

Appendix B5: Air Quality Management Sub-Plan

NEWCASTLE INNER CITY BYPASS – RANKIN PARK TO
JESMOND (STAGE 4 – MAIN WORKS)

ACKNOWLEDGMENT OF COUNTRY

Fulton Hogan acknowledges the Awabakal People as the Traditional Owners of the land we are working on, and pay our respect to their Elders past, present and emerging.

We recognise their deep connection to Country and value the contribution to caring for, and managing the land and water.

We are committed to pursuing genuine and lasting partnerships with Traditional Owners to understand their culture and connections to Country in the way we plan for and carry out the delivery of the Works.



Artwork by Luke Penrith, from Fulton Hogan's Reconciliation Action Plan.

Luke Penrith is a modern contemporary Aboriginal Artist living in Brungle NSW, Wiradjuri Country. His ancestry is connected through the Wiradjuri, Wotjobaluk, the Yuin and the Gumbaynggirr Nation.

Document control

This is an e-copy of the Plan and it interfaces with the other associated plans, which together describe the proposed overall project management system for the project.

The latest revision of this plan is available on the Fulton Hogan server. If any unsigned hard copies of this document are printed, they are valid only on the day of printing.

The revision number is included at the bottom of each page. When revisions occur, the entire document will be issued with the revision number updated accordingly for each owner of a controlled copy.

Attachments/Appendices to this plan are revised independently of this plan.

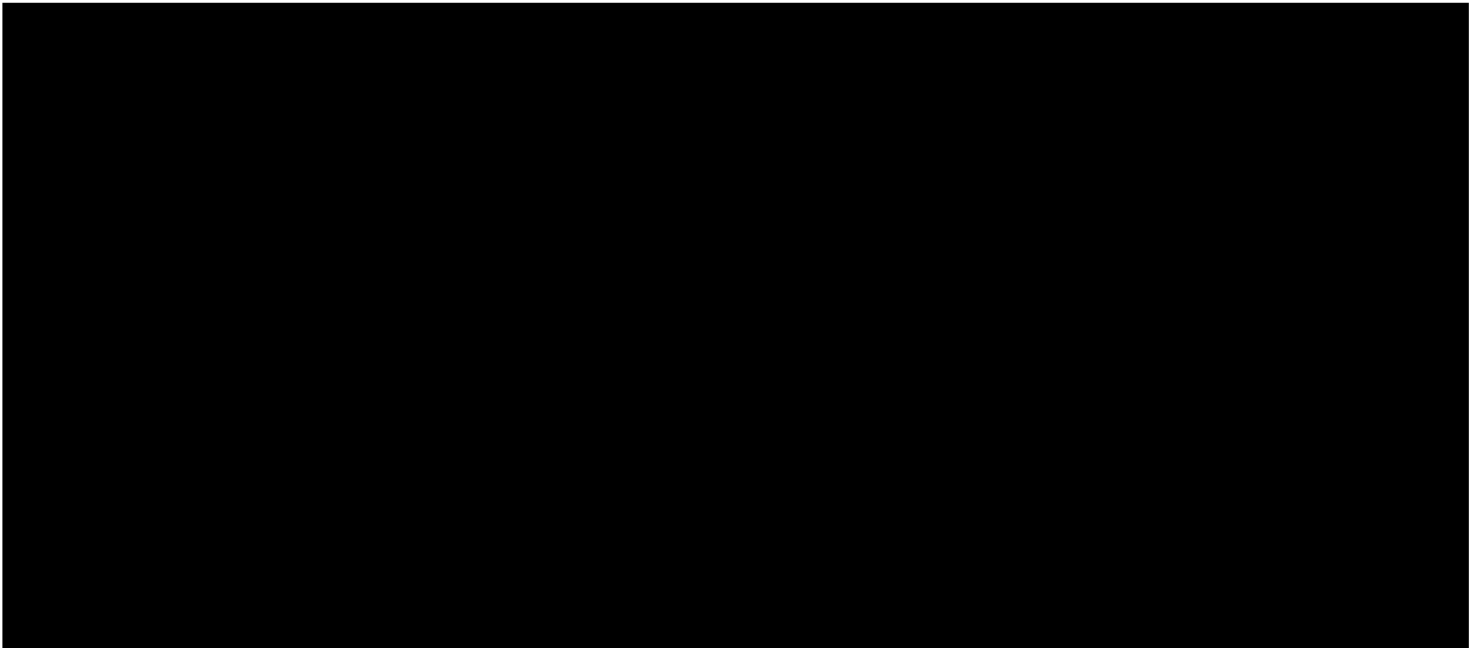


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Glossary/ Abbreviations

Term/ abbreviation	Definition
AAQMS	Ambient Air Quality Monitoring Station
AQMP	Air Quality Management Sub-Plan
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
Construction	Has the same meaning as the definition of the term in the Project Approval.
Construction Boundary	Has the same meaning as the definition of the term in the Project Approval: The area physically affected by works described in documents listed in Condition A1.
D&C	Design and Construct
Department/ DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPA	NSW Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPL	Environment Protection Licence
ER	Environmental Representative for the SSI
ESCP	Primary Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statement
FFMP	Flora and Fauna Management Sub-Plan
HP	Hold Point: a point in the construction or verification process beyond which work may not proceed without receiving authorisation from the appropriate party.
Material harm	Has the same meaning as the definition of the term in the Project Approval: Is harm that: (a) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or (b) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)
Minister, the	NSW Minister for Planning
NA	Not applicable
Non-compliance	Has the same meaning as the definition of the term in the Project Approval: An occurrence, set of circumstances or development that is a breach of the Project Approval. This includes a failure to comply with the processes included within this CEMP.

Appendix B5: Air Quality Management Sub-Plan

Newcastle Inner City Bypass Rankin Park to Jesmond (Stage 4 – Main Works)



Non-conformance	Failure to conform to the requirements of project or Fulton Hogan system documentation.
NPI	National Pollutant Inventory
OEMP	Operational Environmental Management Plan
OEMS	Operational Environmental Management System
Planning Secretary, the	Planning Secretary of the DPE (or nominee, whether nominated before or after the date on which the Project Approval was granted.
POEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
Project, the	Newcastle Inner City Bypass Rankin Park to Jesmond
Project Approval, the	The Minister's approval for the SSI.
Relevant Council(s)	Has the same meaning as the definition of the term in the Project Approval: Lake Macquarie City Council and City of Newcastle, as relevant.
REMM	Revised Environmental Management Measure
RMS	Roads and Maritime Services (now TfNSW)
SPIR	Submissions and Preferred Infrastructure Report
SSI	State Significant Infrastructure, as generally described in Schedule 1 of the Project Approval, the carrying out of which is approved under the terms of the Project Approval.
SWMP	Soil and Water Management Sub-Plan
SWTC	TfNSW Scope of Works and Technical Criteria
TfNSW	Transport for NSW
UDLP	Urban Design and Landscape Plan
Work(s)	Has the same meaning as the definition of the term in the Project Approval: All physical activities to construct or facilitate the construction of the SSI, including environmental management measures and utility works. however, does not include work that informs or enables the detailed design of the SSI and generates noise that is no more than 5 dB(A) above the rating background level (RBL) at any residence

1. Introduction

1.1. Purpose

This Air Quality Management Sub-Plan (AQMP) describes how Fulton Hogan will manage and control emissions, including those generated by dust and vehicle exhausts during construction of the Newcastle Inner City Bypass Rankin Park to Jesmond (RP2J) Project (the project) to ensure that impacts on air quality are minimised.

This AQMP has been prepared to detail how Fulton Hogan will comply with the project approval, and implement and achieve relevant performance outcomes, commitments and mitigation measures specified in the EIS as amended by the SPIR and subsequent Modification 1 Submissions Report (also known as 'Revised Environmental Management Measures' (REMMs)) during construction of the project. Additionally, this AQMP has been prepared to address the requirements of the Scope of Works and Technical Criteria (SWTC) Appendix 4 Additional Environmental Requirements and TfNSW Specification D&C G36 Environmental Protection (G36).

For the avoidance of doubt, the CEMP (including this AQMP) relates to the construction phase only. Detailed design environmental requirements will be addressed as part of the detailed design phase, separate to the CEMP approvals process. Detailed design is generally completed about six months after CEMP approval. In addition, operational environmental requirements will be met during the operational phase (upon the completion of construction) and addressed in the Operational Environmental Management Plan (OEMP) or Environmental Management System (EMS) as agreed with the Planning Secretary in accordance with CoA D3.

1.2. Background

Chapter 17 of the EIS assessed the extent and magnitude of potential impacts of construction and operation of the project on air quality.

The EIS identified that the project may have temporary localised impacts on air quality, primarily due to dust generation and vehicle exhaust emissions. Further, exhaust emissions generated during construction are expected to be insignificant when compared to existing emissions on the surrounding road network.

An additional three potential ancillary facilities were approved as part of the Modification 1 Submissions Report (referred to as Lookout Road site, Cardiff Road site and Peatties Road site). However, Fulton Hogan does not intend on using the Peatties Road or Cardiff Road sites, so the potential impacts associated with the use of these sites are no longer applicable to the delivery of the project. In the unlikely event that these sites are proposed to be used, the CEMP (including relevant Sub-Plans) will be updated and additional consultation undertaken as required.

A review of the construction air quality impacts was carried out as part of the SPIR and Modification 1 Submissions Report and it was concluded that the potential impacts are consistent with those outlined in the EIS.

1.3. Structure of AQMP

This AQMP is part of Fulton Hogan's environmental management framework for the project and is supported by other documents, including relevant Environmental Work Method Statements. The review and document control processes for this AQMP are described in Chapters 11 and 12 respectively of the CEMP.

1.4. Consultation for preparation of the AQMP

In accordance with CoA C4(d), consultation with City of Newcastle and Health Administration Corporation has been undertaken during the preparation of this AQMP. City of Newcastle advised they had no comments or concerns in relation to the AQMP. Health Administration Corporation provided comments that related to air monitoring and a contractual document. The comments required no change to the AQMP and Health Administration Corporation confirmed they had no further comments.

Copies of all consultation correspondence is included at Appendix A5 of the CEMP.

Ongoing consultation will be undertaken during detailed design and construction of the project as required by the project approval. This will be subject to a separate consultation process to that required for preparation of this AQMP and undertaken in accordance with the Community Communication Strategy (CCS) approved by the Planning Secretary under CoA B3.

For the avoidance of doubt, as noted in the CEMP (main section), the Air Quality Construction Monitoring Program required under CoA C9(b) has been prepared separately to the CEMP (by TfNSW) and approved by the Planning Secretary. Consultation with City of Newcastle and Health Administration Corporation in relation to the Air Quality Construction Monitoring Program has already been undertaken as part of that process.

2. Objectives, targets and environmental performance outcomes

2.1. Objectives

The key objective of the AQMP is to ensure that impacts on air quality are minimised and within the scope permitted by the project approval. To achieve this objective, Fulton Hogan will undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to avoid or minimise potential adverse impacts to sensitive receivers along the Project corridor
- Ensure appropriate measures are implemented to address the relevant CoA and REMMs outlined in Table 2 and Table 3 respectively.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Chapter 3 of this AQMP.

2.2. Targets

The following targets have been established for the management of air quality impacts during the project:

- Ensure full compliance with the relevant legislative requirements, CoA and REMMs outlined in Table 2 and Table 3 respectively.
- Meet the monitoring targets detailed in the Air Quality Construction Monitoring Program prepared by TfNSW and approved by the Planning Secretary.

2.3. Environmental performance outcomes

The construction-related environmental performance outcomes relevant to this AQMP are listed in Table 1. A cross reference is also included to indicate where the environmental performance outcome is addressed in this AQMP in terms of how it will be implemented and achieved.

Table 1: Environmental performance outcomes relevant to air quality management

Key issue	Environmental performance outcome	How implemented and achieved
Air quality	Adverse impacts on sensitive receivers would be minimised through the use of effective mitigation measures.	Chapter 6 mitigation measures
	Exhaust emissions from construction machinery use would be minimised.	Chapter 6 mitigation measure ID AQMM14, AQMM15, AQMM16, AQMM18, AQMM19.

3. Legal and other requirements

3.1. Legislation

Legislation relevant to air quality management includes:

- *Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act)*
- *Protection of the Environment Operations Act 1997 (NSW) (POEO Act)*
- *Protection of the Environment Operations (Clean Air) Regulation 2010 (NSW)*
- *National Greenhouse and Energy Reporting Act 2007 (Cth)*
- *Protection of the Environment (Air Toxics) Regulation 1998 (NSW) (as amended)*
- *Protection of the Environment (General) Regulation 2009 (NSW)*
- *Protection of the Environment (Ambient Air Quality) Regulation 1998 (NSW) (as amended)*

Relevant provisions of the above legislation are explained in the Register of legal and other requirements included in Appendix A1 of the CEMP.

3.2. Guidelines and standards

The main guidelines, standards and policy documents relevant to this AQMP include:

- Air Quality Monitoring Criteria for Deposited Dust (DEC Guideline)
- NEPM for Ambient Air Quality Guidelines - National Environment Protection Council (NEPC, 1998)
- AS/NZS 3580 1.1:2016 Siting Air Quality Monitoring Equipment Guide
- AS/NZS 3580.10.1:2016 Methods for sampling and analysis of ambient air Determination of particulate matter - Deposited matter - Gravimetric method
- AS/NZS 3580.12.1:2015 Methods for sampling and analysis of ambient air, Method 12.1: Determination of light scattering - Integrating nephelometer method.
- Action for Air 1998 (NSW DEC)
- Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW (EPA 2016).
- National Environment Protection (Ambient Air Quality) Measure.
- Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW (NSW EPA 2016)

3.3. Conditions of approval

The CoA relevant to this AQMP are listed in Table 2. A cross reference is also included to indicate where the condition is addressed in this AQMP or other project management documents.

Table 2: Conditions of approval relevant to AQMP

CoA No.	Condition requirements	Document reference
PART C - CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
C4	The following CEMP Sub-plans must be prepared in consultation with the relevant public authorities identified for each CEMP Sub-plan :	Section 1.4

CoA No.	Condition requirements	Document reference																								
C5	<p>Table 3: CEMP Sub-plan and relevant public authorities</p> <table border="1" data-bbox="220 376 1002 622"> <thead> <tr> <th></th> <th>Required CEMP Sub-plan</th> <th>Relevant public authorities to be consulted for each CEMP Sub-plan</th> </tr> </thead> <tbody> <tr> <td>(a)</td> <td>Traffic and transport</td> <td>Relevant council and Health Administration Corporation</td> </tr> <tr> <td>(b)</td> <td>Noise and vibration</td> <td>Relevant council and Health Administration Corporation</td> </tr> <tr> <td>(c)</td> <td>Flora and Fauna</td> <td>DPI Fisheries and Relevant council</td> </tr> <tr> <td>(d)</td> <td>Air quality</td> <td>Relevant council and Health Administration Corporation</td> </tr> <tr> <td>(e)</td> <td>Soil and water</td> <td>Relevant council, DPI Fisheries and DPE Water,</td> </tr> <tr> <td>(f)</td> <td>Aboriginal cultural heritage</td> <td>Heritage NSW and Registered Aboriginal Parties</td> </tr> <tr> <td>(g)</td> <td>Flood management</td> <td>Relevant council</td> </tr> </tbody> </table> <p>The CEMP Sub-plans must state how:</p>		Required CEMP Sub-plan	Relevant public authorities to be consulted for each CEMP Sub-plan	(a)	Traffic and transport	Relevant council and Health Administration Corporation	(b)	Noise and vibration	Relevant council and Health Administration Corporation	(c)	Flora and Fauna	DPI Fisheries and Relevant council	(d)	Air quality	Relevant council and Health Administration Corporation	(e)	Soil and water	Relevant council, DPI Fisheries and DPE Water,	(f)	Aboriginal cultural heritage	Heritage NSW and Registered Aboriginal Parties	(g)	Flood management	Relevant council	
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(g)	Flood management	Relevant council																								
(a)	the environmental performance outcomes identified in the documents listed in Condition A1 and terms of this approval will be achieved;	Section 2.3																								
(b)	the mitigation measures identified in the documents listed in Condition A1 and terms of this approval will be implemented;	Through the implementation of this AQMP (in particular refer to Section 3.4).																								
(c)	the relevant terms of this approval will be complied with; and	Through the implementation of this AQMP (in particular refer to Part E Air Quality CoA cross references below).																								
(d)	issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed.	Chapter 5, second paragraph Chapter 6																								
C6	The CEMP Sub-plans must be developed in consultation with the relevant public authorities specified in Table 3 . Details of all information requested by an authority to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those authorities, must be provided with the relevant CEMP Sub-Plan .	Section 1.4																								
C7	Any of the CEMP Sub-plans may be submitted along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before construction for approval by the Planning Secretary.	CEMP (main section) Section 1.4																								
C8	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary, or as otherwise agreed by the Planning Secretary. The CEMP and CEMP Sub-plans , as approved by the Planning Secretary, including any minor amendments approved by the ER must be implemented for the duration of construction. Where construction of the SSI is staged, construction of a stage must not commence until the CEMP and sub-plans for that stage have been approved by the Planning Secretary.	CEMP (main section) Section 1.4																								
CONSTRUCTION MONITORING PROGRAMS																										

CoA No.	Condition requirements	Document reference															
C9	<p>The following Construction Monitoring Programs must be prepared in consultation with the relevant public authorities identified for each to compare actual performance of construction of the SSI against the performance predicted in the in the documents listed in Condition A1 or in the CEMP:</p> <p>Table 4: Construction Monitoring and relevant public authorities</p> <table border="1"> <thead> <tr> <th></th> <th>Required Construction Monitoring Programs</th> <th>Relevant public authorities to be consulted for each Construction Monitoring Program</th> </tr> </thead> <tbody> <tr> <td>(a)</td> <td>Surface and Ground Water Quality</td> <td>DPI Fisheries, DPE Water and Relevant council</td> </tr> <tr> <td>(b)</td> <td>Air Quality</td> <td>Relevant council and Health Administration Corporation</td> </tr> <tr> <td>(c)</td> <td>Noise and vibration</td> <td>Relevant council and Health Administration Corporation</td> </tr> <tr> <td>(e)</td> <td>Flora and fauna</td> <td>DPI Fisheries and Relevant council</td> </tr> </tbody> </table>		Required Construction Monitoring Programs	Relevant public authorities to be consulted for each Construction Monitoring Program	(a)	Surface and Ground Water Quality	DPI Fisheries, DPE Water and Relevant council	(b)	Air Quality	Relevant council and Health Administration Corporation	(c)	Noise and vibration	Relevant council and Health Administration Corporation	(e)	Flora and fauna	DPI Fisheries and Relevant council	Refer to the Air Quality Construction Monitoring Program prepared separately to the CEMP (by TfNSW) and approved by the Planning Secretary.
	Required Construction Monitoring Programs	Relevant public authorities to be consulted for each Construction Monitoring Program															
(a)	Surface and Ground Water Quality	DPI Fisheries, DPE Water and Relevant council															
(b)	Air Quality	Relevant council and Health Administration Corporation															
(c)	Noise and vibration	Relevant council and Health Administration Corporation															
(e)	Flora and fauna	DPI Fisheries and Relevant council															
PART E – AIR QUALITY																	
E1	In addition to the performance outcomes, commitments and mitigation measures specified in the documents listed in Condition A1 , all reasonably practicable measures must be implemented to minimise the emission of dust and other air pollutants from works associated with the SSI.	Chapter 6 mitigation measures															

3.4. Revised environmental management measures

Relevant construction-related REMMs from the Modification 1 Submissions Report are listed in Table 3. A cross reference is also included to indicate where the measure is addressed in this AQMP or other project management documents.

Table 3: Revised environmental management measures relevant to AQMP

ID No.	Revised environmental management measure	Document reference
Air quality		
General air quality impacts		
AQ01	The Construction Environmental Management Plan will include measures for the management of air emissions including:	This AQMP
	<ul style="list-style-type: none"> Air quality management objectives 	Section 2.1
	<ul style="list-style-type: none"> Potential sources and impacts of air emissions 	Section 5.1, last paragraph Section 5.3
	<ul style="list-style-type: none"> Sensitive receivers 	Section 4.1
	<ul style="list-style-type: none"> Hours of work 	NVMP Section 5.1.1
	<ul style="list-style-type: none"> Mitigation measures to minimise air quality impacts to sensitive receivers and the environment 	Chapter 6

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Newcastle Inner City Bypass Rankin Park to Jesmond (Stage 4 – Main Works)



ID No.	Revised environmental management measure	Document reference
	<ul style="list-style-type: none"> Consideration of high winds in dry weather 	Chapter 6 mitigation measure ID AQMM8.
	<ul style="list-style-type: none"> Suitable buffer zone separation distance from temporary fixed plant to off-site sensitive receivers (eg at least 100 metres for batching plants where possible) 	<p>Chapter 6 mitigation measure ID AQMM12.</p> <p>NA for batching plants as no concrete/ asphalt batching plants are required as part of the project as documented in Section 5.1.</p>
	<ul style="list-style-type: none"> A monitoring program to assess compliance with identified objectives 	<p>Section 7.4</p> <p>Air Quality Construction Monitoring Program (by TfNSW)</p>
	<ul style="list-style-type: none"> Contingency plans to be implemented in the event of non-compliances and/or complaints about air quality 	<p>Similar requirement to CoA C10(g) addressed as part of the Air Quality Construction Monitoring Program (by TfNSW)</p> <p>Section 7.7.1</p>
AQ02	<p>The following mitigation measures will be used on-site and included as part of the Construction Environmental Management Plan:</p> <ul style="list-style-type: none"> Areas of exposed surfaces are to be minimised through construction site planning and programming 	<p>This AQMP</p> <p>Good 'site planning and programming' is illustrated by virtue of Chapter 6 mitigation measure ID AQMM1, AQMM3, AQMM10.</p>
	<ul style="list-style-type: none"> Locating stockpiled material as far as possible from sensitive receivers 	SWMP Appendix H Table H-1, second last row.
	<ul style="list-style-type: none"> All stockpiles will be designed, established, operated and decommissioned in accordance with Roads and Maritime <i>Stockpile Site Management Guideline</i> (Roads and Maritime, 2015) 	<p>Stockpile design/ establishment/location – SWMP Chapter 6 mitigation measure ID SWMM33, SWMP Appendix G and SWMP Appendix H.</p> <p>Stockpile operation/ management – Chapter 6 mitigation measure ID AQMM1, AQMM2, AQMM10, AQMM11.</p>
	<ul style="list-style-type: none"> Dust suppression measures, such as the use of water carts or soil binders, will be used on any unsealed surfaces and other exposed areas 	Chapter 6 mitigation measure ID AQMM2, AQMM3, AQMM10
	<ul style="list-style-type: none"> Sealed roads at access points will be watered-down regularly to minimise the re-suspension of dust on sealed roads 	Chapter 6 mitigation measure ID AQMM2, AQMM3, AQMM10

ID No.	Revised environmental management measure	Document reference
	<ul style="list-style-type: none"> Imposing work vehicle speed limits and designating specific routes for haulage and access 	Chapter 6 mitigation measure ID AQMM4, AQMM5
	<ul style="list-style-type: none"> Construction activities which would generate dust would be avoided or modified during high wind periods where possible 	Chapter 6 mitigation measure ID AQMM8.
	<ul style="list-style-type: none"> All trucks will be covered when transporting materials to and from the site 	Chapter 6 mitigation measure ID AQMM9.
	<ul style="list-style-type: none"> All construction equipment will be maintained and operated in accordance with manufacturer specifications. 	Chapter 6 mitigation measure ID AQMM14.
Greenhouse gas and climate change		
Climate change		
GH01	The detailed design of the project will take into consideration the potential effect of climate change, including designing drainage to accommodate increased rainfall and severe weather events.	Detailed Design
Greenhouse gas emissions		
GH02	Vegetation removal will be minimised where practicable.	FFMP Chapter 6 mitigation measure ID FFMM2, FFMM7.
GH03	The use of alternative fuels and power sources for construction plant and equipment will be investigated and implemented, where appropriate.	Chapter 6 mitigation measure ID AQMM18.
GH04	Recycled materials will be incorporated in the design of pavement and structures where possible.	WEMP Chapter 7 mitigation measure ID WEMM19.
GH05	The energy efficiency and related carbon emissions will be considered in the selection of vehicle and plant equipment.	Chapter 6 mitigation measure ID AQMM18.

4. Existing environment

This Chapter provides a brief summary of what is known about air quality within and adjacent to the project based on information provided in Chapter 17 of the EIS and the Air Quality Construction Monitoring Program (prepared by TfNSW and approved by the Planning Secretary).

4.1. Sensitive receivers

Sensitive receivers near the project include residences located along existing roads, John Hunter Hospital precinct and recreational users of Jesmond Park and bushland areas surrounding the project. The nearest residential receivers are located immediately next to existing roads including Lookout Road, Croudace Street and Newcastle Road (EIS, p547).

These sensitive receivers include (EIS, p547):

- Residences
- Recreational areas (e.g. Jesmond Park and bushland areas)
- Educational facilities
- Childcare facilities
- Churches
- John Hunter Hospital precinct
- Community facilities
- Commercial properties, and
- Industrial properties.

4.2. Local ambient air quality

The EPA maintains an air quality monitoring network across key areas of NSW. The nearest EPA managed ambient air quality monitoring station (AAQMS) to the Project is located at the swimming pool in Wallsend, approximately 2.3 km to the north-west at height of 8 metres (m) Australian Height Datum (AHD). The Wallsend AAQMS is a NEPM performance AAQMS and monitoring is undertaken in accordance with relevant Australian Standard methods. The AAQMS was commissioned in 1992 and monitors for a range of air quality and meteorological parameters including PM₁₀, PM_{2.5}, wind speed and wind direction.

PM₁₀ and PM_{2.5} data collected at the Wallsend AAQMS for the years 2016 to 2020 is summarised in Table 4 as follows:

- except for 2017, there were multiple exceedances of the 24-hour PM₁₀ Air NEPM standard for all years with a maximum of 21 exceedances in 2019 due to bushfire smoke
- except for 2017 and 2018, there were multiple exceedances of the 24-hour PM_{2.5} Air NEPM standard for all years with a maximum of 19 exceedances in 2019 due to bushfire smoke
- there were no exceedances of the annual PM₁₀ Air NEPM standard
- except for 2019, there were no exceedances of the annual PM_{2.5} Air NEPM standard. The exceedance in 2019 was largely due to bushfire smoke in November and December.

Notwithstanding the elevated 24-hour PM₁₀ and PM_{2.5} concentrations recorded at the Wallsend AAQMS during November and December of 2019 and January and February 2020 due to bushfires, the existing air quality at the Project is expected to be of similar magnitude.

Table 4: Ambient air quality monitoring data at Wallsend AAQMS (2016 – 2020)¹ (Source: TfNSW Air Quality Construction Monitoring Program)

Year	Annual average (µgm ³)		Maximum 24-hour average (µgm ³)		Number and dates of exceedances
	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	
2016	16.6	8.0	65.5	50.7	PM ₁₀ : 1 (maximum on 7 November) PM _{2.5} : 1 (maximum on 7 November)
2017	17.4	7.3	47.9	20.4	PM ₁₀ : 0 PM _{2.5} : 0
2018	19.4	7.5	136.5	20.2	PM ₁₀ : 5 (maximum on 22 November) PM _{2.5} : 0
2019	22.8	10.4	127.9	108.3	PM ₁₀ : 21 (maximum on 5 December) PM _{2.5} : 19 (maximum on 5 December)
2020	17.7	7.3	77.9	56.8	PM ₁₀ : 6 (maximum on 8 January) PM _{2.5} : 5 (maximum on 8 January)

Air NEPM standard	25	8	50	25
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(1) Monitoring data from 2016 to 2020 was downloaded from <https://www.dpie.nsw.gov.au/air-quality/air-quality-data-services/data-download-facility>

4.2.1. Local meteorology (wind fields)

The relative exposure of sensitive receivers to air emissions from a source generally varies based on distance from the source and prevailing wind conditions (EIS, p551).

Figure 6-1 of the Air Quality Construction Monitoring Program (prepared by TfNSW and approved by the Planning Secretary) presents the annual and seasonal wind roses at the Wallsend AAQMS illustrating the strength and direction of the winds for the years 2016 to 2020. The wind roses indicate the typical wind fields at Wallsend AAQMS are:

- most frequently from a south-easterly and south-westerly direction during summer with a calm (winds with a speed of less than 0.5 m/s) wind frequency of 9.1% and an average wind speed of 2.3 m/s
- most frequently from a south-westerly direction during autumn with a calm wind frequency of 21% and an average wind speed of 1.6 m/s
- most frequently from a north-westerly and then south-westerly direction during winter with a calm wind frequency of 23.6% and an average wind speed of 1.5 m/s
- most frequently from a south-westerly direction during spring with a calm wind frequency of 15.4% and an average wind speed of 2.0 m/s
- most frequently from a south-westerly direction over the 5 years with a calm wind frequency of 17.3% and an average wind speed of 1.8 m/s.

Overall, the Wallsend AAQMS experiences relatively high calm conditions and low wind speeds especially during winter. Similar meteorological conditions are likely to be experienced at the Project site with differences likely due to varying local topography and surrounding vegetation.

5. Environmental aspects and impacts

The key construction activities and the associated potential sources of air quality impact are identified through a risk management approach. The consequence and likelihood of each activity’s impact on the environment has been assessed to prioritise its significance. The results of this risk assessment are included in Appendix A3 of the CEMP.

Ongoing environmental risk analysis will be undertaken during construction through regular inspections, monitoring and auditing as described in Chapter 7. This will ensure that issues requiring management (including cumulative impacts) are appropriately managed.

5.1. Construction activities

Construction of the project may have temporary localised impacts on air quality, primarily due to dust generation and vehicle exhaust emissions (EIS, p553). The individual processes which generate dust can be categorised as follows:

- Mechanical disturbance - dust emissions from the operation of construction vehicles and equipment (e.g. material handling and wheel-induced emissions)
- Wind erosion - dust emissions from exposed, disturbed soil surfaces under high wind speeds during construction.

A range of plant and equipment would be required during construction of the project. Typical equipment would include excavators, dozers, cranes, graders, rollers, haul trucks, bitumen and asphalt spraying plants, line-marking equipment and water carts. Material handling facilities such as rock crushers/ screens would also be required.

The EIS (p553) identified that the project may include a temporary concrete batching plant and an asphalt batching plant (to be confirmed by the construction contractor) and included this in the air quality assessment to provide a worst-case scenario. The EIS (p554) also identified that while there are no published guidelines in NSW identifying suitable 'buffer zones', it is found in other jurisdictions that 100 metres from sensitive receivers is suitable for batching (in terms of managing dust impacts). However, now that Fulton Hogan has been appointed as the 'construction contractor', Fulton Hogan can now confirm that no on-site concrete/ asphalt batching plants are required as part of the project. Therefore, the 100 metre 'buffer zone' for concrete/ asphalt batching plants is not applicable. Primary activities that will generate dust from construction include:

- Clearing of vegetation and topsoil
- Excavation and levelling of soil
- Earthworks for cut and fill areas
- Movement of soil and fill by dump trucks and scrapers
- Wind erosion from unsealed surfaces and stockpiles
- Wheel-induced dust from construction vehicles travelling on unsealed areas
- Rock crushing and screening.

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

- Vehicle (exhaust) emissions from construction equipment
- Odours released during excavations of contaminated materials.

5.2. Factors likely to affect dust generation and impacts

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

- Wind direction – determines whether dust and suspended particles are transported in the direction of the sensitive receivers
- Wind speed – governs the potential suspension and drift resistance of particles
- Soil type - more erodible soil types have an increased soil or dust erosion potential
- Soil moisture – increased soil moisture reduces soil or dust erosion potential
- Rainfall or dew – rainfall or heavy dew that wets the surface of the soil and reduces the risk of dust generation.

5.3. Impacts

5.3.1. Dust generation

The dominant winds in the study area are from a south-westerly direction. This highlights the potential for adverse dust impacts at sensitive receivers to the north of the project construction footprint, and near the John Hunter Hospital precinct. Residential receivers are generally located to the north and west of the project. Those to the north and the John Hunter Hospital precinct would have highest potential for adverse impacts during spring months when winds mostly occur from the south-west. Potential adverse impacts from high dust levels include health effects (from smaller particles) and amenity impacts (due to fallout of the larger particles). The impacts are generally greater during dry weather periods and high wind conditions. Mitigation measures in Chapter 6 will be implemented to minimise air quality impacts to sensitive receivers and the environment.

5.3.2. Air emissions other than dust

Construction vehicle exhaust emissions have the potential to impact on local air quality. Vehicle exhaust emissions depend on the fuel type, fuel quality, power output and operating condition of the engine. All construction vehicles (including light vehicles) are expected to be maintained in a serviceable condition. Providing the construction vehicles are well maintained, the volume and impact of exhaust emissions during construction is expected to be substantially lower than that from vehicle emissions on existing roads (EIS, p554).

Most of the construction footprint is separated from the main residential areas by dense bushland and undulating topography. It is located between about 100 metres from Wallsend and about 200 metres from Elernmore Vale. The John Hunter Hospital precinct is located about 100 metres from the construction footprint. These separation distances would assist in reducing exposure to emissions.

The abovementioned potential impacts would be adequately managed through the implementation of the mitigation measures provided in Chapter 6.

Odour may be generated during excavation at locations where contaminated material is encountered. Site boundary odour screening will be conducted during excavation in areas of known or unexpected contaminated material to minimise the potential impacts in accordance with the Air Quality Construction Monitoring Program prepared by TfNSW and approved by the Planning Secretary under CoA C12.

As outlined in Section 5.1, no on-site asphalt batching plants are required as part of the project; as a result, there will be no odour impacts associated with the operation of asphalt batching plants.

6. Environmental mitigation measures

Specific mitigation measures to address impacts on air quality are outlined in Table 5.

Table 5: Air quality mitigation measures

ID	Mitigation measure	Timing		Responsibility
		PC ¹	C ²	
DUST				
AQMM1	Progressively stabilise all exposed surfaces and long term stockpiles (in place for more than 20 days) as well as any stockpiles that are susceptible to wind or water erosion, within 10 days of forming each stockpile.		✓	Foreman Project / Site Engineer Environmental Coordinator
AQMM2	Water dust generating materials during loading, unloading and demolition; and unsealed active work areas (including stockpiles and haul roads) during working hours to minimise wind-blown or traffic generated dust emissions.		✓	Foreman
AQMM3	Cover unsealed roads with densely graded road base, water, or polymers where uncontrolled dust is observed.		✓	Foreman
AQMM4	Restrict speeds of construction traffic to 20km/h, or 40km/h for haul roads. Signpost the speed limit.		✓	Foreman
AQMM5	Restrict construction traffic to designated roadways.		✓	Foreman
AQMM6	Control mud tracking on public roads by installing stabilised access (e.g. hardstand, rock, rumble grids, or wheel washes) at all access/egress points on site.		✓	Foreman
AQMM7	Remove mud spilt by construction traffic from public roads as soon as practicable but no later than by the end of each working day.		✓	Foreman
AQMM8	Modify or stop construction activities during periods of strong wind (in excess of 40km/h) and in response to strong wind weather forecasts to prevent excessive airborne dust. Promote this in the internal communications (e.g. site weather update email).		✓	Foreman Environmental Coordinator
AQMM9	Cover all loads that enter or leave the site to minimise potential for odour/ dust impacts.		✓	Subcontractors Foreman
AQMM10	Use dust suppressants (e.g. soil stabilisers, polymers) and temporary ground covers (e.g. hydromulch) as much as possible to stabilise disturbed surfaces, such as batters		✓	Foreman

ID	Mitigation measure	Timing		Responsibility
		PC ¹	C ²	
	and stockpiles, and minimise visible airborne dust emissions.			Environmental Coordinator
AQMM11	Limit topsoil stockpiles to 2m high where there is sufficient area as per the Blue Book.		✓	Foreman
AQMM12	Implement suitable buffer zone separation distance from temporary fixed plant (such as rock crushers) to off-site sensitive receivers.		✓	Construction Manager
AQMM13	Erect temporary barriers or dust screens, as appropriate, to suppress the effect of dust movement to uncontrolled sites.		✓	Construction Manager
OTHER POLLUTANTS, SUCH AS EXHAUST				
AQMM14	Maintain all vehicles, plant and construction equipment in good working order in accordance with the manufacturer's specification to minimise spills and air/exhaust emissions that may cause nuisance.		✓	Procurement Coordinator Foreman
AQMM15	Turn machinery, vehicles and lights off when not in use. Do not leave machinery and vehicles idling when not in use.		✓	Subcontractors Foreman
AQMM16	Where practicable, ensure vehicles are fitted with pollution reduction devices.		✓	Procurement Coordinator
AQMM17	No burning off (e.g. of cleared and grubbed vegetation or waste).		✓	Subcontractors Foreman
AQMM18	Ensure the energy efficiency and related greenhouse gas/ carbon emissions are considered in the selection of vehicle and plant equipment.	✓	✓	Procurement Coordinator
AQMM19	Ensure construction equipment, plant, and vehicles are appropriately sized for the task.		✓	Subcontractors Foreman

¹ PC means pre-construction; ² C means construction

7. Compliance management

7.1. Roles and responsibilities

Fulton Hogan's Project Team organisational structure and overall roles and responsibilities are outlined in Section 4.1 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Table 5 of this AQMP.

7.2. Training

All employees, subcontractors and utility staff working on site will undergo site induction training relating to air quality management issues, including:

- requirements of this AQMP, including stop work protocols, investigating alternatives/ modifying construction activities and implementing additional controls, where required
- relevant legislation
- roles and responsibilities for air quality management

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

- Planning and preparedness for strong wind events (in excess of 40km/h) / dust risk periods
- Lessons learnt from dusty periods, incidents and other events, e.g. low rainfall / strong wind (in excess of 40km/h)

Further details regarding staff induction and training are outlined in Chapter 5 of the CEMP.

7.3. Complaints

Complaints will be recorded and addressed in accordance with Section 6.2.3 of the CEMP and the Community Communication Strategy (CCS).

7.4. Inspections and monitoring

Regular inspections and monitoring specific to air quality will be undertaken during construction in accordance with the Air Quality Construction Monitoring Program prepared by TfNSW and approved by the Planning Secretary under CoA C12.

General requirements and responsibilities in relation to inspections and monitoring are documented in Sections 8.1 and 8.2 of the CEMP respectively.

7.5. Auditing

Auditing (both internal and external) will be undertaken to assess the effectiveness of environmental mitigation measures, compliance with this AQMP, TfNSW specifications and other relevant approvals, permits and licences. Auditing requirements are detailed in Section 8.4 of the CEMP.

7.6. Reporting

General reporting requirements and responsibilities are documented in Chapter 9 of the CEMP.

7.7. Non-conformances

Non-conformances will be dealt with and documented in accordance with Chapter 10 of the CEMP.

7.7.1. Contingency plans

Implementation of the mitigation measures listed in Table 5 will ensure air quality impacts are minimised during construction. In the event complaints about air quality are received or an exceedance of criteria provided in the Air Quality Construction Monitoring Program (by TfNSW) has been identified through monitoring, site inspections or audits, Fulton Hogan will implement the following contingency plans:

- The Environmental Manager will firstly investigate the issue to determine possible causes of the complaint or non-compliance
- Where investigation confirmed clear and unambiguous air quality impact resulting from the construction of the project, the Environmental Manager, in consultation with the project team, will identify additional mitigation measures. Examples of these measures include increased monitoring, targeted inspections, additional water cart

usage, work methodology reviews, and removal/ covering of odorous/ dust generating material. It is the responsibility of the relevant Foreman to ensure that the identified additional mitigation measures are implemented.

Where identified exceedances of criteria impact the safety of people or property, work at the concerned site must cease immediately. The works will not recommence until a corrective/ preventative action has been closed out.

8. Review and improvement of AQMP

The AQMP will be reviewed to ensure compliance with legislative requirements and its suitability and effectiveness for the project.

The review may be in the form of:

- A formal management review
- An audit, and/or
- An inclusion as a separate item at a site meeting.

The Environmental Manager may review and update the AQMP more regularly where:

- Significant changes in construction activities occur
- Where targets are not being achieved, or
- In response to audits and non-conformance reports.

Any minor changes to the AQMP will be approved by the ER and the remainder approved by the Planning Secretary in accordance with CoA C8. For additional information about the document review process, refer to Section 1.6 of the CEMP.