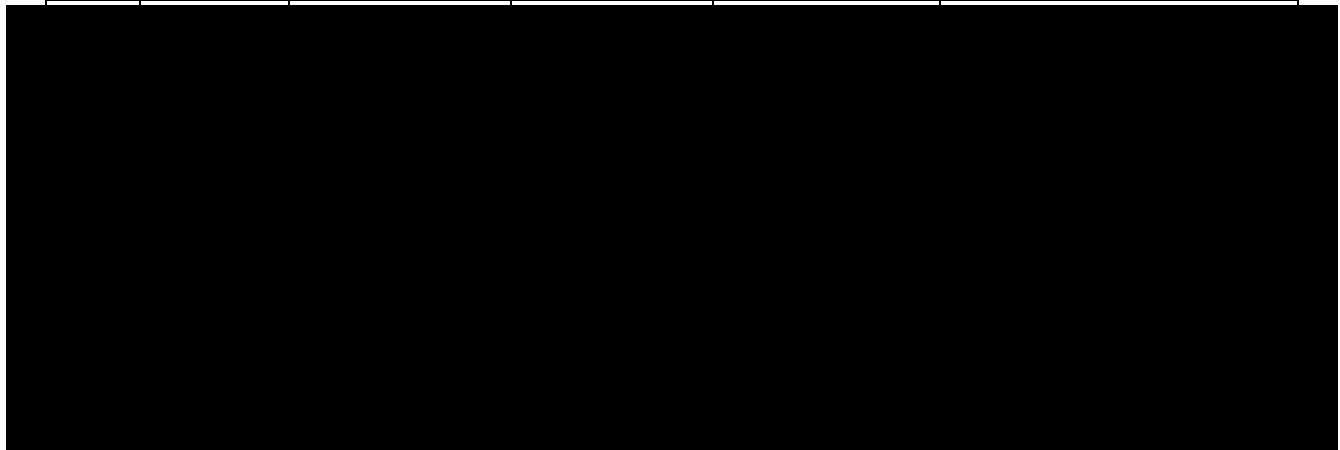


Air Quality Management Plan

Cross River Rail Project – Tunnel, Stations and Development Package (TSD)

REV	DATE	PREPARED BY NAME & SIGNATURE	REVIEWED BY NAME & SIGNATURE	APPROVED BY NAME & SIGNATURE	REMARKS
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Revision: 3

Compliance Matrix

Table 1 Compliance matrix

CRRDA REFERENCE	REQUIREMENT	ADDRESSED IN SECTION
Coordinator-General's change report Appendix 1 – Part C – Condition 13 Air Quality		
(a)	Project Works must aim to achieve the goals in Table 2.	This Plan
(b)	During construction, monitor and report on air quality in accordance with the AQMP, a sub-plan of the CEMP	This Plan

Details of Revision Amendments

Document Control

The CBGU Project Director is responsible for ensuring that this Plan is reviewed and approved. The Project Environment & Sustainability Manager is responsible for updating this Plan to reflect changes to the Project, legal and other requirements, as required.

Amendments

Any revisions or amendments must be approved by the CBGU Project Director before being distributed / implemented.

Distribution and Authorisation

The CBGU Project Director is responsible for the distribution of this Plan. The controlled master version of this document is available for distribution as appropriate and maintained on TeamBinder. All circulated hard copies of this document are deemed to be uncontrolled.

All personnel employed on the Project will perform their duties in accordance with the requirements of this Plan, supporting management plans, and related procedures.

Table of Contents

1	Introduction	9
1.1	Background	9
1.2	Context	9
1.3	Objectives	9
1.4	Legislative Framework	9
1.4.1	Commonwealth Legislation	9
1.4.2	State Legislation	9
1.4.3	Approvals, Permits and Licences	10
1.4.4	Guidelines and Standards	10
2	Required Outcomes	11
2.1	Coordinator-General Conditions	11
2.2	Environmental Outcomes	11
2.3	Performance Criteria	11
3	Impacts and Mitigation Measures	12
3.1	Impacts	12
3.1.1	Southern Portal and Boggo Road	12
3.1.2	Woolloongabba Station	12
3.1.3	Albert Street Station	13
3.1.4	Roma Street Station	13
3.1.5	Northern Portal	13
3.2	Mitigation Measures	14
3.2.1	General	14
3.2.2	Dust	15
3.2.3	Diesel Exhaust Emissions	16
3.2.4	Odour	17
3.2.5	Greenhouse Gases	17
4	Compliance Management	18
4.1	Roles and Responsibilities	18
4.2	Induction and Training	18
4.2.1	Environmental Induction	18
4.2.2	Environmental Training	18
4.3	Incidents and Emergencies	18
4.3.1	Incident Notification	18
4.3.2	Incident Types	18
4.3.3	Incident Prevention Management	18
4.3.4	Incident Investigation	18
4.3.5	Complaint Management	18

5	Inspections, Monitoring, Auditing and Reporting	19
5.1	Environmental Monitoring.....	19
5.1.1	Baseline Monitoring	19
5.1.2	Performance Monitoring.....	19
5.1.3	Auditing.....	22
5.1.4	Corrective Action	22
5.2	Reporting.....	22
5.2.1	Monthly Report	22
5.2.2	Greenhouse Gas Emissions Reporting.....	23
5.2.3	Incidents and Non-Compliance Reporting	23
5.3	Documentation and Communication	23
5.3.1	Environmental Records	23
5.3.2	Document Control	23
5.3.3	Review and Improvement	23
5.3.4	Communication	24

Table of Tables

Table 1	Compliance matrix.....	i
Table 2	Referenced Documents	v
Table 3	Terms	vi
Table 4	Control Methods for construction activities at specific sites.....	15
Table 5	Baseline Air Quality	19
Table 6	Locations for ongoing performance monitoring in relation to air quality.....	20

Table of Figures

Figure 1	Monitoring Locations.....	21
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Referenced Documents

The following provides a list of referenced documents either as a sub-plan to this plan or referenced from.

Table 2 *Referenced Documents*

Document Number	Document Name	Location of Controlled Version
Referenced Project Plans include:		
CRRTSD-EN-MPL-CBGU-000019	Construction Environment Management Plan	TeamBinder
CRRTSD-CU-MPL-CBGU-000002	Community Engagement Plan	TeamBinder
CRRTSD-CU-MPL-CBGU-000018	Communications and Stakeholder Engagement Management Plan	TeamBinder
CRRTSD-EN-ENMP-CBGU-000001	Air Quality Management Plan	TeamBinder
CRRTSD-EN-ENMP-CBGU-000010	Acid Sulfate Soils Management Plan	TeamBinder
CRRTSD-CU-MPL-CBGU-000018	Community and Stakeholder Engagement Plan	TeamBinder

Note: this Management Plan may not contain the current version of the documents listed above. Refer to the 'location of controlled version' for the most current version.

Glossary of Terms

Table 3 Terms

Term	Meaning
$\mu\text{g}/\text{m}^3$	Micrograms per Cubic Meter of Air
2012 CGER	Coordinator-General's evaluation report
AASS	Actual Acid Sulfate Soils
ACH Act	Aboriginal Cultural Heritage Act 2003
AQMP	Air Quality Management Plan
ARI	Average Recurrence Interval
ASS	Acid Sulfate Soils
ASSMP	Acid Sulfate Soils Management Plan
BCC	Brisbane City Council
BTC	Brisbane Transit Centre
CaCO_3	Calcium carbonate (Aglime)
CBD	Central Business District
CBGU	Design & Construct Contractor comprising a joint venture with CPB Contractors Pty Ltd, BAM International Australia Pty Ltd, Ghella Pty Ltd and UGL Engineering Pty Ltd
CEMP	Construction Environmental Management Plan
CG	Coordinator-General
CGCR	Coordinator-General change reports
CHMP	Cultural Heritage Management Plans
CLR	Contaminated Land Register
COEMP	Commissioning Environmental Management Plan
CPB CMS	CPB Contractors Management System
CRR	Cross River Rail
CSEP	Community and Stakeholder Engagement Plan
DATSIP	Department of Aboriginal and Torres Strait Islander Partnerships
dBA	Means decibels measured on the 'A' frequency weighting network
DEHP	Department of Environment and Heritage Protection (now DES)
Delivery Authority	Cross River Rail Delivery Authority
DES	Department of Environment and Science
Directly Affected Persons	An entity being either the owner or occupant of premises for which predictive modelling or monitoring indicates the Project impacts would be above the performance criteria in the Imposed Conditions.
DTMR	Department of Transport and Main Roads
ECM	Environmental Constraints Map

Term	Meaning
EIS	Environmental Impacts Statement
EMP	Environmental Management Plan
EMR	Environmental Management Register
EMS	Environmental Management System
EP Act	Environmental Protection Act 1994 (Qld)
EPP (Water)	Environmental Protection (Water) Policy 2009 (Qld)
ESC	Erosion and Sediment Control
ESCP	Erosion and Sediment Control Sub-Plan
EWMS	Environmental Work Method Statements
GHG	Greenhouse Gas
INB	Inner Northern Busway
IECA	International Erosion Control Association
LA10 adj	means the A-weighted sound pressure level, adjusted for tonal character or impulsiveness, that is exceeded for 10% of a 1 hour period when measured using time-weighting 'F'
LAeq adj	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 1 hour period has the same mean square sound pressure of a sound that varies with time
LCA	Licensed Construction Area
mg/m ² /day	Milligrams per Square Meter per Day
mm/s PPV	Millimetres per Second Peak Particle Velocity
NATA	National Association of Testing Authorities
NEPM	National Environmental Protection Measure
PA	Princess Alexandra
PAH	polycyclic aromatic hydrocarbons
PASS	Potential Acid Sulfate Soils
PFAS	per- and poly-fluoroalkyl substances
PM ₁₀	Particulate Matter of 10 Microns in diameter or smaller
Predictive Modelling	Means the use of an appropriate analytical scenario testing, whether or not by numerical measurements, undertaken prior to the commencement of Project Works
Project	Cross River Rail Project
PSI	Preliminary Site Investigations
PSTR	Project Scope and Technical Requirements
QLD	Queensland
QR	Queensland Rail
RfPC	EIS Request for Project Change

Term	Meaning
RNA	Royal National Agriculture and Industrial Association
SDS	Safety Data Sheets
SPL	Sound Pressure Levels
SQP	Suitably Qualified Person
TMR	Transport and Main Roads
TRH	total recoverable hydrocarbons
TSP	Total Suspended Particulates

1 Introduction

1.1 Background

The Design and Construction Joint Venture comprising of CPB Contractors Pty Ltd, BAM International Australia Pty Ltd, Ghella Pty Ltd and UGL Engineering Pty Ltd (CBGU D&C JV or CBGU) is responsible for delivering the Cross River Rail (CRR) Project (the Project) on behalf of the Cross River Rail Delivery Authority (the Delivery Authority).

This Air Quality Management Plan should be read in conjunction with the Project's overarching Construction Environment Management Plan (CEMP).

The CEMP provides specific details regarding the background of the Project, the scope of the Project and the staging and timing of key milestones associated with the construction of the Project.

1.2 Context

This Construction Air Quality Management Plan (AQMP) forms part of the Construction Environmental Management (CEMP) developed for the construction of the Project. The AQMP describes how the CBGU D&C JV will manage air quality and minimise impacts during construction of the Project.

1.3 Objectives

The objectives of this AQMP are to:

- Achieve the environmental outcomes stated in Section 2 of this AQMP
- Nominate the Project's monitoring and reporting requirements in relation to air quality
- Manage the impact on the local community and sensitive receptors in terms of air quality from construction works
- Monitor the effects of management and mitigation measures.

1.4 Legislative Framework

1.4.1 Commonwealth Legislation

- *National Greenhouse and Energy Reporting Act 2007.*

1.4.2 State Legislation

State legislation that is relevant to the Project and this AQMP includes:

- *Cross River Rail Delivery Authority Act 2016*
- *Environmental Protection Act 1994*
- *Environmental Protection (Air) Policy 2008*
- *Building Act 1975*
- *City of Brisbane Act 2010*
- *Economic Development Act 2012*

- *Local Government Act 2009*
- *Transport Infrastructure Act 1994*
- *State Development and Public Works Organisation Act 1971*
- *Planning Act 2016*
- *Work Health and Safety Act 2011*

1.4.3 Approvals, Permits and Licences

CBGU will obtain licences, permits and approvals as required by law and maintain them as required throughout the delivery phase of the project. No condition of the Infrastructure Approval removes the obligation for CBGU to obtain, renew or comply with such necessary licences, permits or approvals.

All relevant approvals, permits and licences have been identified in the CEMP. None are specifically relevant to air quality.

1.4.4 Guidelines and Standards

Project works must be undertaken in accordance with specific guidelines and standards. Guidelines and standards related to the management of air quality, that must be met include, but are not limited to:

- AS 2985 Workplace atmospheres - method for sampling and gravimetric determination of respirable dust
- AS 3640 Workplace atmospheres - method for sampling and gravimetric determination of inhalable dust
- AS3580.1.1 Method for sampling and analysis of ambient air – Guide to siting air monitoring equipment
- AS3580.9.3 Methods for sampling and analysis of ambient air - Part 9.3: Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler Gravimetric method
- AS3580.9.6 Methods for sampling and analysis of ambient air - Method 9.6: Determination of suspended particulate matter - PM10 high volume sampler with size selective inlet – Gravimetric method
- AS3580.9.14 Methods for the sampling and analysis of ambient air - Method 9.14: Determination of suspended particulate matter – PM2.5 high volume sampler with size selective inlet - gravimetric method
- AS3580.9.9 Methods for sampling and analysis of ambient air - Method 9.9: Determination of suspended particulate matter - PM10 low volume sampler - Gravimetric method
- AS3580.9.10 Methods for sampling and analysis of ambient air - Method 9.10: Determination of suspended particulate matter - PM2.5 low volume sampler - Gravimetric method
- AS3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposition matter – Gravimetric method
- AS3580.14 Meteorological Monitoring for Ambient Air Quality.

2 Required Outcomes

2.1 Coordinator-General Conditions

The Imposed Conditions relating to Air Quality for the Project can be found on the Coordinator-General's website (<http://www.dsdmip.qld.gov.au/coordinator-general/assessments-and-approvals/coordinated-projects/completed-projects/cross-river-rail-project.html>).

2.2 Environmental Outcomes

The following environmental outcomes in relation to air quality are to be achieved for the Project.

- Nuisance from dust, odour and emissions arising from the Project construction activities is minimised at nearby sensitive receivers, by implementing controls in each precinct.

2.3 Performance Criteria

The following performance criteria must be achieved throughout the construction works:

- Emissions are within the air quality goals as set out in the Coordinator- General's Imposed Condition
- Seek to minimise complaints from dust generation by ensuring that controls are implemented
- Where emissions are predicted to exceed the air quality goals, mitigation measures are designed and implemented to mitigate the impacts for nearby sensitive receivers.

3 Impacts and Mitigation Measures

3.1 Impacts

Impacts possibly generated from Project construction works may include potential dust emissions associated with the following activities:

- Drilling and blasting
- Excavating spoil
- Loading and haulage of spoil material on trucks
- Rock breaking and piling
- Wind erosion from disturbed surfaces
- Wheel generated dust from machinery on unpaved surfaces
- Vehicle and plant emissions.

Specific potential impacts for each of the applicable worksites have been identified in the following sections. These potential impacts have been informed by the Evaluated Project EIS and, where applicable updated dispersion modelling.

For the purpose of evaluating impacts, sensitive receptors relevant to the Project have been identified and include:

- Residential dwellings
- Educational, community and health buildings
- Parks, outdoor education and recreational areas.

3.1.1 Southern Portal and Boggo Road

A combination of cut and cover and mined cavern will be used for the construction of the Boggo Road Station and Southern Portal. This will likely reduce the air quality impacts. RfPC-4 provided updated dispersion modelling due to the proposed removal of the fabric filter to control dust emissions. This modelling illustrated that provided additional control measures are implemented the majority of exceedances are removed with the exception of the nuisance based dust deposition goal which remains at one nearby receptor.

Contour plots showing the distribution of impacts for particulate matter, TSP and dust deposition are provided in Appendix A.

3.1.2 Woolloongabba Station

This worksite would be used for:

- Construction of the cut and cover box and station cavern for the Woolloongabba Station
- TBM launch site and removal of spoil from construction of the tunnels between Woolloongabba and Victoria Park
- Retrieval of the TBMs for the tunnels between Yeerongpilly and Woolloongabba.

It is relevant to note that an acoustic shed is proposed at the Woolloongabba worksite for tunnelling and spoil logistics this will help mitigate air quality impacts.

Based on the updated dispersion modelling completed for the RfPC-4 EIS it is predicted that there will be no exceedances of relevant short term (24-hour average) or long term (annual average) criteria at any of the residential receptors surrounding the site for all pollutants with the exception of 24-hour average TSP concentration predicted at a commercial receptor on Main Street. Due to lower levels of peak spoil generation (and therefore vehicle movements) estimated for RfPC-4 compared to the Evaluated Project, impacts are predicted to be less than previously evaluated.

Contour plots showing the distribution of impacts for particulate matter, TSP and dust deposition are provided in Appendix B.

3.1.3 Albert Street Station

Works at the Albert Street station site will involve:

- Construction of the northern station entrance and associated plant
- Albert Street Station mined cavern shaft accommodating the southern entrance and associated plant
- Subway and entrance under Albert & Mary Street corner
- Demolition works for Lots 1 & 2 (96 & 87-109 Albert Street)
- Demolition of 142 Albert Street (Northern Entry) – noting that this activity has been previously addressed by the CEMP.

Exposed excavation activities do have the potential to generate dust at this location. Other construction activities will occur in the shaft or a purpose built acoustic shed. These activities are not expected to result in exceedances of air quality goals.

3.1.4 Roma Street Station

Surface works with the potential to generate nuisance dust include construction of the vent shaft to the west, the 'vertical transport box' in the centre and a construction shaft located at Lot 60 in the east, which includes an acoustic shed.

Activities that have the potential to generate the most dust, such as removal of spoil from the mined cavern to develop the underground station would occur through the Lot 60 acoustic shed. The presence of the acoustic shed means that dust levels at the surface are likely to meet the air quality goals for the project.

Updated dispersion modelling was undertaken for the RfPC 4 EIS to address an increase in the scale of the works at Roma Street over the Evaluated Project. The dispersion modelling showed no exceedances of the air quality project goals off-site and demonstrated that the dust management measures outlined in Section 3.2 and the use of the acoustic shed is effective.

Contour plots showing the distribution of impacts for particulate matter, TSP and dust deposition are provided in Appendix A.

3.1.5 Northern Portal

Activities at the Northern Portal that have the potential to generate dust emissions as a result of the following:

- Construction of the north portal, dive structure and cut and cover tunnel sections.
- Retrieval of the TBMs for the tunnels between Woolloongabba and Victoria Park.
- The excavation activities and spoil handling activities have the greatest potential to generate air quality impacts.

Mitigation will be applied according to the below section (section 3.2).

3.2 Mitigation Measures

3.2.1 General

- To support on-going construction dust monitoring and in accordance with the requirements of the Outline AQMP worksites (at site or near to) will be serviced by the following:
 - A calibrated weather station measuring wind direction and speed, rainfall, temperature and humidity
 - Calibrated air quality samplers suitable for monitoring TSP, PM10 and dust deposition, locations as per advice from Suitably Qualified Persons
 - Calibrated air quality monitoring equipment suitable for campaign monitoring of dust deposition
 - A person capable of and trained in the operation of the air quality sampling equipment and in the recording of sampling data (from the Outline Construction Environmental Management Plan - Outline Air Quality Management Plan (OAQMP) p 5).
- Prior to commencement of works and during construction CBGU will consult with sensitive receivers proximate to the worksites about the scale and duration of works with the potential to impact on air quality. Consultation requirements have been specifically addressed within the Communication and Stakeholder Engagement Plan (CSEP).
- At construction sites and spoil placement sites, meteorological conditions will be monitored, particularly wind speed and direction. When adverse meteorological conditions are experienced at worksites, such as dry conditions with high winds, CBGU will take measures to minimise or avoid impacts of unreasonable dust or odour on adjacent properties. Such measures may include:
 - Modification of construction methods
 - Increase in dust suppression measures
 - Implementation of additional washing and sweeping of roads servicing worksite access and egress points
 - when no other reasonable or practical measure is available, cessation of work until the meteorological conditions improve and the environmental outcome can be achieved (OAQMP p 7).
- If monitoring shows exceedances during construction, additional mitigation measures will be required, such as reviewing dust generating activities during dry, windy conditions, undertaking additional checks of dust controls, increasing watering rates during dry periods, or undertaking targeted consultations with affected entities (OAQMP p 7-8).
- Haul roads within the operational tunnelling sites at the Southern Portal / Boggo Road, Woolloongabba and Northern Portal will be paved for dust management as further detailed in Table 4 (OAQMP p 8).

- Where predictive modelling or monitoring indicates exceedances of the air quality goals for human health at nearby sensitive receivers, measures such as work sheds or enclosures equipped with a fabric filter for the removal of airborne particulate matter may be required (OAQMP p 8).
- When no other reasonable or practical measure is available, the alteration or cessation of work until the meteorological conditions improve and the environmental outcome can be achieved (OAQMP p 7).

3.2.2 Dust

- Site specific dust mitigation methods have been tested as part of the RfPC-4 EIS to identify adequate mitigation measures for potential air quality impacts. The control methods and factors are identified in Table 4. These additional control measures must be implemented at these worksites (RfPC 4 p 119).

Table 4 Control Methods for construction activities at specific sites.

Precinct	Activity	Control Method
Northern portal	Drilling	Water spray
	Blasting	Hoardings around construction worksite
	Excavators/Front-end loaders	Hoardings and water spray
	Bulldozers on spoil	Hoardings around construction worksite
	Loading trucks	Hoardings around construction worksite
	Wheel-generated dust	50% sealed hardstand roads and sprays
	Rock-breaker	Hoardings around construction worksite
	Piling rig	Hoardings around construction worksite
	Wind erosion	Water spray
Woolloongabba and Roma Street Station	Drilling	Acoustic enclosure, water spray
	Blasting	Acoustic enclosure, Hoardings
	Excavators/Front-end loaders	Acoustic enclosure, Hoardings and water spray
	Bulldozers on spoil	Acoustic enclosure, Hoardings
	Loading trucks	Acoustic enclosure, Hoardings
	Wheel-generated dust	Acoustic enclosure, 50% sealed hardstand roads and sprays
	Rock-breaker	Acoustic enclosure, Hoardings
	Piling rig	Acoustic enclosure, Hoardings
	Wind erosion	Acoustic enclosure, water spray
Southern Portal/Boggo Road Station	Drilling	Water spray
	Blasting	Hoardings around construction worksite

Precinct	Activity	Control Method
	Excavators/Front-end loaders	Hoardings and water spray or manual watering to ensure materials are moist
	Bulldozers on spoil	Hoardings and water spray or manual watering to ensure materials are moist
	Loading trucks	Hoardings around construction worksite
	Wheel-generated dust	90% sealed/hardstand roads and Level 2 water sprays
	Rock-breaker	Hoardings around construction worksite
	Piling rig	Hoardings around construction worksite, manual watering on visual dust
	Wind erosion	Water spray

- The site shall be visually monitored daily for excessive dust generation and corrective actions undertaken to minimise dust where possible (OAQMP p 10).
- Where practicable, only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Impose appropriate speed limit for construction vehicles at worksites, including on sealed roads.
- Ensure trucks transporting construction spoil are:
 - covered to prevent wind-blown dust during transport (OAQMP p 8); and
 - where necessary, cleaned down prior to exit from the worksites and the spoil placement site to prevent spills of loose material to roadways (OAQMP p 8).
- Where necessary, truck wheel wash stations will be installed at predetermined locations at each worksite. The proposed locations have been illustrated on the Site Management Plans contained and the Erosion and Sediment Control Management Plan (ESCP) .

3.2.3 Diesel Exhaust Emissions

- Adopt traffic management procedures in accordance with the Construction Traffic Management Plan (CTMP) to avoid vehicles idling for excessive periods if required to queue to enter the worksite.
- Manage the movement of construction vehicles to avoid queuing near residential receivers approaching the worksites or adjacent to other sensitive activities (OAQMP p 8).
- Attempt to locate marshalling sites and queuing areas for trucks and site vehicles away from residential areas and other sensitive receivers (OAQMP p 8).
- Where feasible, collect and direct exhaust emissions from stationary plant away from sensitive receivers (OAQMP p 8).
- For stationary plant and equipment, consider fitting diesel motors with emission control measures that are regularly maintained to manufacturers' specifications (OAQMP p 8).

3.2.4 Odour

- Odorous soils may be present within the Project alignment, particularly in association with PASS and ASS that may occur within the floodplains of the Brisbane River and the western extent of the Norman Creek catchment near Woolloongabba. During the first disturbance of potentially odorous soils, implement reasonable and practicable measures to avoid or mitigate and manage impacts of odours on adjacent properties. Such measures may include:
 - ensuring clean cover materials (e.g. clean fill) is on hand to immediately cover odorous spoil materials that are resulting in off-site impacts (OAQMP p 9);
 - identifying and determining the potential for odour impacts at off-site sensitive receivers based on preliminary information on the scale and nature of any known contamination, the distance from the contamination area to sensitive receivers, and the prevailing meteorological conditions (OAQMP p 9);
 - conducting works with odorous soils when wind directions is less likely to affect sensitive receivers (OAQMP p 9);
 - covering odorous, excavated soil stockpiled on a construction site or a spoil placement site to reduce odour impacts (OAQMP p 9); or
 - Management of ASS in accordance with the Acid Sulfate Soils Management Plan (ASSMP).

3.2.5 Greenhouse Gases

- Maintain construction plant and equipment and haul trucks in good working order to maximise the fuel efficiency of equipment (OAQMP p 9).
- Procure energy efficient construction equipment, when appropriate (OAQMP p 9).
- Use appropriately sized equipment for construction activities (OAQMP p 9).
- Minimise waste from construction by procuring pre-fabricated products (OAQMP p 9).
- Use mains electricity where practicable to minimise the use of generators (OAQMP p 9).

4 Compliance Management

4.1 Roles and Responsibilities

The organisational responsibilities and accountabilities in relation to environmental management throughout Project construction works are outlined in the overarching CEMP.

4.2 Induction and Training

4.2.1 Environmental Induction

All CBGU staff, subcontractors and visitors to worksites must attend general induction training that covers general environmental management requirements, site-wide controls and site-specific and work specific risks and mitigation measures. Further details regarding environmental induction requirements have been outlined in the overarching CEMP.

4.2.2 Environmental Training

Details regarding environmental training requirements have been outlined in the overarching CEMP.

4.3 Incidents and Emergencies

4.3.1 Incident Notification

The immediate response to all incidents is to make the area safe and undertake measures to prevent further environmental harm. The Environment and Sustainability Manager, Shared Services Director and Project Director should be notified immediately in the event of an environmental incident.

Further details regarding Incident Notification, have been outlined in the overarching CEMP.

4.3.2 Incident Types

Incidents include, but are not limited to:

- Any breach of the legislation or an approval condition or the Co-ordinator General Conditions (NCE)

4.3.3 Incident Prevention Management

Incident Classification and Procedure has been identified within the overarching CEMP.

4.3.4 Incident Investigation

The Incident Investigation process has been specified in the overarching CEMP.

4.3.5 Complaint Management

All complaints are to be dealt with in accordance with the complaints management procedure outlined in the CEMP.

5 Inspections, Monitoring, Auditing and Reporting

This section outlines the compliance processes that have been adopted by CBGU to ensure compliance with the Coordinator-General Conditions and any other legislative requirements. The section below details specific requirements relating to inspections, monitoring and auditing requirements.

5.1 Environmental Monitoring

5.1.1 Baseline Monitoring

Baseline air quality information adopted for the evaluated Project and summarised in Table 5 was established based on data from four monitoring stations (Cannon Hill, Brisbane CBD, South Brisbane, Rocklea). The data, presented in Table 5 indicates that baseline concentrations are below their respective air quality goals which have been derived from *Environmental Protection Policy (Air) 2008* and which have been adopted for the Project construction.

Table 5 Baseline Air Quality

Air Quality Indicator	Averaging Period	Units	Background Concentration	Air Quality Goals
Dust deposition	30 days	mg/m ² /day	60	120
Total Suspended Particulates (TSP)	24 hours	µg/m ³	26	80
	1 year	µg/m ³	24	90
Particulate matter (PM ₁₀)	24 hours	µg/m ³	17	50
	1 year	µg/m ³	14.5	25

5.1.2 Performance Monitoring

Monitoring will be undertaken at the sensitive receptors nominated in Table 6 to validate the impacts predicted for the Project to measure the effectiveness of environmental controls and implementation of this AQMP. The monitoring also helps in addressing any potential Community Complaints that may be received. Air quality monitoring will be conducted at the designated monitoring sites at all times that relevant surface works are conducted. The monitoring requirements for air quality are outlined below.

Dust and odour

- Monitor and log meteorological conditions, including wind speed and direction (OAQMP p 11) see Figure 1.
- Undertake visual inspections for dust generating activities on a daily basis (e.g. stockpiles, unstable material with potential for dust) (OAQMP p 11).
- Undertake ambient odour inspections for potential odour-generating activities (e.g. excavation of contaminated soils) on a daily basis (OAQMP p 11).
- Undertake regular monitoring of ambient air quality (TSP, PM₁₀ and deposited dust) against the air quality goals for each of the construction worksites in operation. Monitoring must be conducted in the

vicinity of construction worksites in areas representative of the receiving environment and sensitive receptors for the duration of surface works, and in response to complaints. Monitoring locations must be down-wind of the worksites. Indicative air quality monitoring locations around the main construction worksites are provided in Table 6 below and Figure 1 (OAQMP p 11).

Table 6 Locations for ongoing performance monitoring in relation to air quality.

Worksite	Dust Monitoring Locations
Southern Portal and Boggo Road Station	<ol style="list-style-type: none"> 1. Quarry Street, Woolloongabba, (dust) 2. DES Monitoring Station at PA Hospital, O’Keefe St, Woolloongabba (PM10) 3. Peter Doherty Street, Dutton Park (dust)
Woolloongabba Station	<ol style="list-style-type: none"> 4. TMR/DES monitoring station at South Brisbane (PM10) 5. Russian Orthodox Cathedral (dust) 6. Woolloongabba Busway, Cnr Stanley St and Main Rd (dust)
Albert Street Station	<ol style="list-style-type: none"> 7. Mary St, Brisbane City (dust, PM10, TSP) 8. Queensland University of Technology’s Gardens Point (PM10)
Roma Street Station	9. Adjacent to Platform 3, Roma Street Railway Station (dust, PM10, TSP)
Northern Portal	10. Transurban Monitoring Station, 400 Gregory Tce, Bowen Hills (PM10)

Note: Further TSP & PM10 monitoring may be conducted when required.

- All monitoring is to be performed by a suitably qualified person in accordance with the QLD Air Quality Sampling Manual (1997), and in accordance with the relevant Australian Standards. All laboratory analyses are to be performed by a NATA-accredited laboratory (OAQMP p 12).
- To support on-going construction dust monitoring and in accordance with the requirements of the Outline AQMP worksites (at site of near to) will be serviced by the following:
 - A calibrated weather station measuring wind direction and speed, rainfall, temperature and humidity
 - Calibrated air quality samplers suitable for monitoring TSP, PM10 and dust deposition, locations as per advice from Suitably Qualified Persons
 - Calibrated air quality monitoring equipment suitable for campaign monitoring of dust deposition
 - A person capable of and trained in the operation of the air quality sampling equipment and in the recording of sampling data (OAQMP p 5).

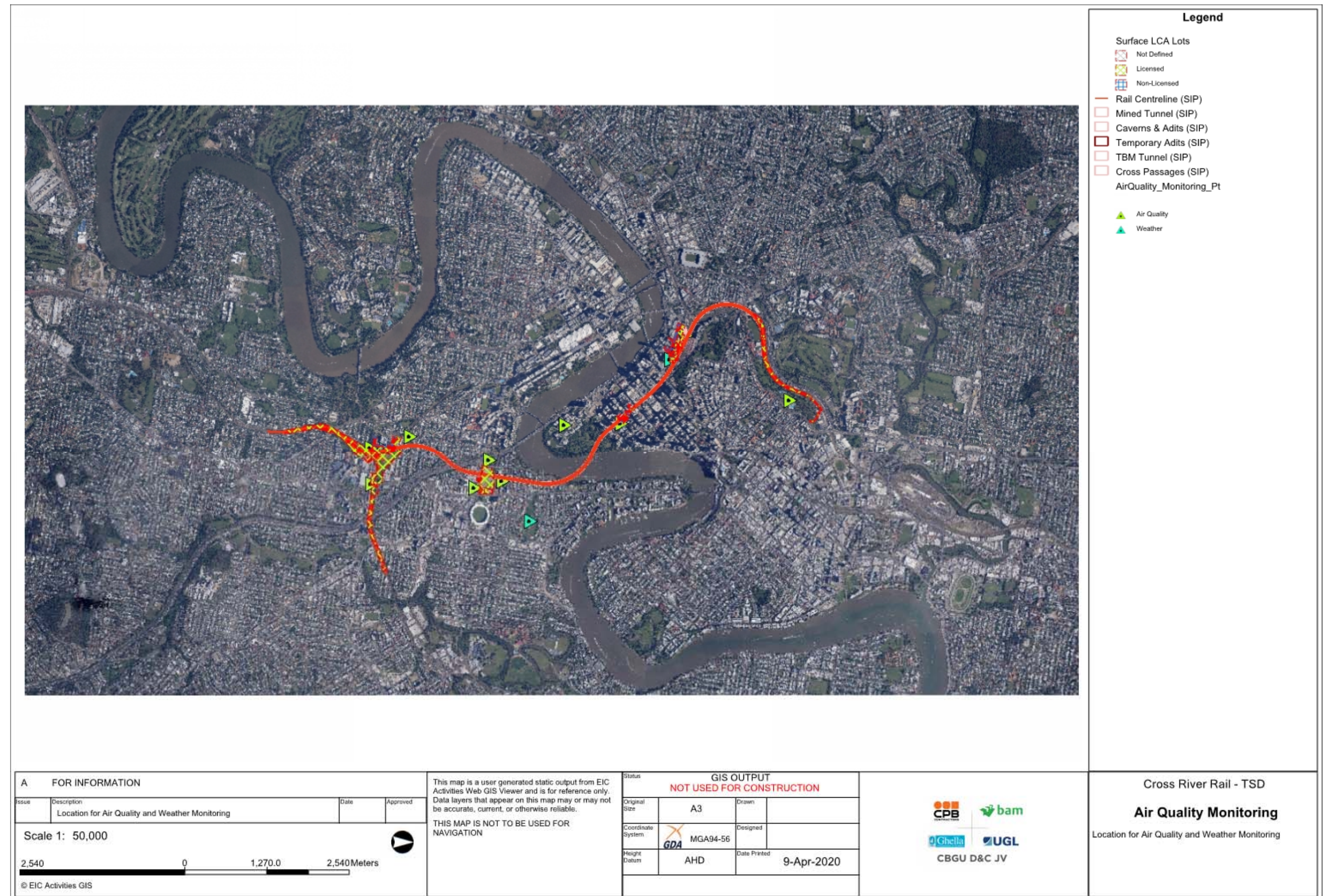


Figure 1 Monitoring Locations

Vehicle emissions

- Conduct observations of construction vehicle movements on a regular basis to:
 - Prevent queuing in streets, other than designated haul routes identified in the CTMP
 - Prevent queuing vehicles idling for periods exceeding five minutes (OAQMP p 12).

Greenhouse gases

- Record the following consumption data to enable GHG emissions to be accurately calculated and reported for the Project:
 - Diesel, petrol, LPG use by Project and contractor vehicles and machinery
 - Electricity use
 - Consumption of oils and greases
 - Number of units and size of any refrigeration units on site (OAQMP p 12).

5.1.3 Auditing

Audits will be undertaken to assess the effectiveness of environmental controls, compliance with the CEMP, compliance with Environmental Design Requirements, and other relevant permits, approvals, and guidelines. There will be a monthly internal audit undertaken by CBGU as per the CEMP, who is to report findings to the Environmental Monitor. This includes reporting on compliance with the CEMP and the Imposed Conditions.

Audits will be undertaken in accordance with the overarching CEMP.

5.1.4 Corrective Action

Corrective actions must be undertaken where monitoring or validated complaints indicate the environmental outcomes or Imposed Conditions are not achieved in relation to particular works, either because the performance criteria have not been met, or mitigation measures have not been implemented. Where corrective actions become necessary, the specific works that do not achieve the environmental outcomes or meet the Imposed Conditions must cease until the corrective actions have been developed and implemented.

The process for developing and implementing Correction Actions has been specified within the overarching CEMP.

5.2 Reporting

5.2.1 Monthly Report

To ensure compliance with Coordinator-General Condition 6, CBGU will prepare and submit a monthly report as per the CEMP.

Reporting requirements associated with this AQMP are outlined below:

- The monthly environmental report must include the results of the ambient air quality monitoring data.
- Energy consumption data will also be reported each month to enable GHG emissions to be accurately calculated and reported.
- Maintain records of the number of incidents or complaints received in relation to dust or odour impacts.

- Record actions taken to mitigate incidents or complaints.

The specific requirements of the Monthly Report have been identified in the CEMP.

5.2.2 Greenhouse Gas Emissions Reporting

Records of the following consumption data will be maintained to enable Greenhouse Gas (GHG) emissions to be accurately calculated and reported for each month for the Project:

- Diesel, petrol, LPG use by vehicles and machinery
- Electricity use
- Consumption of oils and greases
- Number of units and size of any refrigeration units on site.

5.2.3 Incidents and Non-Compliance Reporting

Environmental incidents meeting the criteria of a Non-Compliance Event (NCE) shall be notified in writing to the Coordinator-General within 48 hours of becoming aware of the non-compliance occurring. Notification will generally be undertaken by the Environment and Sustainability Manager or delegate. Additional notification of the incident to the relevant authorities, EM and parent companies will also be undertaken as required.

Further details regarding reporting, including provision of interim and detail reports have been provided in the overarching CEMP.

5.3 Documentation and Communication

5.3.1 Environmental Records

The process for managing and collecting environmental records is detailed in the overarching CEMP. All relevant records in relation to air quality must be maintained in accordance with these requirements.

5.3.2 Document Control

Document control requirements have been specifically addressed within the overarching CEMP.

5.3.3 Review and Improvement

In accordance with the General Requirements of the Outline AQMP this construction AQMP must also be updated and revised on the basis of:

- Detailed designs for Project infrastructure developed by the Contractor
- Detailed construction planning
- Meteorological data relevant to each worksite
- Air quality data relevant to each worksite
- Predictive modelling for each planned construction scenario, considering seasonal variations in meteorological conditions and the programme of works
- Management Review

- Audit (either internal or by external parties)
- Complaints or non-conformance reports
- Changes to the Company's standard system.

Revisions shall be reviewed and approved prior to issue. Updates to this AQMP are numbered consecutively and issued to holders of controlled copies

5.3.4 Communication

All internal and external communication with all stakeholders including the public, Coordinator-General, government agencies and the Delivery Authority must be done in accordance with the requirements of the overarching CEMP.

Appendix A

Air Quality Modelling

D2: Roma Street Contour Plots

D2.1: Dust Deposition – Roma Street



D2.2: Annual and 24-hour average PM₁₀ – Roma Street





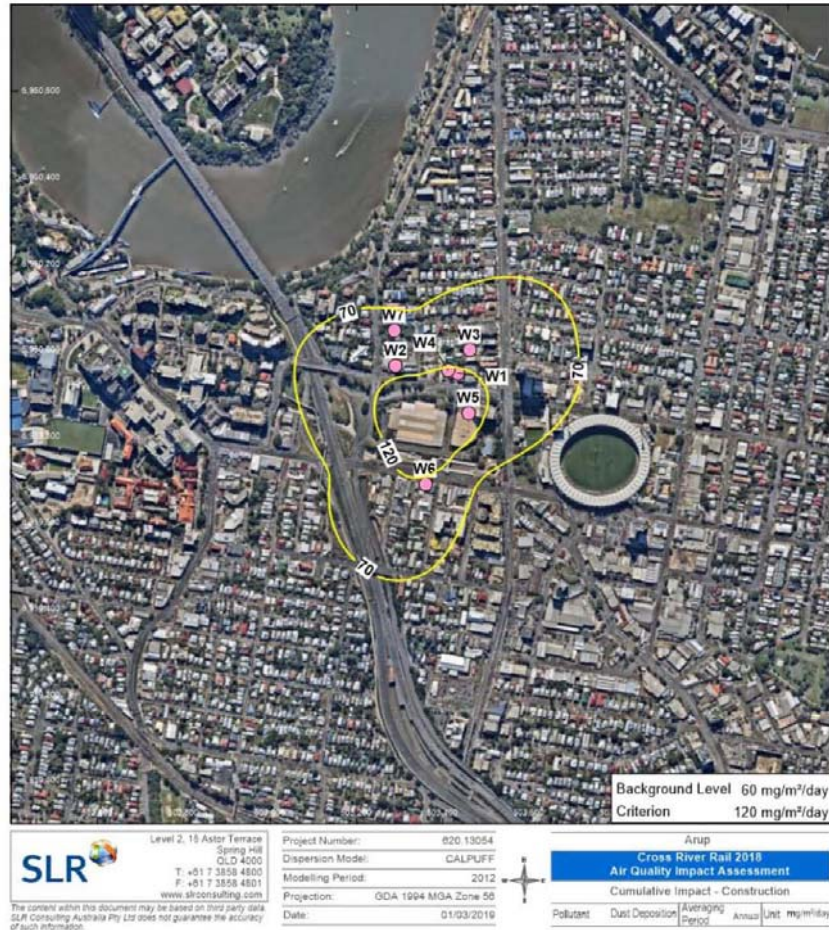
D2.3: Annual and 24-hour average PM_{2.5} – Roma Street





D2.4: Annual and 24-hour average TSP – Roma Street Station

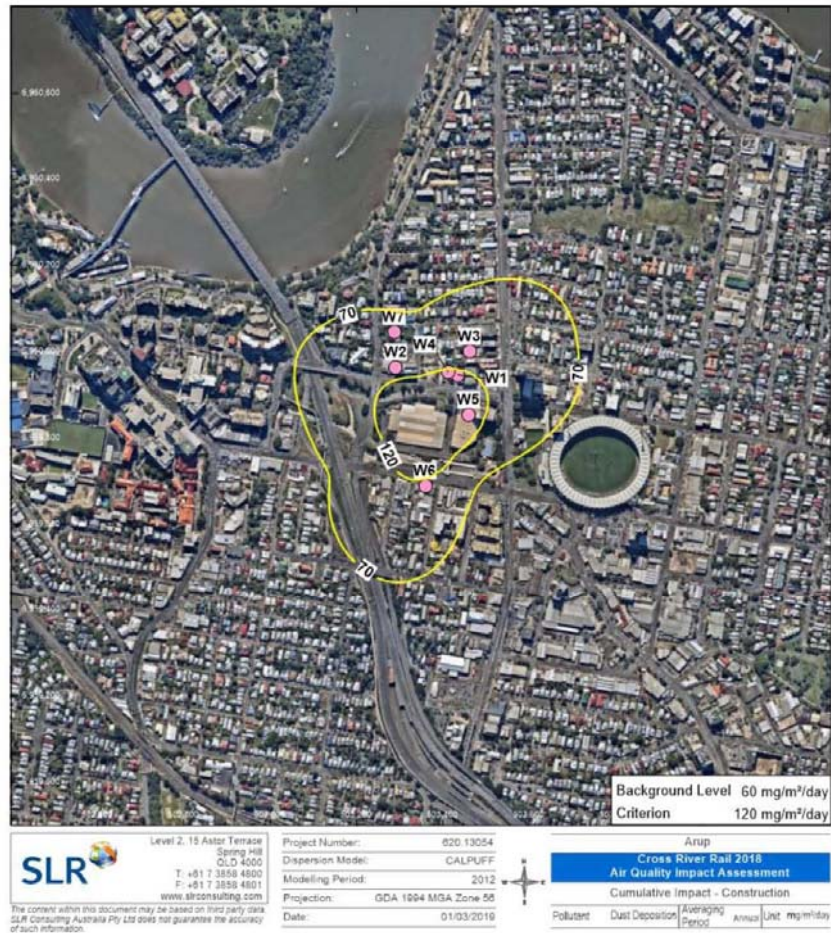






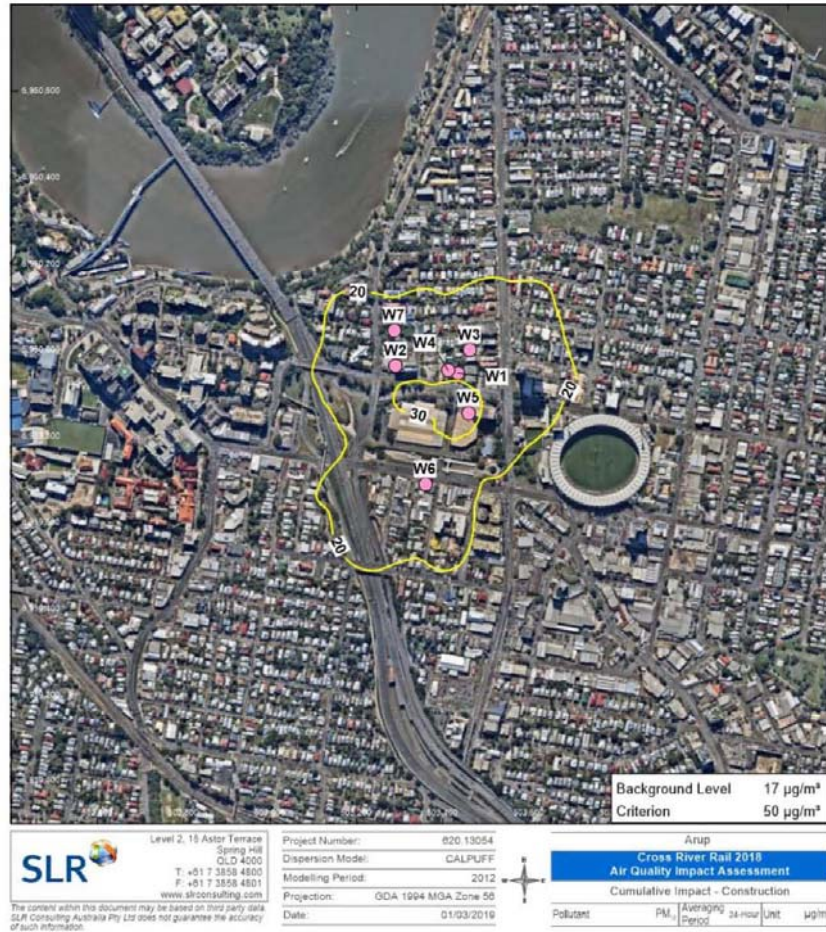
D3: Woolloongabba Contour Plots

D3.1: Dust Deposition – Woolloongabba Station

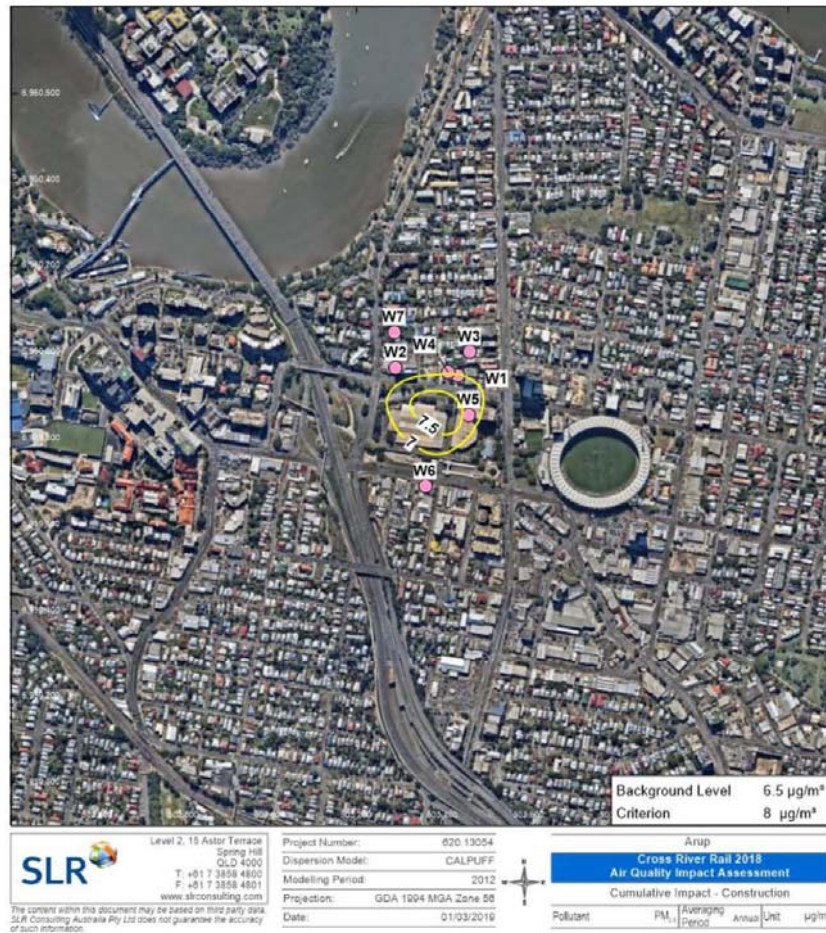


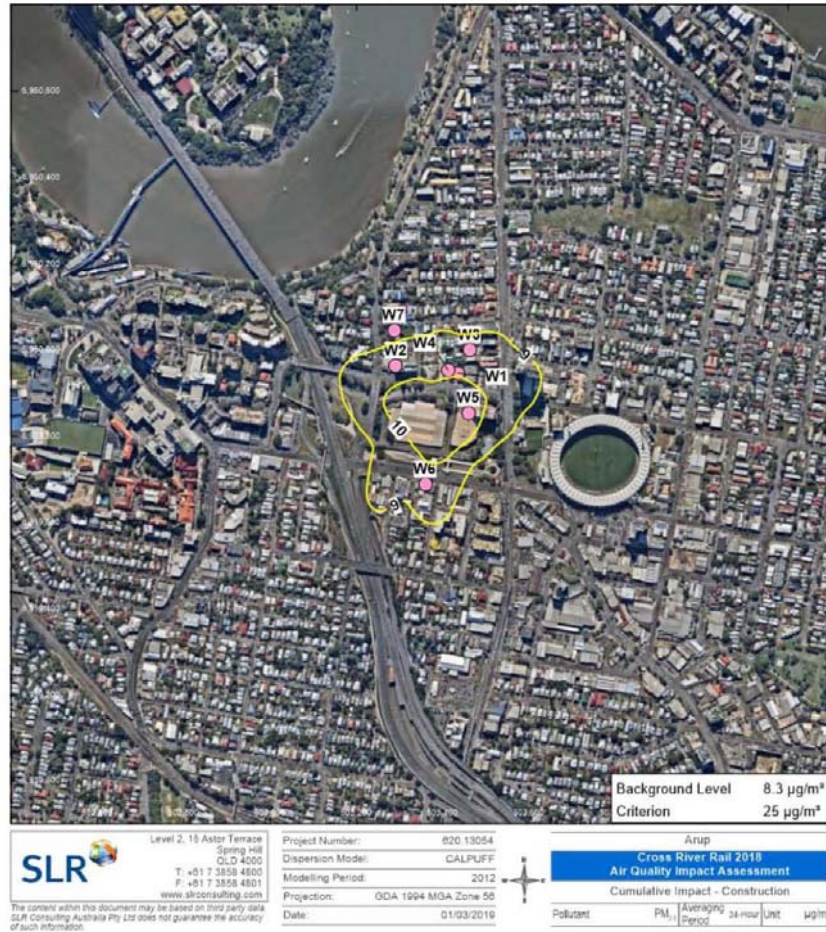
D3.2: Annual and 24-hour average PM₁₀ – Woolloongabba Station





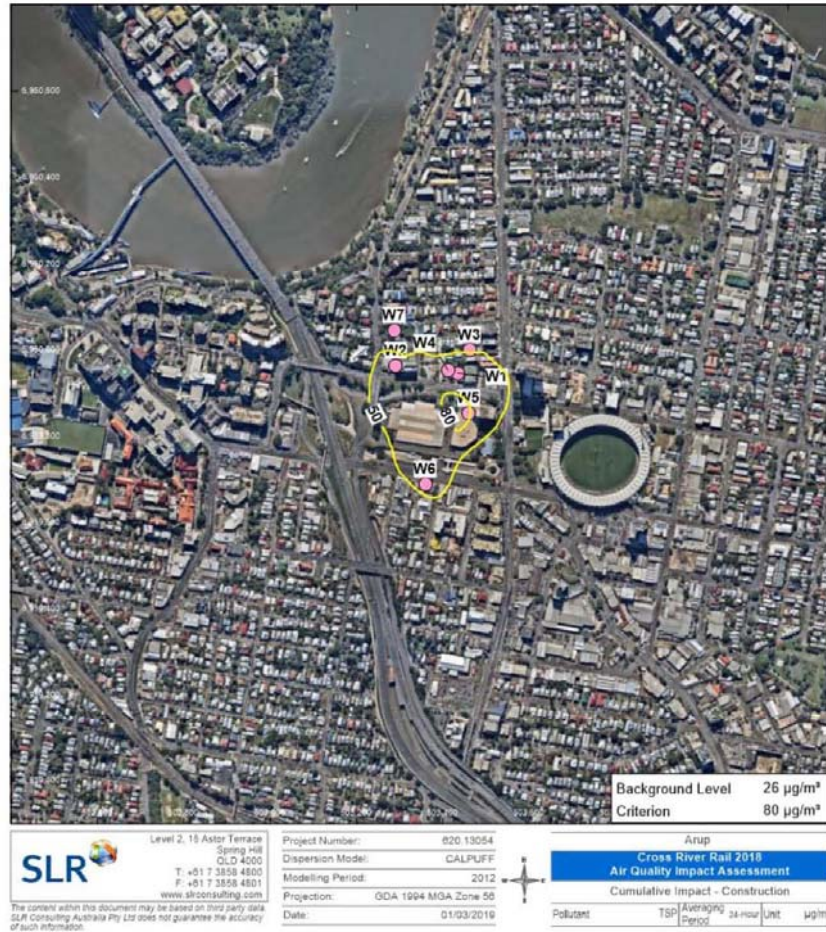
D3.3: Annual and 24-hour average PM_{2.5} – Woolloongabba





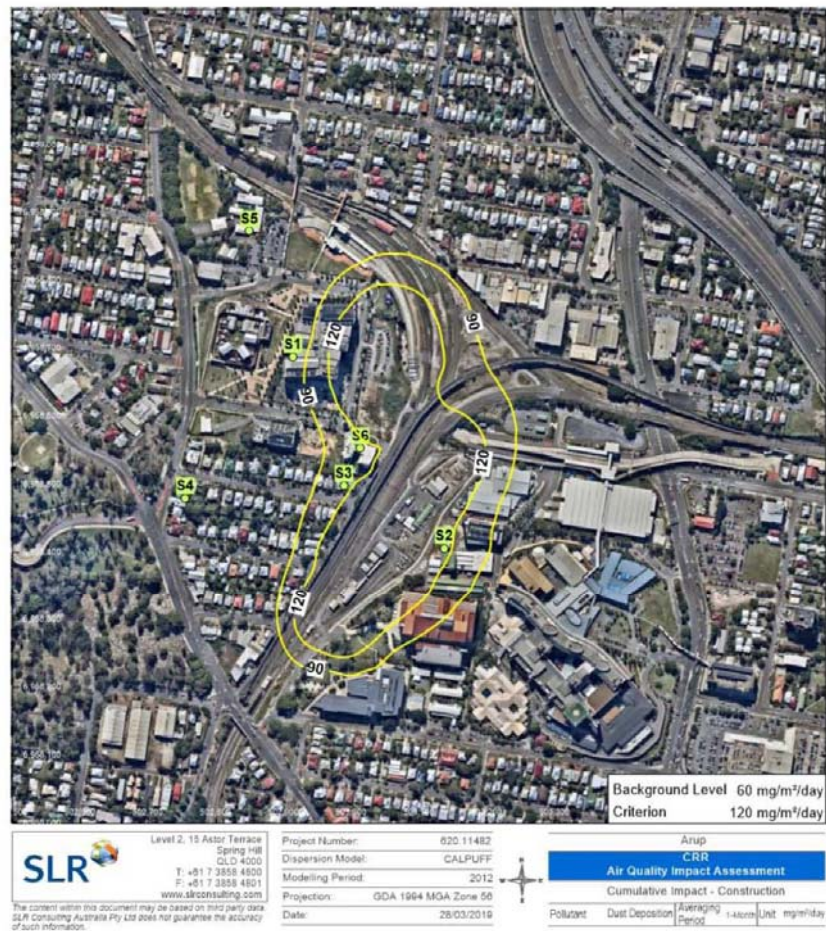
D3.4: Annual and 24-hour average TSP – Woolloongabba





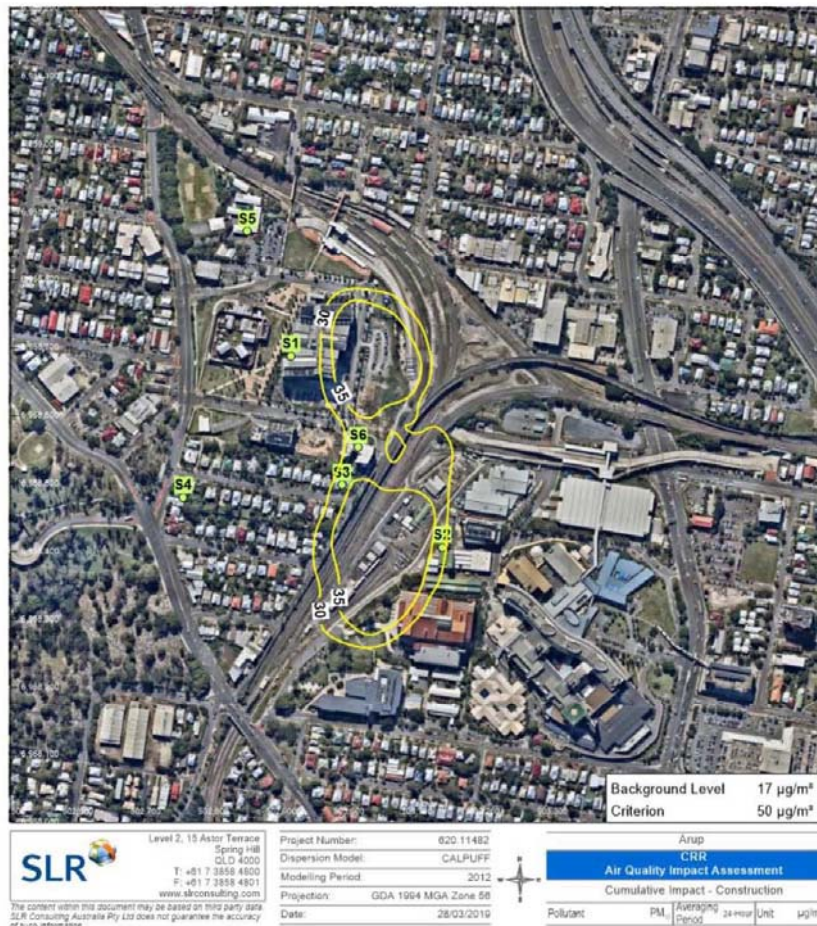
D4: Southern Portal and Boggo Road Contour Plots

D4.1: Dust Deposition – Southern Portal and Boggo Road Station

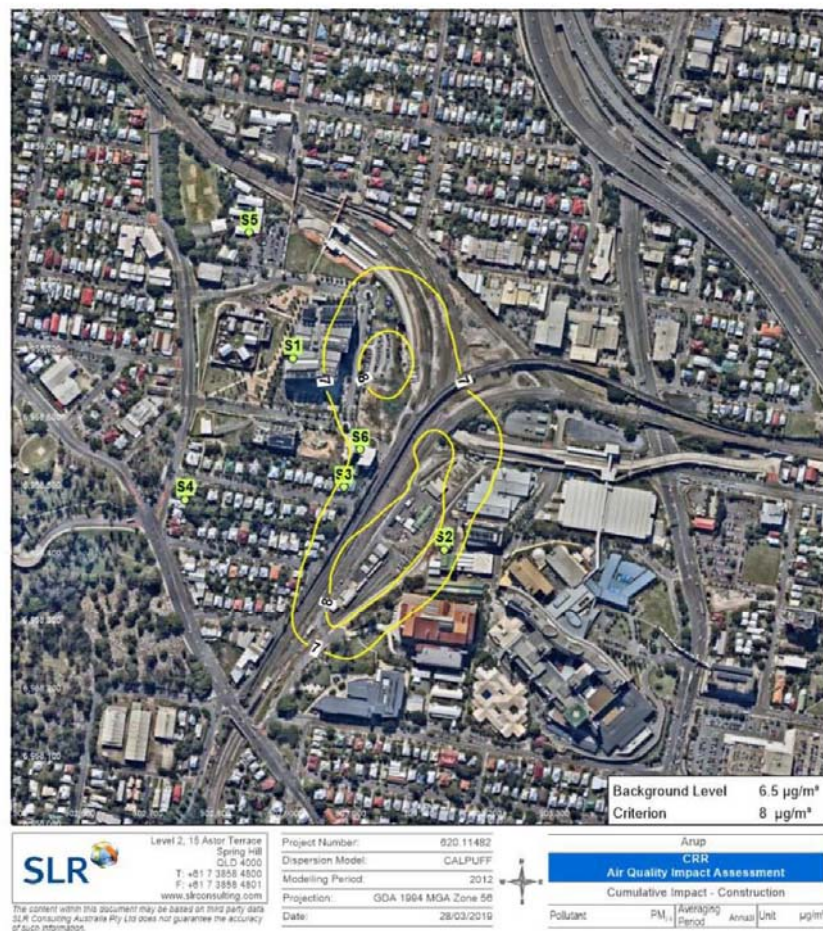


D4.2: Annual and 24-hour average PM₁₀ –Southern Portal and Boggo Road Station





D4.3: Annual and 24-hour average PM_{2.5} – Southern Portal and Boggo Road Station





D4.4: Annual and 24-hour average TSP –Southern Portal and Boggo Road Station

