissions from source.

The objectives and key performance indicators (KPIs) of dust management and mitigation are outlined in Table 9.

Table 9 Objectives and KPIs

Objectives	KPIs	Timeframe	Accountability	Documentation/Reporting
Ensure impacts from dust emissions/ deposition during construction works are minimised for the nearest sensitive receptors	• No visible dust leaving the construction site • No community complaints, written warnings or infringement notices regarding excessive dust arising from the construction works	At all times	Site Supervisor	Daily Site Inspection Records (Site Diaries) Site Environmental Inspection
Use monitoring to assess the effectiveness of dust mitigation/ control measures that are being applied during construction works	• Establish trigger levels using monitoring data to scale construction management responses to the increasing level of action required, based on the risk of total concentration levels of dust exceeding the impact assessment criteria • No community complaints, written warnings or infringement notices arising from the construction works	At all times	Environmental Manager Community Liaison Manager	Daily Site Inspection Records (Site Diaries) Site Environmental Inspection
Minimise mud and earth material from being deposited on public roads by construction equipment, machinery or vehicles	• No community complaints, written warnings or infringement notices regarding material deposition on public roads	At all times	Site Supervisor	Daily Site Inspection Records (Site Diaries) Site Environmental Inspection
Compliance and conformance with all conditions of relevant approval conditions	• Zero non-conformances and non-compliances	At all times	Environmental Manager Construction Manager	Compliance Tracking Reports

Objectives	KPIs	Timeframe	Accountability	Documentation/Reporting
	related to compliance with conditions of approval			
No non-compliant monitoring results that can be directly attributed to construction activities for the Project. Criteria from the Approved Methods for Modelling and Assessment of Air Pollutants in NSW (Department of Environment and Conservation 2005) include: • Maximum annual increase in deposited dust level of 2g/m^2/month • Maximum total deposited dust level of 4g/m^2/month (maximum annual and total levels apply to annual average period).	• Zero non-conformances	At all times	Construction Manager	Monitoring Results

1.4 Consultation

This CAQMP has been prepared in consultation with the Environmental Protection Authority (EPA) as outlined below (Table 10). Supplementary information to support the consultation undertaken is included in Appendix A.

Table 10 Consultation Summary

Agency	Date Contacted	Comment	Status
EPA	Unknown, contacted by DPE	The EPA was consulted and has advised that it does not wish to provide comments on the plan.	Complete.
DPE	20/02/17	Comments provided throughout report for amendment.	Complete.

2 LEGISLATION AND GUIDELINES

Legislation, standards and guidelines relating to the management of air quality in New South Wales (NSW) which are relevant to this CAQMP are included in Table 11.

Table 11 Legislation and Guidelines

Management of Dust Emissions
Legislation
• *Environment Planning and Assessment Act 1999* • *Protection of the Environment Operations Act 1997* • Protection of the Environment Operations (Clean Air) Regulation 2010 • Protection of the Environment Operations (General) Regulation 2009 • National Environment Protection (Ambient Air Quality) Measure (NSW) • National Environment Protection (Diesel Vehicle Emissions) Measure 2001 (NSW)
Standards
• Australian/ New Zealand Standard AS/NZS 3580.1.1:2007 (Methods for Sampling and Analysis of Ambient Air, Part 1.1 Guide to Siting Air Monitoring Equipment) • Australian/ New Zealand Standard 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)
Guidelines
• Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales ("Approved Methods") (NSW Environment Protection Authority (EPA), 2005)

2.1 Environmental Protection Licence

An EPL (No. 21054) was issued by the EPA for the Moorebank Precinct on 4 June 2018. A variation to the license was issued on 18 April 2019 to capture cut and fill earthworks occurring on the MPE Stage 2 Project Site and additional considerations observed during a site inspection on the 23 November 2018.

The licence applies to the Moorebank Precinct (excluding the MPE Stage 1 Rail Access Land Package (RALP) which has a separate EPL licence (No. 20966) and authorises > 100,000 – 500,000 tonnes crushing, grinding or separating processing capacity per annum and > 500,000 – 2,000,000 tonnes extraction, processing or storage capacity per annum. The licence applies to all other activities carried on at the premises, including road construction, bulk earthworks 'cut and fill' and importing fill.

Specific requirements for EPL 21054 are addressed in Table 5 and Section 4.2 of the CEMP.

3 EXISTING ENVIRONMENT

3.1 Meteorological Conditions

3.1.1 Prevailing Wind Conditions

Wind conditions affect the dispersion of air emissions and dust, and hence are an important consideration in the management of air quality and dust impacts.

For dispersion modelling, the AQIA (ENVIRON Australia Pty Ltd, May 2015) (Section 5.2) adopted the weather data from the nearest representative weather station at Liverpool, which is located approximately 2.3 km northwest of the Project site and operated by the NSW Office of Environment and Heritage (OEH).

The AQIA (ENVIRON Australia Pty Ltd, May 2015) reports that the annual wind pattern was dominated by southwest to westerly airflows (Figure 2). The highest wind speeds were recorded from the southwest to westerly direction, with an average recorded wind speed of 1.8 m/s (based on 2013). The frequency of calm conditions (wind speeds less than 0.5 m/s) was in the order of 12% of the time (based on 2013).

Seasonal and diurnal wind roses (2013) for the Liverpool station are presented in 5 and 6, respectively, in Annex A.

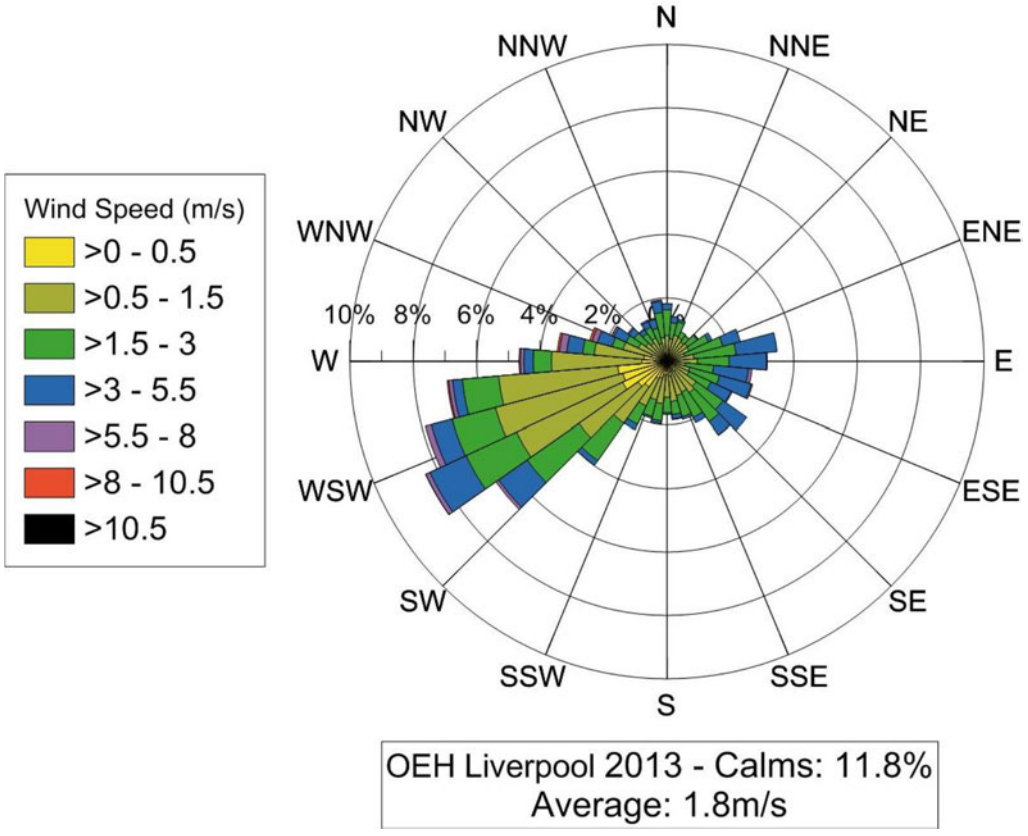

Figure 2 Annual wind rose (based on OEH Liverpool 2013 data) (ENVIRON Australia Pty Ltd, May 2015)

3.1.2 Rainfall

For rainfall, the AQIA references Bankstown Airport weather station (located approximately 6 km northeast of the Project site), operated by the Bureau of Meteorology (BoM) for long-term regional trends. The mean rainfall (1968 to 2016) for Bankstown Airport is provided in Table 12.

Table 12 Rainfall Data (1968 to 2016), Bankstown Airport (Bureau of Meteorology, 2016)

Month	Rainfall (mm)
January	94.4
February	103.6
March	97.2
April	86.9
May	68.0
June	75.0
July	44.1
August	49.8
September	43.6
October	59.8
November	79.0
December	68.3
Annual	874.6

3.1.3 Temperature

The AQIA references Bankstown Airport weather station for the regional temperature. The mean temperature (1968 to 2016) for Bankstown Airport is provided in Table 13.

Table 13 Temperature Data (1968 to 2016), Bankstown Airport (Bureau of Meteorology, 2016)

Month	Mean Maximum Temperature (°C)	Mean Minimum Temperature (°C)
January	28.2	18.1
February	27.8	18.1
March	26.3	16.2
April	23.7	12.7
May	20.5	9.5
June	17.7	6.7
July	17.2	5.1
August	19.0	6.0
September	21.6	8.7
October	23.9	11.8
November	25.3	14.4
December	27.3	16.7
Annual	23.2	12.0

3.2 Sensitive Receptors

The AQIA (ENVIRON Australia Pty Ltd, May 2015) identified a number of residential suburbs located in proximity to the SIMTA site, including:

- Wattle Grove, located approximately 600 m east from the Stage 1 site
- Moorebank, located approximately 1,700 m north from the Stage 1 site
- Casula, located approximately 1,100 m west from the Stage 1 site
- Glenfield, located over 1,700 m southwest from the Stage 1 site.

Locations of the sensitive receptors, as identified in the AQIA, are presented in Figure 3.

The Approved Methods defines a sensitive receptor as “a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area”. Hence, for the purpose of this CAQMP, and in addition to the sensitive receptors identified in the AQIA, any external work areas immediately adjacent to the Project site boundary and different IMT areas coming into operation during different phases of the construction works are also considered to be sensitive receptors.

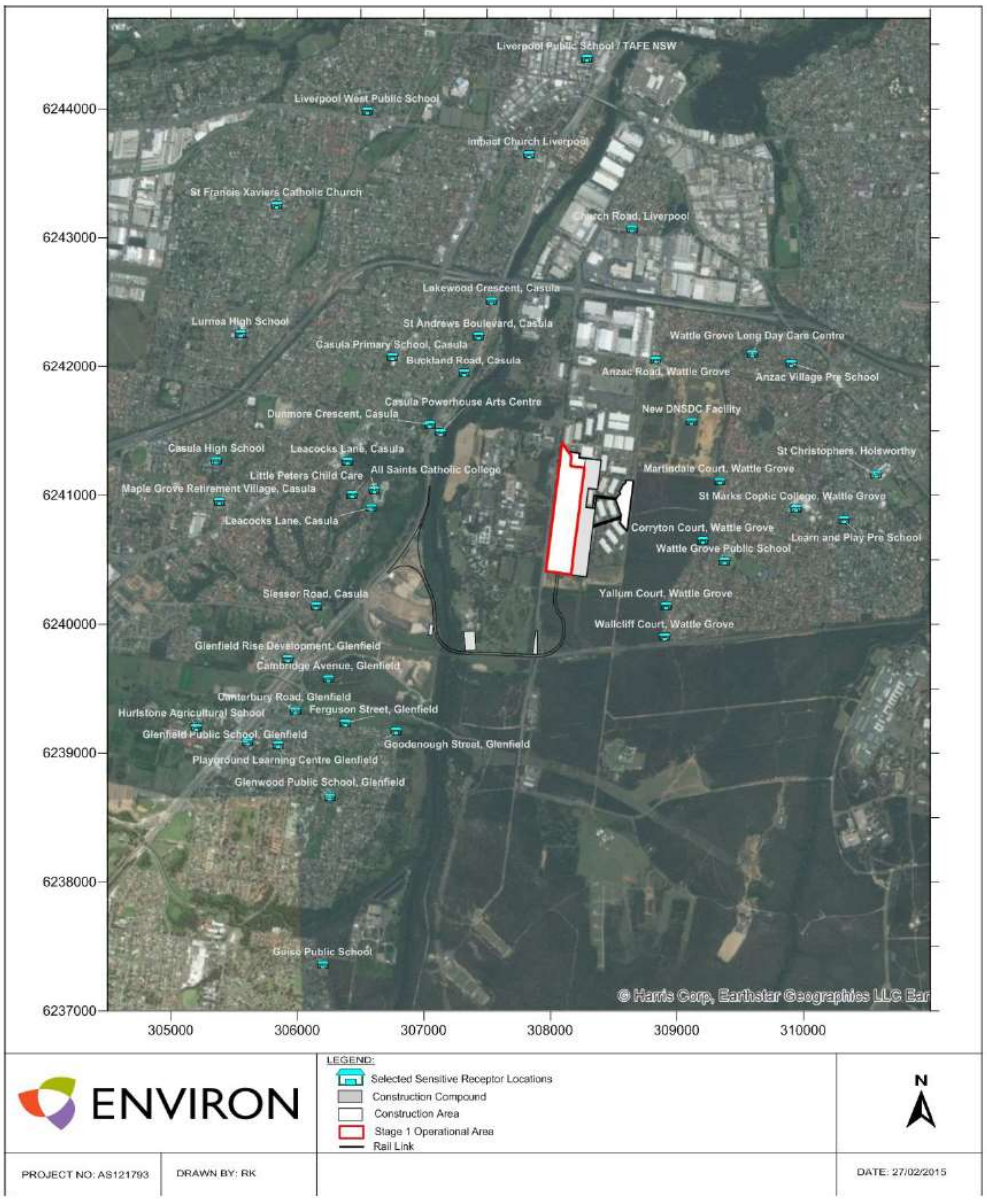

Figure 3 Location of Sensitive Receptors (Reference, Figure 2, AQIA (ENVIRON Australia Pty Ltd, May 2015))

3.3 Existing Pollution Sources

The AQIA (ENVIRON Australia Pty Ltd, May 2015) reported the following existing and potential future sources in the surrounding area which will influence the local air shed to varying degrees, including, but not limited to:

- Traffic emissions from the wider road network, including the South Western Motorway (M5)
- Emissions from diesel locomotives using the Southern Sydney Freight Line (SSFL) and the East Hills rail line
- Existing commercial and industrial facilities including the Greenhills Industrial Estate and Moorebank Business Park to the north
- The Glenfield Waste Facility to the southwest of the site
- Emissions from aircraft at Bankstown Airport to the northeast
- The proposed Moorebank Intermodal Terminal Project (MIC Proposal) to the immediate west of the SIMTA site.

3.4 Existing Ambient Air Quality

According to the AQIA (ENVIRON Australia Pty Ltd, May 2015), no site-specific ambient air quality monitoring was available for the SIMTA site. The AQIA made reference to the following sources of monitoring data:

- OEH monitoring site at Liverpool station (located on Rose Street, approximately 2.5 km northwest of the SIMTA site) for particulate matter with aerodynamic diameter of 10 microns or less (PM_{10}), particulate matter with aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), nitrogen dioxide (NO_2), ozone (O_3) and carbon monoxide (CO)
- OEH monitoring site at Chullora (located on Worth Street, approximately 12 km northeast of the SIMTA site) for sulphur dioxide (SO_2).

It is noted the AQIA reported that separate monitoring was completed closer to the SIMTA site as part of the EIS for the MIC Proposal; this data was then compared in said EIS with the Liverpool monitoring data and found to provide a suitable conservative dataset for use for defining ambient air quality.

The OEH data indicated that PM_{10}, $PM_{2.5}$ and O_3 showed exceedances of the NSW EPA criteria (PM_{10} and O_3) and National Environment Protection Measure (NEPM) goal ($PM_{2.5}$) for certain years through 10 years of monitoring (2005 to 2014), while there were no exceedances recorded for NO_2, CO or SO_2 for the same period.

4 ASPECTS, IMPACTS AND RISKS

A high-level Environmental Risk Analysis (ERA) (Hyder Consulting Pty Ltd, 2013) was undertaken and documented as part of the Concept Plan Application. The ERA assessed the environmental risks, including those related to air quality during the construction and operation stages. The air quality risk during construction, as reported in the ERA, is presented in Table 14. The risk matrix and criteria for evaluating likelihood are presented in Table 15 and Table 16, respectively.

The control measure as identified in the ERA for dust during construction is preparation of a CAQMP which will include dust control measures. The proposed dust management and control measures are provided in Section 5.

A further update to the 2013 ERA is provided in the Aspects and Impacts Register of the CEMP, which fully addresses air quality impacts on a more detailed basis.

Table 14 Air Quality Risk Analysis (Hyder Consulting Pty Ltd, 2013)

Issues	Potential impacts	Risk Ranking before Control Measures Applied*	Control Measures	Residual Impacts	Risk Ranking after Control Measures Applied*
Air quality	Increased air pollution (particulate matter, NO_2, CO and ozone) from the construction of the SIMTA site	VH	An Air Quality Management Plan would be prepared and implemented to include appropriate control measures during the construction and operation phases, including control of dust and other particulate emissions	Minor	L

Note: * Very High (VH), Moderate (M), Low (L)

Table 15 Risk Matrix (Reference: Table 1, ERA (Hyder Consulting Pty Ltd, 2013))

Likelihood	Consequence				
	1 – Not significant	2 - Minor	3 - Moderate	4 - Major	5 - Severe
A – Almost certain	Moderate	Moderate	High	Very High	Very High
B – Likely	Low	Moderate	High	Very High	Very High
C – Possible	Low	Low	Moderate	High	High
D - Improbable	Low	Low	Low	Moderate	Moderate
E - Rare	Low	Low	Low	Low	Moderate

Table 16 Criteria for Evaluating Likelihood (Reference: Table 2, ERA (Hyder Consulting Pty Ltd, 2013))

Level	Descriptor	Description	Frequency of Occurrence
A	Almost Certain	Is expected to occur in most circumstances	Once per month
B	Likely	Will probably occur in most circumstances	Between once a month and once a year
C	Possible	Might occur at some time	Between once a year and once in 5 years
D	Unlikely	Could occur at some time	Between once in 5 years and once in 20 years
E	Rare	May occur in exceptional circumstances	Once in more than 20 years

4.1 Identification of Emission Sources and Emissions Quantification

4.1.1 Emissions Inventory

The key emissions to air during the construction phase are Particulate Matter (PM), which is typically described in three size fractions:

- $PM_{2.5}$
- PM_{10}
- PM with aerodynamic diameter of 50 microns or less (Total Suspended Particulates – TSP).

During mechanical motion and earth movements, the vast majority of PM generated is between 2.5 microns and 50 microns in aerodynamic diameter. PM greater than 10 microns in aerodynamic diameter cannot pass into the human respiratory system; however, PM of this size fraction can result in nuisance to surrounding receptors as a result of dust deposition. Consequently, in relation to PM, two potential impacts from dust generation are considered:

- Ambient concentration of PM_{10}; and
- Dust deposition (as a nuisance issue).

The principal sources of PM emissions will be from the following activities:

- Vegetation clearing/ earthmoving during site preparation and haul roads construction;
- Handling (loading/ unloading) of spoil/ demolition material;
- Handling (loading/ unloading) of fill material, soils, aggregate, ballast etcetera;
- Demolition of existing structures;
- Movement of heavy plant and machinery within the site on unpaved haul roads and unsealed areas; and / or
- Wind erosion from exposed areas and stockpiles.

The AQIA (ENVIRON Australia Pty Ltd, May 2015) quantified the emissions from key dust generating activities during works periods 1 (site preparation), 2 (earthworks) and 3 (engineering fill). It was considered in the AQIA that works periods 4 (concrete/ rail alignment construction) and 5 (miscellaneous structural construction) do not have significant dust generating equipment or activities.

The emission factors used in the AQIA were developed by the United States Environmental Protection Agency (USEPA) and have been applied to estimate the amount of dust produced by each activity (material handling, wind erosion, hauling). Emissions have been quantified for TSP, PM_{10} and $PM_{2.5}$, and are replicated from the AQIA (ENVIRON Australia Pty Ltd, May 2015) in Table 17.

Table 17 Construction Phase Emissions Estimates (kg/annum) (ENVIRON Australia Pty Ltd, May 2015)

Source/ Activity	TSP	PM_{10}	$PM_{2.5}$
Site Preparation			
Vegetation clearing – dozers	4,992	1,053	524
Scrapers/ Graders	189	66	132
Demolition – dozers	6,053	1,466	636
Demolition – excavators	16.4	7.7	1.2
Mobile crusher	9.5	4.2	0.3
Earthworks			
Material handling (excavators/ loaders)	1,132	535.2	81.1
Dozers	9.984	2,105	1,048
Scrapers/ Graders	1,891	661	1,321
Hauling (unsealed)	17,008	4,801	480.1
Engineering Fill			
Material handling (excavators/ loaders)	771.6	364.9	55.3
Dozers	7,987	1,684	839
Scrapers/ Graders	3,781	1,321	2,642
Wind erosion (total)	8,662	4,331	650
TOTAL	**62,476**	**14,070**	**7,760**

4.1.2 Stockpiles

Figure 4 shows the indicative locations of the following temporary stockpiles during the construction period:

- Waste concrete (demolition) stockpile;
- Subsoil stockpile; and
- Topsoil stockpile.

Wind erosion from temporary stockpiles will be limited by minimising the number of work faces on stockpiles, minimising the number of stockpiles and through covering or temporary stabilisation (compaction of surface, water sprays, seeding, veneering) of the stockpiles.

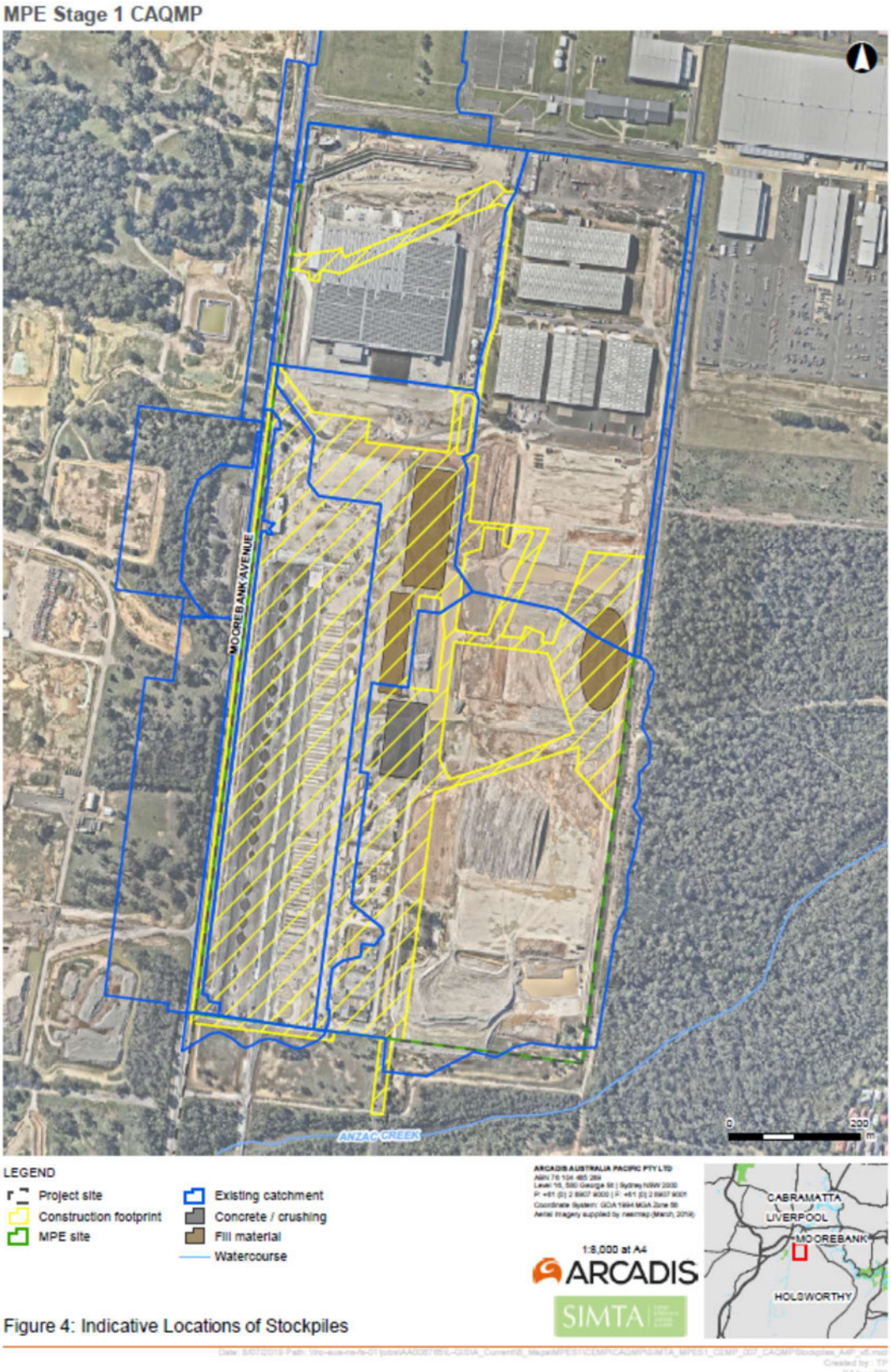

Figure 4 Indicative Locations of Stockpiles

5 MANAGEMENT MEASURES

This Section describes the overall approach and principles associated with managing and mitigating air quality and dust risks during the Project. The management measures are based on the mitigation measures compiled from the compliance matrices of Table 1 to Table 7.

5.1 Principles of Dust Management

Management of dust impacts from construction activities will be undertaken through the use of on-site management together with boundary measurements.

On-site management will form the basis for control and management of dust emissions from site activities to ensure off-site impacts are minimised. Continuous control of dust emissions at source will assist with compliance and conformance with the impact assessment criteria at off-site locations and ensure, as far as possible, that construction activities may continue unimpeded.

The boundary measurements will be used to provide site management with continuous air quality information and, through the use of a trigger threshold, inform site management when there is potential for exceedance of the impact assessment criteria to occur. Control of dust emissions at site boundary will ensure impacts from the site at sensitive receptors are minimised.

5.2 Mitigation, Management and Control Measures

For the different activities of the construction works, Table 18 presents the mitigation, management and control measures to be undertaken.

The proposed type of emission controls are based on the site-specific best practice assessment (Appendix C, AQIA – Best Practice Review) where relevant to the construction phase covered by this CAQMP, as well as the assessed likely emissions in the AQIA as referred to in Section 4.1. If there are changes to the best practice assessment and/or assessed likely emissions subsequent to the finalisation of this CAQMP, the emission controls will be reviewed to ensure that they are still considered best practice and appropriate for the magnitude/type of emissions estimated.

Table 18 Construction Mitigation/ Management/ Control Action and Responsibilities

Item	Mitigation/ Management/Control Measure	Trigger/Timing	Responsibility	Reference
Clearing, Site Preparation and Excavation				
AQ1	Modify working practices by limiting clearing, stripping and spoil handling during periods of adverse weather (hot, dry and windy conditions) and when dust is seen leaving the site.	When visible dust is being generated, and/or when trigger levels are reached (see Section 6.2.5)	Supervisors, Construction Manager	CMM, AQIA
AQ2	Limit the extent of clearing of vegetation and topsoil to the designated footprint required for construction and appropriate staging of any clearing.	During construction works planning stage	Construction Manager	CMM, AQIA
AQ3	All disturbed areas where trees and other vegetation are removed are to be stabilised and or revegetated/ rehabilitated in accordance with the contractual requirements as soon as practical following final land shaping	After final land shaping	Supervisors, Construction Manager	CMM
AQ4	Minimise the exposure of fill and excavated material to active work fronts.	Ongoing	Supervisors	-
AQ5	Operation of a water cart on fill areas, unsealed travel routes and areas where scrapers/graders are operating. The water rate will be adjusted accordingly to minimise generation of visible dust. The water will be transported to site by tankers for this purpose. The number and size of the water carts shall be regularly reviewed by the Construction Manager to ensure that adequate watering is taking place and dust is kept to a minimum. Care is to be exercised to limit the amount of water used to ensure run-off does not occur and leave the site.	When visible dust is being generated, and/or when trigger levels are reached (see Section 6.2.5)	Supervisors, Construction Manager	FCMM – 2A, AQIA
AQ6	Use water sprays as a suppressant during road construction, when movement of materials generates visible dust and during dusty activities such as ballast dumping and compacting.	When visible dust is being generated, and/or when trigger levels are reached (see Section 6.2.5)	Supervisors, Construction Manager	FCMM – 2A, CMM
AQ7	Minimise drop heights for material transport to prevent dust dispersal.	Ongoing	Supervisors	Best Practice
AQ8	Maintain all construction equipment, machinery and vehicles to ensure optimal performance which would minimise exhaust emissions.	Ongoing	Supervisors	Best Practice
AQ9	Minimise idling of construction equipment, machinery and vehicles to no more than 5 minutes to minimise exhaust emissions.	Ongoing	Supervisors	Best Practice
AQ10	Plan construction methodology to ensure capacity of construction equipment, machinery and vehicles is fully utilised.	During construction works planning stage	Construction Manager	CMM

Item	Mitigation/ Management/Control Measure	Trigger/Timing	Responsibility	Reference
AQ11	Asbestos in soil, if any, will be managed in line with a separate Asbestos Management Plan, including set up of exclusion zones, monitoring and mitigation measures.	If asbestos is found to be in the soil, after testing	Construction Manager	-
Demolition of Existing Structures				
AQ12	Where possible, materials and structures will be dampened using water sprays prior to demolition.	Prior to demolition	Supervisors	AQIA
AQ13	During adverse weather (hot, dry and windy conditions), consideration will be given to modify demolition activities when dust is seen leaving the site	When visible dust is being generated, and/or when trigger levels are reached (see Section 6.2.5)	Supervisors, Construction Manager	CMM, AQIA
AQ14	Special consideration will need to be given to the demolition of buildings containing asbestos in accordance with relevant guidelines and legislation (asbestos management will be through a separate Asbestos Management Plan).	If asbestos is found to be in the soil, after testing	Construction Manager	AQIA
Haulage and Heavy Plant and Equipment Movements				
AQ15	Internal sealed roads that are part of the final design will be constructed first and used, as far as practicable, for construction-related traffic.	During construction works planning stage	Construction Manager	Best Practice
AQ16	Operation of a water cart on all unsealed internal roadways and travel routes, as well as fill areas and areas where scrapers/ graders are operating. The water rate will be adjusted accordingly to minimise generation of visible dust. The water will be transported to site by tankers for this purpose. The number and size of the water carts shall be regularly reviewed by the Construction Manager to ensure that adequate watering is taking place and dust is kept to a minimum. Care is to be exercised to limit the amount of water used to ensure run-off does not occur and leave the site	When visible dust is being generated, and/or when trigger levels are reached (see Section 6.2.5)	Supervisors, Construction Manager	FCMM – 2A, AIQA
AQ17	Modifying work practices during periods of high winds and/or dry conditions by limiting scraper/ grader activity.	Ongoing	Supervisors	CMM
AQ18	All vehicles on-site will be confined to a designated route with a speed limit of 20 km/hr enforced.	Ongoing	Supervisors	CMM, AQIA
AQ19	Trips and trip distances will be controlled and reduced, for example by coordinating delivery and removal of materials to avoid unnecessary trips.	Ongoing	Supervisors, Construction Manager	CMM
AQ20	A stabilised access is to be utilised to reduce the tracking of dirt, sand and other materials off-site.	Ongoing	Supervisors	Best Practice

Item	Mitigation/ Management/Control Measure	Trigger/Timing	Responsibility	Reference
AQ21	Dirt track-out from construction traffic will be managed using shaker grids and/ or wheel cleaning. If thorough washing can be achieved, wheel washing may be carried out without a specific device, e.g. washing using a tide/ hose.	Ongoing	Supervisors	CoC – E15, CMM, AQIA
AQ22	Dirt, sand and other materials that have been tracked onto public roads beyond the site boundary will be cleaned using a road sweeper as soon as practicable, but at a frequency of no less than twice daily during construction hours.	Ongoing	Supervisors	CMM, AQIA
AQ23	All trucks delivering fill or leaving the site with spoil material will have their load covered.	Ongoing	Supervisors	CoC – E15, AQIA
AQ24	No idling of vehicles unless power is required for unloading or cooling for the occupant of vehicle on days of high temperature.	Ongoing	Supervisors	-
Wind Erosion				
AQ26	Wind erosion from exposed ground will be limited by avoiding unnecessary vegetation and topsoil clearing and limiting to the minimum footprint required.	Ongoing	Supervisors, Construction Manager	AQIA
AQ27	Wind erosion from temporary stockpiles will be limited by minimising the number of work faces on stockpiles, minimising the number of stockpiles and through covering or temporary stabilisation (compaction of surface, water sprays, seeding, veneering) of the stockpiles.	Ongoing	Supervisors, Construction Manager	CMM
Dust monitoring				
AQ29	Visual checks for excessive dust generation will be undertaken daily during construction (see Section 6.1)	Ongoing	Supervisors, Construction Manager	FCMM – 2C
AQ30	Continuous boundary monitoring for reactive dust management. Trigger thresholds for $PM_{2.5}$ and PM_{10} will be established to enable staged responses for precipitating control actions, depending on the level of intervention needed, e.g. increased watering rate and frequency of watering (see Section 6.2).	Ongoing	Supervisors, Construction Manager	FCMM – 2C

6 AMBIENT AIR MONITORING

Monitoring will be undertaken during the construction phase to:

- Identify triggers for implementation of construction management response measures;
- Assess the effectiveness of dust control measures during construction;
- Ensure the construction activities' contributions for dust concentrations/ deposition remain below the relevant impact assessment criteria at sensitive receptors, when background levels are taken into account; and
- Provide data suitable to demonstrate compliance and conformance with contract conditions and the Project Conditions of Approval.

Monitoring will be undertaken using three methods:

- Visual checks;
- Continuous boundary monitoring for $PM_{2.5}$ and PM_{10} concentrations; and
- Monthly boundary and background dust deposition.

6.1 Visual Checks

Visual checks provide a first-line rapid indication of dust generation potential and effectiveness of dust control measures.

A designated person on site (Construction Manager, or as delegated) will undertake the following visual checks near the construction site boundary at least once on each working day until the Project works are completed:

- If observed, report on excessive dust being generated at source (e.g. wheel generated dust, scrapers/ graders, dozers, excavators, stockpiles, wind erosion);
- Inspect and report on water cart activity (including daily water usage rate); and
- If observed, report on dust, earth and other materials leaving the site.

The findings of the visual checks will be reported in the weekly environmental inspection report. Non-conformance (e.g. excessive dust generation, dust/earth/ other materials leaving the site) will be reported immediately to the Construction Manager or management. The weather conditions (Section 6.3) will also be recorded when a non-conformance is reported during a visual check.

Upon identification of excessive dust generation, mitigation measures as outlined in Section 5 will be implemented.

6.2 Continuous Boundary Monitoring

During continuous boundary monitoring, trigger thresholds will be established to provide an automated "alert" system for increased emissions of dust to ensure that construction activities minimise unacceptable impacts to surrounding sensitive receptors. A trigger threshold acts as a limit where its exceedance will precipitate actions to reduce $PM_{2.5}$ and PM_{10} emissions which may include additional mitigation (such as increasing watering), or in extreme cases, temporary cessation of construction activities.

The boundary monitoring data provides a body of evidence to support the likely contribution of the site construction works in the event of complaints. Such data may also be able to help attribute any high levels of dust to specific activities on site in order that appropriate action may be taken.

6.2.1 Monitored Parameters

Continuous boundary monitoring will be undertaken for the following air emissions:

- $PM_{2.5}$ concentration;
- PM_{10} concentration; and
- Dust deposition.

Whilst it is acknowledged that NO_2 monitoring was included in the Concept Plan Revised Statement of Commitments and Stage 1 Final Compilation of Mitigation measures it is nevertheless considered that in relation to monitoring of NO_2 during construction NO_2 is a common air pollutant that is found in the atmosphere as a result of natural processes and as a result of anthropogenic combustion. NO_2 will therefore be present in the baseline air quality of the project location, even without the construction activities. During the construction phase, the exhaust emissions from diesel-burning vehicles/heavy machinery/equipment used are likely to be mobile, diffuse and intermittent in nature. Monitoring for such additional mobile/diffuse/ intermittent NO_2 emissions is difficult to allow distinction from the existing background NO_2 levels. The control and minimisation of NO_2 during construction activities is best achieved through planning construction activities to optimise usage of diesel-burning vehicles/heavy machinery/equipment, and to ensure that maintenance of these are regularly undertaken to optimise engine and fuel-burning performance.

During the construction phase, the number of diesel-burning vehicles/ heavy machinery/ equipment is unlikely to be high enough to have any impacts on air quality at sensitive receptors (Section 3.2). This is based on "The Design Manual for Roads and Bridges, Volume 11 (Environmental Assessment), Section 3 (Environmental Assessment Techniques), Part 1 (Air Quality)" (Highways Agency of England, 2007), which provides a scoping guideline. This guideline states that if there is a change in heavy duty vehicles, used to approximate construction-related vehicles in this CAQMP, of at least 200 annual average total daily traffic flow (AADT), then there is potential for NO2 impacts. If the heavy duty vehicles change is less than 200 AADT, then no NO2 impacts are anticipated.

This approach is agreed by the Institute of Air Quality Management, who state that:

"*Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed*" (Institute of Air Quality Management, 2014).

6.2.2 Monitoring Locations

Onsite

The dominant wind directions, as reported in Section 3.3, are from the southwestern to western directions. In addition, there is also a relatively high incidence of easterly winds.

Figure 7 in Appendix A shows the different phases (Phase A to Phase D) of the Project construction, with different sections of the IMT coming into operation as different phases of construction are completed. As the Approved Methods defined a workplace receptor as a sensitive receptor (see Section 3.2), the monitoring locations will be moved accordingly based on the different construction phases.

The locations for site boundary monitoring for $PM_{2.5}$, PM_{10} and dust deposition have been selected in line with the main areas of construction works (according to each construction phase) and dominant wind direction, with consideration of the location of nearest sensitive receptors as the operations of the IMT are gradually phased in. As the main areas of construction works generally provide the worst-case dust emissions potential, siting the site boundary monitoring locations immediately adjacent and downwind, in the predominant wind direction, of these areas means dust control/mitigation measures can be adopted that are also protective of other areas with less construction activities.

Monitoring locations have been provided in Figure 8. It should be noted that the monitoring locations may be subject to change should construction sequencing be amended, if it is identified during construction that the monitoring location is in fact not suitable or other mitigating factors such as security of monitoring equipment etc.

Final selection of the monitoring location, when preparing the monitoring plan for boundary air quality monitoring (see Section 6.2.6), shall be in general agreement with the monitoring locations and additionally take into account actual site conditions when the monitoring is to be commenced and the general guidelines of the relevant Australian Standards (AS/NZS 3580.1.1:2007) for siting air quality monitoring equipment (as provided in Appendix B).

Table 19 Monitoring Locations (Onsite)

Phase	Description	Monitoring Location(s)
Phase A	Whole Construction Site	Two general monitoring locations will be set, upwind and downwind of the construction site, in relation to the prevailing wind directions which are dominated by southwest to westerly airflows, as outlined in Section 3.1.1: • One at the eastern boundary of the Stage 1 construction area where the earthworks area is located (Location A1). • One at the western boundary along Moorebank Avenue where construction of the IMT takes place (Location A2). Establishing monitoring locations upwind and downwind of the construction site allows assessment of site contribution (i.e. the difference between the upwind and downwind levels is the site contribution), which provides information about the extent of dust impacts from the construction activities, and thus the corresponding level of dust mitigation/control needed. Locations A1 and A2 reflect: • The general central point at the construction boundary (upwind/downwind) of Phase A (in line with the main area of construction works and dominant wind direction). The construction boundary is the initial point where there is potential for exposure to sensitive receptors.
Phase B	Operation of the western portion of the IMT and construction of the remainder (eastern) portion of the IMT. The western portion of the IMT is hence considered a workplace and is a sensitive receptor.	Three general monitoring locations will be set, upwind and downwind of the construction site, in relation to the prevailing wind direction: • One at the eastern boundary of the Stage 1 construction area (maintain same location as Location A1) (Location B1). • One at the eastern boundary of the operational western portion of the IMT (Location B2). • One at the western boundary of the operational western portion of the IMT (Location B3). Establishing monitoring locations upwind and downwind of the construction site allows assessment of site contribution (i.e. the difference between the upwind and downwind levels is the site contribution), which provides information about the extent of dust impacts from the construction activities, and thus the corresponding level of dust mitigation/control needed. Locations B1 and B3 reflect: • The general central point at the construction boundary (upwind/downwind) of Phase B (, in line with the main area of construction works and dominant wind direction). • The construction boundary is the initial point where there is potential for exposure to sensitive receptors (including the workers at IMT). Location B2 reflects: The “internal” construction boundary where it is the initial point for potential of exposure to workers working in the section of the IMT that started operations.

Phase	Description	Monitoring Location(s)
Phase C	Operation of the eastern portion of the IMT, and refurbishment of the western portion of the IMT. The western portion of the IMT is hence considered a workplace and is a sensitive receptor.	Three general monitoring locations will be set, upwind and downwind of the construction site, in relation to the prevailing wind direction: • One at the eastern boundary of the Stage 1 construction area (maintain same location as Location A1) (Location C1). • One at the eastern boundary of the operational western portion of the IMT (Location C2). • One at the western boundary of the operational western portion of the IMT (Location C3). Locations C1 and C3 reflect: • The general central point at the construction boundary (upwind/downwind) of Phase C (in line with the main area of construction works and dominant wind direction). • The construction boundary is the initial point where there is potential for exposure to sensitive receptors (including the workers at IMT). Location C2 reflect: • The "internal" construction boundary where it is the initial point for potential of exposure to workers working in the section of the IMT that started operations.
Phase D	Operation of the entire Stage 1 IMT, meaning construction activities have ceased.	Operation monitoring will be undertaken but it is not considered further as part of this CAQMP. Operation monitoring will be outlined within the Operation Environmental Management Plan (OEMP).

It is noted that the boundary monitoring locations are outlined as general locations only. Specific siting considerations are provided in Appendix B and need to be taken into account when selecting a final monitoring location for the monitoring plan/ protocol.

In addition to the boundary monitoring locations, one dust gauge will be placed in a background location away from construction activities but in a local environment with similar surrounding land use. Boundary measurements will be compared to the measurements for the background monitor. For the first year of construction, measurements will be averaged over the period since the start of construction. After one year of construction, deposition rates will be averaged on a rolling annual basis prior to comparison with the impact assessment criterion.

Offsite

The requirement of CPCoA 2.2iv requires that onsite and offsite monitoring be undertaken for construction air quality impacts. This is, however, generally not applicable to construction air quality impacts, which mainly pertain to dust. As dust impacts from construction activities decreases with increasing distance due to settlement, the implication is compliance and conformance with the trigger levels and impact assessment criteria (Section 6.2.5) at the site boundary, which will indicate compliance and conformance at receptors beyond the site boundary.

Furthermore, at sensitive receptors beyond the site boundary, IMEX construction may not be the source of dust that is causing the exceedance, therefore any exceedances at these sensitive receptors may not be due to the construction activities of the MPE Project, making it difficult to assess the corresponding scale of mitigation/control measures needed. It is, therefore, more efficient and effective to control dust impacts by ensuring that these impacts at the site boundary, which are directly linked to onsite construction activities, are within the recommended trigger levels and impact assessment criteria.

Based on the above, offsite monitoring has been scoped out from consideration during construction.

6.2.3 Monitoring Equipment

$PM_{2.5}$ and PM_{10}

As the monitoring is undertaken for reactive dust management rather than compliance and conformance demonstration, a portable, real-time and compact dust monitoring equipment (such as the light-scattering instrument DustTrak) is proposed. The DustTrak is a continuous, portable and compact real time light-scattering laser photometer that simultaneously measures size-segregated mass fraction concentrations corresponding to different particulate size fractions (PM_1, $PM_{2.5}$, PM_{10} and total PM). The DustTrak may be powered either by battery or solar panels.

As the Stage 1 IMT construction period may coincide with periods of high humidity, the DustTrak will be equipped with a heating manifold at the sampling inlet to evaporate water droplets in the inlet stream. This prevents over-prediction of ambient air concentrations by the monitors through erroneous readings of water droplets as particulates.

Dust Deposition

The gravimetric method (AS 3580.10.1:2016) will be employed for the boundary monitoring of dust deposition. The deposition gauge consists of a stand (or stake) and a bottle assembly which includes a glass funnel attached to a glass bottle with a rubber stopper. This is a passive monitoring method, hence no power supply/ solar power is needed. One gauge will be required for each monitoring location.

Dust deposition will be measured on a monthly basis at each monitoring location. At the end of each monitoring duration, the gauge will be sent to the laboratory whereby the deposited dust will be analysed to obtain the total (wet plus dry) deposition rate.

6.2.4 Monitoring Duration and Frequency

Construction boundary monitoring will be carried out upon commencement of Stage 1 construction of the IMT and will end when construction is completed.

The monitoring of $PM_{2.5}$, PM_{10} will be undertaken on a continuous basis. Since no further analysis is required in the laboratory, the output from DustTraks will be a real-time indication of the ambient PM_{10} and $PM_{2.5}$ concentrations and can be compared to the trigger levels for further action (see Section 6.2.5).

The dust deposition measurement will be undertaken on a continuous basis; however, the sample collected will be sent back to the laboratory for further analysis to obtain a monthly dust deposition level.

6.2.5 Impact Assessment Criteria and Trigger Levels

Boundary monitoring will be undertaken such that overall monitored levels do not exceed the impact assessment criteria, as outlined in Table 20.

Table 20 Impact assessment criteria for PM_{10} and dust deposition from Approved Methods

Pollutants	Averaging Period	Impact Assessment Criteria
$PM_{2.5}$	24 hour	25 µg/m^3
	Annual	8 µg/m^3
	24-hour	50 µg/m^3

Pollutants	Averaging Period	Impact Assessment Criteria
PM_{10}	Annual	30 µg/m^3
Dust deposition	Annual (increase)	2 g/m^2/month (maximum increase, i.e. no more than 2 g/m^2/month above baseline)
	Annual (total)	4 g/m^2/month

$PM_{2.5}$

Trigger values for $PM_{2.5}$ (applicable only at the onsite monitoring locations) are established to protect air quality over the short-term standard period (24-hour) and to enable staged responses and control actions onsite, The DustTraks will send alert messages either by SMS or email to relevant site personnel when trigger values are exceeded. The following trigger alert standards have been developed for the Project.

- Alert Level – 1 hour mean $PM_{2.5}$ concentration is greater than 25 µg/m^3 for 1 hour. Actions would include:
  - Checking the weather forecast for that day;
  - Comparison of the concentration at the upwind monitor to the downwind monitor to determine the site contribution; and
  - Identifying risk areas and notifying construction site personnel to be alert to dust generation to employ additional damping down/ water spraying where required.
- Remedial Action Level – 1 hour mean $PM_{2.5}$ concentrations are greater than 25 µg/m^3 for three consecutive hours. Actions would include:
  - Comparison of the concentration at the upwind monitor to the downwind monitor to determine the site contribution;
  - Increased watering; and
  - Decreasing and/ or relocating dust generating activities identified to be a source of the impact (e.g. from visual checks).
- Extreme Action Level – 1 hour mean $PM_{2.5}$ concentrations are above 75 µg/m^3 for three consecutive hours. Actions to include:
  - Comparison of the concentration at the upwind monitor to the downwind monitor to determine the site contribution; and
  - Cessation of dust generating activity at all or parts of the site when the elevated $PM_{2.5}$ concentrations are not caused by an external regional event such as a bushfire.

Exceedance of the alert, remedial or extreme action levels will require documentation of the actions taken and will be included in reporting (see Section 7). The CAQMP will be reviewed and updated, if necessary, in the instance of an exceedance of nominated trigger levels.

PM_{10}

Trigger values for PM_{10} (applicable only at the onsite monitoring locations) are established to protect air quality over the short-term standard period (24-hour) and to enable staged responses and control actions onsite, The DustTraks will send alert messages either by SMS or email to relevant site personnel when trigger values are exceeded. The following trigger alert standards have been developed for the Project.

- Alert Level –1 hour mean PM_{10} concentration is greater than 50 µg/m^3 for 1 hour. Actions would include:

  - Checking the weather forecast for that day;
  - Comparison of the concentration at the upwind monitor to the downwind monitor to determine the site contribution; and
  - Identifying risk areas and notifying construction site personnel to be alert to dust generation to employ additional damping down/ water spraying where required.
- Remedial Action Level – 1 hour mean PM_{10} concentrations are greater than 50 µg/m^3 for three consecutive hours. Actions would include:
  - Comparison of the concentration at the upwind monitor to the downwind monitor to determine the site contribution;
  - Increased watering; and
  - Decreasing and/ or relocating dust generating activities identified to be a source of the impact (e.g. from visual checks).
- Extreme Action Level –1 hour mean PM_{10} concentrations are above 150 µg/m^3 for three consecutive hours. Actions to include:
  - Comparison of the concentration at the upwind monitor to the downwind monitor to determine the site contribution; and
  - Cessation of dust generating activity at all or parts of the site when the elevated PM_{10} concentrations are not caused by an external regional event such as a bushfire.

Exceedance of the alert, remedial or extreme action levels will require documentation of the actions taken and will be included in reporting (see Section 7). The CAQMP will be reviewed and updated, if necessary, in the instance of an exceedance of trigger levels.

Dust Deposition

The dust deposition monitoring at the site boundary locations will be set to be protective of the long-term exposure of 4 g/m^2/month, with the trigger threshold set at no more than 2 g/m^2/month above the measured background levels expressed as an annual average (applicable only at the onsite location). For the first year of construction, measurements will be averaged over the period since the start of construction. After one year of construction, deposition rates will be averaged on a rolling annual basis prior to comparison with the impact assessment criterion.

Since the dust deposition gauge does not provide real-time readings, additional mitigation actions are applied retrospectively if the trigger threshold is found to be exceeded at the site boundary monitoring locations. Construction records, as described in Section 7 will help in identification of sources not mitigated and/or inadequate mitigation measures.

The CAQMP will be reviewed and updated, if necessary, in the instance of an exceedance of the nominated trigger level.

6.2.6 Monitoring Plan

Prior to undertaking monitoring, ensure that a detailed monitoring plan is in place which takes into account sampling protocol, health and safety issues, and quality assurance/control considerations during monitoring/analysis.

6.3 Weather

No weather monitoring will be undertaken. Instead, weather data is recommended to be taken from the BoM website for Bankstown Airport (http://www.bom.gov.au/products/IDN60901/IDN60901.94765.shtml), which is the nearest BoM automatic weather station to the Project site. The BoM weather data is provided online in real-time format (30 minute intervals), which is conducive to reactive dust management. The alternative is to obtain weather data from the MIC site or at OEH Liverpool site, if these data sources can be accessed real-time.

The weather parameters of relevance are:

- Wind speed;
- Wind direction;
- Temperature; and
- Rainfall.

These weather parameters have been selected for monitoring in support of dust control:

- Measurement of wind direction will allow knowledge of which monitoring equipment is upwind and downwind of construction activities.
- Measurement of wind speed will provide an indication of the risk of dust re-entrainment.
- Measurement of rainfall will enable knowledge of the extent of natural dust attenuation through watering and if additional watering is needed.

7 COMPLIANCE MANAGEMENT

7.1 Reporting and Auditing

Reporting and auditing will be undertaken in accordance with the Project CEMP, as well as additional requirements listed below. Record keeping and reporting will be linked back to the KPIs in Table 9, to ensure that compliance and conformance against the objectives in Table 9 can be tracked.

7.1.1 Construction Site Records

The site management (Construction Manager, or as delegated) will maintain a site record of each of these following items throughout the construction period that will detail, as a minimum

- Dust sources;
- Dust management measures applied;
- Date and time of dust management measures;
- Complaints of dust emissions/deposition;
- Any other visual observations of incidents likely to cause impacts to air quality, such as bushfires; and
- Exceedances of monitoring trigger thresholds.

Results of the visual checks made by the Construction Manager (or as delegated), as outlined in Section 6.1, will also be recorded in the site record throughout the construction period.

These records will ensure that dust management is undertaken throughout the construction period and will assist in identification of sources not mitigated in the event of exceedance of a trigger threshold.

7.1.2 Monitoring Reports

The report for the construction compliance monitoring will be compiled by the Contractor every 6 months and sent to SIMTA and the Secretary until the completion of construction. All construction compliance monitoring reports will be submitted to the EPA no later than one month from the end of each six-month reporting interval.

All reports will include a map clearly showing the location of each monitoring station.

7.1.3 Exceedance/ Incident Reporting of Trigger Thresholds

Any detection of an exceedance of a trigger threshold or identification of an incident relating to an impact assessment criterion exceedance which may lead to actual or potential significant on-site or off-site impacts will be notified by the Contractor to the SIMTA/ the Secretary/ the EPA within 24 hours of becoming aware of such an incident. Within 7 days of the date on which the incident occurred, full written details of the incident will be submitted to the SIMTA/ the Secretary/ the EPA by the Contractor. The report will include the following details, as a minimum:

- For $PM_{2.5}$ and PM_{10} concentration, the date, time, magnitude and nature of the exceedance/ incident where it can be determined that the source of the exceedance is due to site based activities;
- For dust deposition, the month, magnitude and nature of the exceedance/incident;
- Identify the likely cause(s) of the exceedance/incident;
- Identify the potential or actual impacts of the exceedance/incident;
- Describe the mitigation measures in place during the exceedance/incident;
- Describe the response action that has been undertaken to date; and
- Describe the proposed additional mitigation measures to address the exceedance/incident.

The incident report will also be compiled as an appendix to the monitoring report, according to the latter's 6-monthly reporting period in which the incident occurred.

7.1.4 Auditing of Site Records/ Incident Reports

A monthly audit will be undertaken by the Contractors Environmental Representative (or as delegated) to ensure that all construction site records, monitoring reports, incident reports and other related documents to the CAQMP are in line with the requirements of this CAQMP and the EMS.

7.2 Training

All staff, contractors and subcontractors associated with the implementation of this CAQMP will be given training.

Personnel directly involved in implementing dust control measures on site will be given specific training in the various control and mitigation measures to be implemented. Toolbox meetings will also be undertaken as and when required, which will cover specific environmental issues and shall include dust control measures.

Training will be undertaken as detailed in the CEMP. As a minimum, all staff will be given basic environmental awareness for the construction phase. Personnel conducting sampling, measuring, monitoring and reporting activities are to be suitable trained or experienced in the activity. Records of all training are to be filed in accordance with the project filing system.

Management and operational staff will be given training according to the roles and responsibilities required for the implementation of mitigation measures during construction, as well as the implementation of the CAQMP.

All contractors and associated subcontractors will be required to participate in a site induction prior to the commencement of work. As a minimum, the induction is to include:

- The SIMTA Environmental Policy and EMS requirements;
- The requirements of this CAQMP, including environment incident reporting; and
- Environmental emergency contact details.

In the event that there are specific environmental management requirements relating to a contractor's work activities, details of these requirements are to be issued to the contractor in writing as a part of the induction.

Records, which detail the attendees, content of the induction/training as well as any additional information provided, will be maintained.

In addition to the induction program, training will be provided as deemed necessary to contractors to provide them with the knowledge, skills and awareness to minimise environmental impact during construction.

7.3 Roles and Responsibilities

Relevant roles and responsibilities associated with this CAQMP are presented in Table 21.

Table 21 Roles and responsibilities

Roles	Responsibilities
Construction Manager	Oversee the overall implementation of this CAQMP Ensure that sufficient resources are allocated for the implementation of this CAQMP Ensure that the CEMP covers the management and mitigation measures presented in this CAQMP Consider and advise senior management on compliance and conformance obligations, including demonstrating and reporting achievement of KPIs Ensure that the outcomes of the visual checks/ compliance and conformance construction monitoring/ incident reporting are systematically evaluated as part of ongoing management of construction activities Ensure all dust mitigation measures are implemented Where dust mitigation measures are deemed insufficient, undertake reasonable steps to manage adverse impacts Based on the set trigger thresholds (as per Section 6.2.5), authorise cessation of construction activities on-site Ensure construction site records/ monitoring records/ incident reports are kept and maintained on-site (as per Section 7) Ensure audits of construction site records/ monitoring records/ incident reports are undertaken on a monthly basis, findings are shared with relevant site personnel and corrective actions are implemented Ensure all relevant personnel have and understand the most up-to-date copy of this CAQMP Ensure that all requirements of this CAQMP are effectively implemented Ensure that any required actions arising from incident investigation processes during compliance and conformance construction monitoring are reported to the relevant personnel for further action and ensure that the actions are effectively implemented Coordinate the implementation of monitoring requirements as well as corrective and preventative actions Ensure that qualified personnel conduct the air quality monitoring and laboratory analysis Ensure all monitoring reporting requirements are met and maintained on site Authorise all monitoring reports and any revisions to this CAQMP
Construction supervisors/ contractors/ subcontractors/workers	Understand and implement mitigation protocols as required in the CAQMP (as per Section 5) and any other required measures during construction Undertake relevant training to implement the requirements of this CAQMP
Air monitoring personnel	Undertake relevant training to implement the requirements of this CAQMP Undertake all monitoring activities in accordance with this CAQMP Prior to undertaking monitoring, ensure that a detailed monitoring plan is in place which takes into account sampling protocol, health and safety issues, and quality assurance/control considerations during monitoring/analysis Ensure regular maintenance of monitoring equipment

Roles	Responsibilities
	Ensure all relevant monitoring quality control/ assurance procedures are effectively implemented Review laboratory results and write monitoring reports.

7.4 Enquiries, Complaints and Incident Management

Enquiries, complaints and incident management will be undertaken as per the Project CEMP, including those related to dust management.

Accordingly, in the case of an incident resulting in impact assessment criteria being exceeded as per monitoring results, the incident management response procedures provided in the Project CEMP will be implemented, taking in account the trigger levels as outlined in Section 6.2.5.

The Construction Manager will be informed and all necessary stakeholders informed as per the incident management process in the Project CEMP.

The Construction Manager will act as a contact in the event of complaints of dust emissions. A complaint register will be set up, recording complaints received and the responses provided.

7.5 Non-compliances, Non-conformance and Actions

It is the responsibility of all site personnel to report non-compliances and non-conformances to the Site Supervisor and/or the Contractor's EM.

Non-compliances, non-conformances and corrective and preventative actions will be managed in accordance with Section 9.2.1 of the CEMP.

7.6 Review and Improvement

The CAQMP will be reviewed at least every quarterly or earlier if changes to the CAQMP are required. The review of the CAQMP will reflect changes in operational procedures, management protocols and environmental requirements. The CAQMP will also be reviewed and updated, if necessary, in the instance of an exceedance of nominated trigger levels.

Upon final approval of the revised CAQMP, the document will be circulated to relevant personnel.

8 REFERENCES

Bureau of Meteorology. (2016). *Climate statistics for Australian Locations*. Retrieved June 1, 2016, from Monthly climate statistics for Bankstown Airport Automatic Weather Station: http://www.bom.gov.au/climate/averages/tables/cw_066137.shtml

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APPENDIX A

Figures

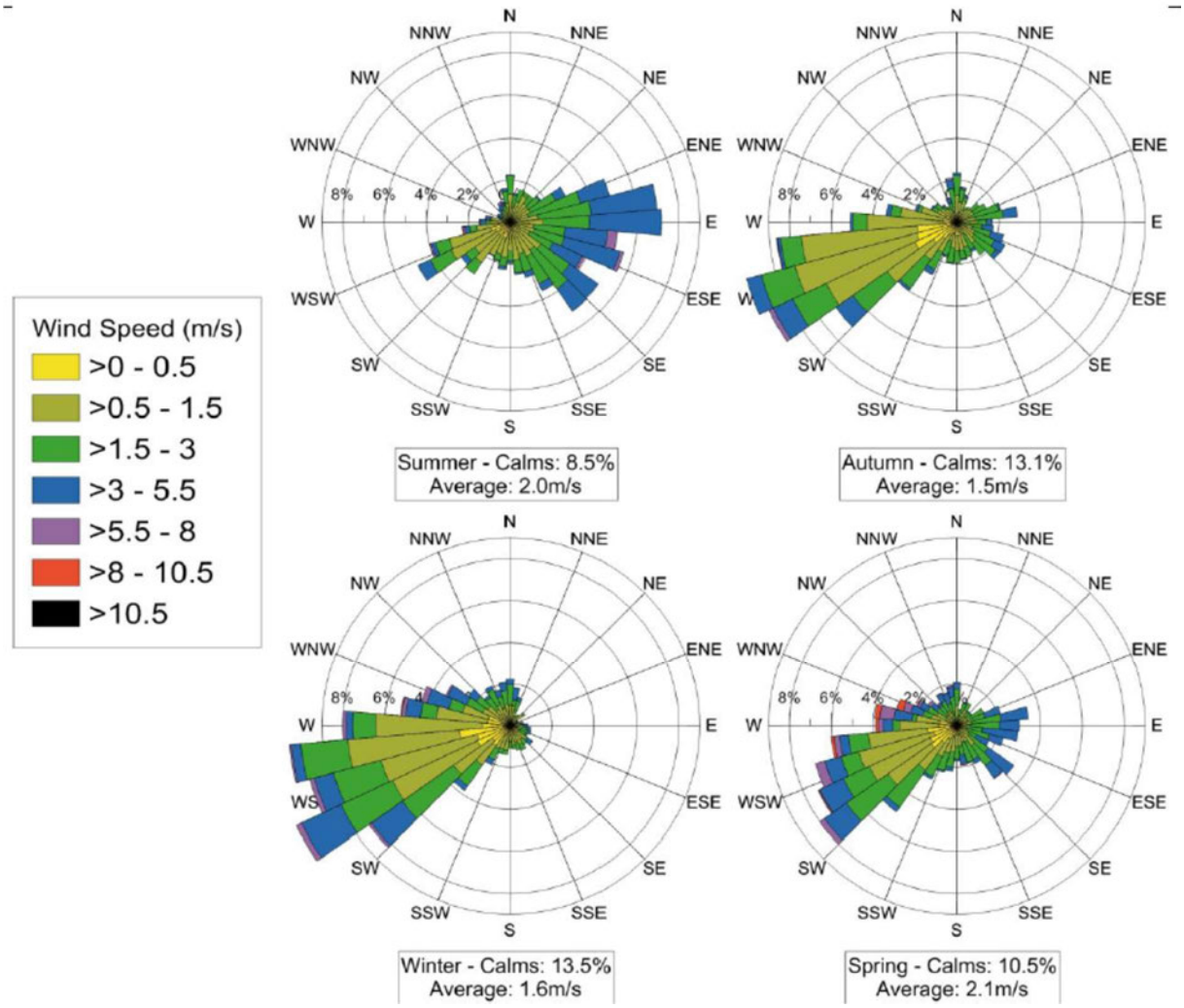


Figure 5 Seasonal Wind Roses (2013) at OEH Liverpool weather station (Reference: Figure A-3, AQIA (ENVIRON Australia Pty Ltd, May 2015))

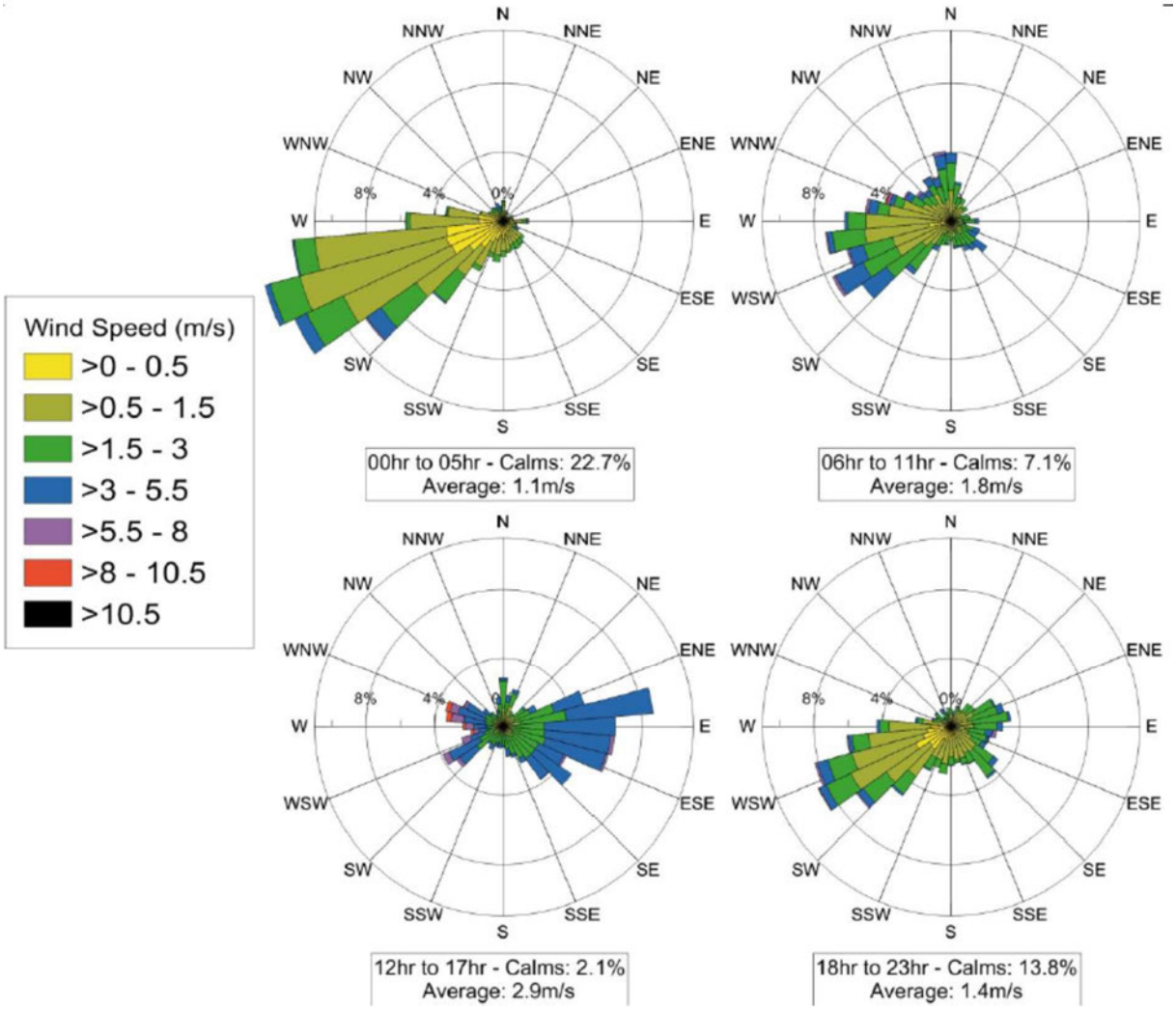
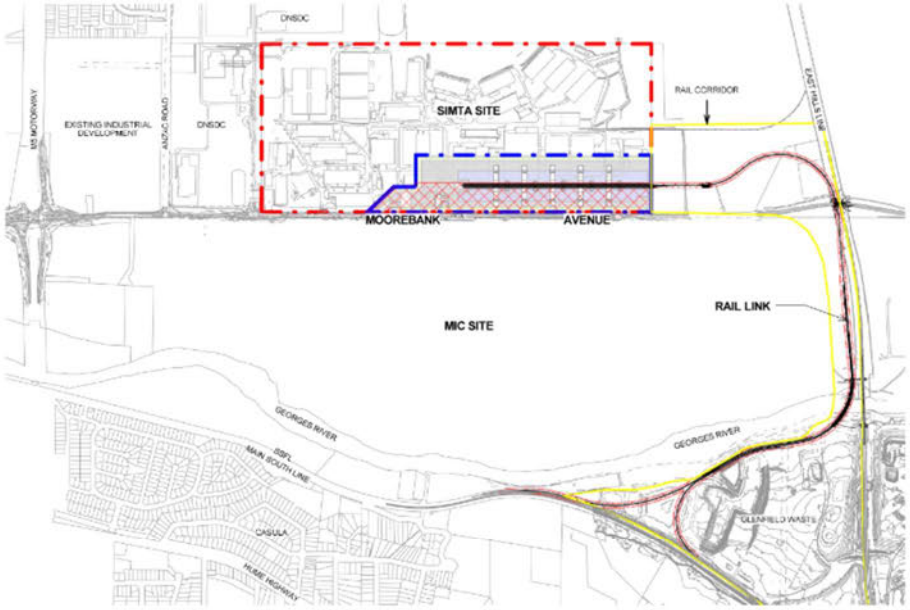
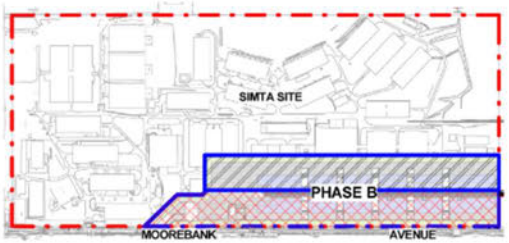


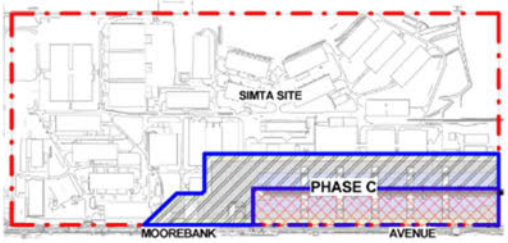
Figure 6 Diurnal Wind Roses (2013) at OEH Liverpool weather station (Reference: Figure A-5 [sic], AQIA (ENVIRON Australia Pty Ltd, May 2015))



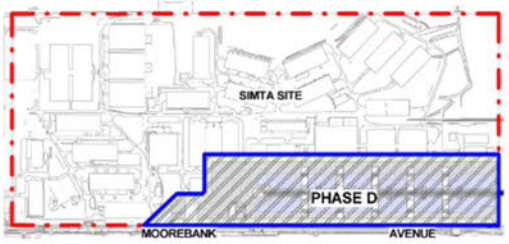
PHASE A - CONSTRUCTION OF RAIL LINK, RAIL SIDINGS, THE WESTERN PORTION OF THE INTERMODAL TERMINAL AND THE ANCILLARY OPERATIONAL FACILITIES



PHASE B - OPERATION OF THE WESTERN PORTION OF THE INTERMODAL TERMINAL USING MANUAL FORKLIFTS AND REACH STACKERS. CONSTRUCTION OF THE REMAINDER (EASTERN) PORTION OF THE INTERMODAL TERMINAL INCLUDING ERECTION OF GANTRY CRANES



PHASE C - OPERATION OF THE EASTERN PORTION OF THE INTERMODAL TERMINAL USING GANTRY SYSTEMS. REFURBISHMENT OF THE WESTERN PORTION OF THE INTERMODAL TERMINAL FOR GANTRY SYSTEMS



PHASE D - OPERATION OF THE ENTIRE STAGE 1 INTERMODAL TERMINAL USING GANTRY SYSTEMS AND TRANSITION TO A FULLY AUTMATED PROCESS

Figure 7 Phasing Plan for the Stage 1 Construction (Reference: Figure 4-11, EIS (Hyder Consulting Pty Ltd, 2015))

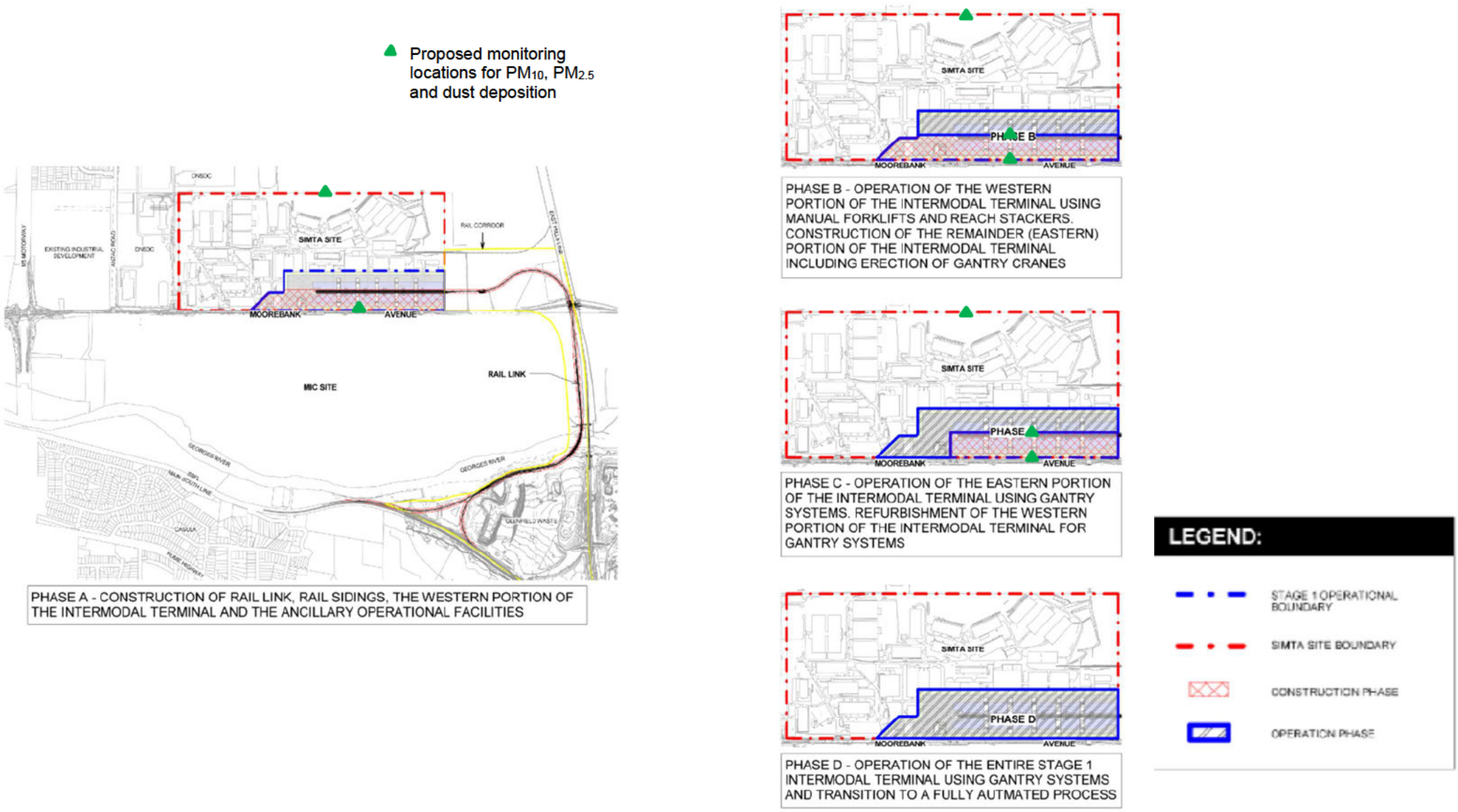


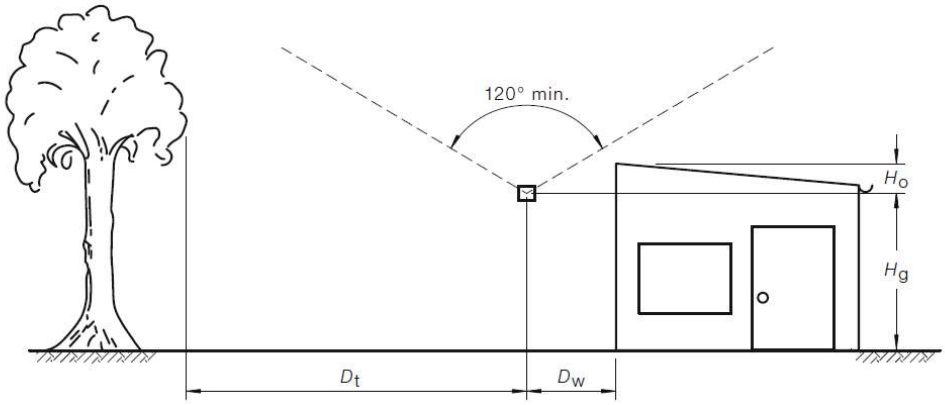
Figure 8 Proposed Onsite Monitoring Locations Based on Construction Phases

APPENDIX B

General Considerations for Siting Air Quality Monitoring Equipment

The Australian/ New Zealand Standard AS/NZS 3580.1.1:2007 (Methods for Sampling and Analysis of Ambient Air, Part 1.1 Guide to Siting Air Monitoring Equipment) provides the following general guidelines for siting an air quality monitoring station. Relevant recommendation from the guidelines applicable for siting the DustTraks and dust deposition gauges at the site boundary are provided below:

- Be located in an area with no impediment to air approaching the sampling inlet, particularly in the predominant wind direction. As a general rule, a sampling inlet will be located away from any nearby structures (e.g. buildings, walls and trees) to the extent that the sampling inlet has a minimum clear sky angle of 120° (see Figure 9).
- Be clear of all vegetation and building structures which may alter pollutant concentrations (e.g. by adsorption or absorption).
- Be located away from areas that may present chemical interference (e.g. measuring particulate matter near domestic or commercial incinerators).
- Be located away from areas that may present physical interference (e.g. electrical interference to sampling equipment from high voltage power lines).
- Be located away from extraneous local sources of air pollution/ air emissions unless those sources are specifically being monitored.
- Be on flat and level ground.
- Be readily accessible to personnel and for transporting equipment.
- Have adequate and reliable communication services.
- Be located in an area which does not impose restrictions on any construction activities due to the presence of the equipment.



LEGEND:

H_g = Height of sampling inlet above ground — 2 to 5 m for ground based sampling sites and up to 15 m for roof top sampling sites.
H_o = Height of nearby obstacle above sampling inlet — $2H_o \leqslant D_w$
D_t = Distance to nearby tree — $\geqslant$ 10 m
D_w = Distance to wall (supporting structure) — minimum 1 m
120° = Minimum clear sky angle above sampling inlet

Figure 9 Generalised ground level sampling site (not to scale) (from AS/NZS 3580.1.1:2007)

Specifically, AS/NZS 3580.1.1:2007 recommended the following guidelines in Table 22 for positioning of the sampling inlet of the monitoring equipment relevant to PM_{10} and dust deposition.

Table 22 Positioning requirements of sampling inlet (from AS/NZS 3580.1.1:2007)

Pollutants	Height above ground to Sampling Inlet (m)[1]	Other Locating Criteria for Sampling Inlet (Minimum Requirements)
PM_{10} and $PM_{2.5}$	1.0 - 5	• Clear sky angle 120° • Unrestricted airflow of 270° around sample inlet or 180° if inlet is on the side of a building • 10m from nearest object or dripline of trees that are higher than 2m below the height of the sample inlet • No extraneous sources nearby • >50m from road (for traffic ≤ 10,000 vehicles/day)
Dust deposition	2.0 ± 0.2	• ≥5m from source • Clear sky angle 120° • Unrestricted airflow of 360° around sample inlet • 10m from dripline of trees • No extraneous sources

1. For ground level based site