APPENDIX B6

Construction Air Quality Management Plan

Whytes Lane to Pimlico Road Early Works – Wave 2

Woolgoolga to Ballina Pacific Highway Upgrade

OCTOBER 2015

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Glossary / Abbreviations

CAQMP	Construction Air Quality Management Plan
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEC	Former Department of Environment and Conservation (NSW)
DECC	Former Department of Environment and Climate Change (NSW) now NSW Office of Environment and Heritage.
DoE	Commonwealth Department of the Environment
DPI	NSW Department of Primary Industries
DP&E	NSW Department of Planning and Environment
DLWC	NSW Department of Land and Water Conservation
EIS	Woolgoolga to Ballina Pacific Highway Upgrade Environmental Impact Statement (December, 2012)
EPA	NSW Environment Protection Authority
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPL	NSW Environment Protection Licence under the Protection of the Environment Operations Act 1997.
ERSED	Erosion and sedimentation
EWMS	Environmental Work Method Statements
FM Act	NSW Fisheries Management Act 1994
Minister, the	NSW Minister for Planning
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measures
NOW	NSW Office of Water
OEH	NSW Office of Environment and Heritage
PoEO Act	NSW Protection of the Environment Operations Act 1997
Project, the	Whytes Lane to Pimlico Road Early Works – Wave 2
SEE Civil	SEE Civil Pty Ltd
SPIR	Woolgoolga to Ballina Pacific Highway Upgrade Submissions Preferred Infrastructure Report (November, 2013)
SSI	State Significant Infrastrucuture

1 Introduction

1.1 Context

This Construction Air Quality Management Plan (CAQMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the upgrade of the Whytes Lane to Pimlico Road Early Works – Wave 2 (the Project).

This CAQMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA) and the mitigation measures listed in the Pacific Highway Upgrade Woolgoolga to Ballina Environmental Impact Statement (EIS), the Submissions/Preferred Infrastructure Report November 2013 (SPIR) and all applicable legislation.

Wave 2 (the Project) is located within Section 11 of the Woolgoolga to Ballina Pacific Highway Upgrade. Wave 2 of the Early Works (soft soil treatments) is to allow the future upgrade of the section of HW10 Pacific Highway, Woolgoolga to Ballina. The Project specifically covers the following soft soil site as detailed below:

- Soft Soil Site 11 – between Whytes Lane and Pimlico Road (W2P) (STN 159,900 to STN 163,800).

1.2 Background

The Pacific Highway Upgrade Woolgoolga to Ballina Environmental Impact Statement (EIS) (December 2012) assessed the impacts of construction and operation of the Project on air quality, within Chapter 18.

The EIS identified the potential for minor impacts on air quality during construction typically associated with dust. However, it concluded any potential impacts could be managed by standard mitigation and management measures.

The EIS management measures were subsequently updated within the Woolgoolga to Ballina Submissions / Preferred Infrastructure Report (November 2013), with applicable management measures from that report included as part of this CAQMP.

1.3 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Construction Environmental Management Plan (CEMP).

The CAQMP is part of the SEE Civil environmental management framework for the Project, as described in Section 4.1 of the CEMP.

Management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS). EWMS will be developed and signed off by environment and management representatives prior to associated works and construction personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the CEMP, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by SEE Civilpersonnel and contractors.

The review and document control processes for this Plan are described in Chapter 10 of the CEMP.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how SEE Civil proposes to manage and protect air quality during construction of the Project.

2.2 Objectives

The key objective of the CAQMP is to ensure that impacts on air quality are minimised and within the scope permitted by the infrastructureapproval. To achieve this objective, SEE Civil will undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to avoid or minimise air quality impacts and potential adverse impacts to sensitive receivers along the Project corridor.
- Ensure appropriate measures are implemented to address the relevant CoA outlined in Table 3.1 and the mitigation measures detailed in the EIS.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this Plan.

Refer to Appendix B7 Construction Waste and Energy Management Plan for measures to reduce greenhouse gas emissions during construction.

3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation

Legislation relevant to air quality management includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Protection of the Environment Operations Act 1997* (POEO Act).
- Protection of the Environment Operations (Clean Air) Regulation, 2002.
- *National Greenhouse and Energy Reporting Act 2007*.
- *Protection of the Environment (General) Regulation 2009*

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the CEMP. Matters relating to the *National Greenhouse and Energy Reporting Act 2007* are addressed in the Construction Waste and Energy Management Plan (Appendix B7).

3.1.2 Guidelines and standards

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

- National Environment Protection Council's (NEPC) – NEPM for Ambient Air Quality Guidelines.
- AS 2922 Ambient Air Guide for Citing of Sampling Equipment.
- AS 3580.10.1-1991 Methods of Sampling Analysis of Ambient Air.
- Action for Air 1998 (NSW DEC).
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007)
- Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW (DEC 2005).
- Air Quality Monitoring Criteria for Deposited Dust (DEC Guideline), Refer to Table 5-1.

3.2 Minister's Conditions of Approval

The CoA relevant to this Plan are listed in Table 3-1. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-1 Conditions of Approval relevant to the CAQMP

CoA No.	Condition Requirements	Document Reference
B35	Where available, and of appropriate chemical and biological quality, stormwater, recycled water or other water sources shall be used, where feasible and reasonable, in preference to potable water for construction activities, including dust control.	Table 7-1
B66	The SSI shall be constructed in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated	Table 7-1

CoA No.	Condition Requirements	Document Reference
	dust and tracking of material onto public roads. All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Applicant shall identify and implement all feasible and reasonable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.	
B80	The Applicant shall ensure that all plant and equipment used at the site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Table 7-1
C1	Prior to the commencement of construction or as otherwise agreed by the Secretary, the Applicant shall prepare and implement a **Community Communication Strategy** to the satisfaction of the Secretary. The Strategy shall provide mechanisms to facilitate communication between the Applicant (and its contractor(s)), the Environmental Representative (see condition D22), the relevant council and community stakeholders (particularly adjoining landowners) on the construction environmental management of the SSI. The Strategy shall include, but not be limited to: (vi) air quality and dust; (The Applicant shall maintain and implement the Strategy throughout construction of the SSI.	Community Communication Strategy
D25	The Applicant shall prepare and implement (following approval) a **Construction Environmental Management Plan** for the SSI, prior to the commencement of construction, or as otherwise agreed by the Secretary. The Plan shall be prepared in consultation with the EPA, OEH, DPI (Fisheries), NOW and DoE and outline the environmental management practices and procedures that are to be followed during construction, and shall be prepared in consultation with the relevant government agencies and in accordance with the *Guideline for the Preparation of Environmental Management Plans* (Department of Infrastructure, Planning and	Table 7-1

CoA No.	Condition Requirements	Document Reference
	Natural Resources, 2004). The Plan shall include, but not necessarily be limited to: (v) measures to monitor and manage **dust emissions** including dust from stockpiles, traffic on unsealed public roads and materials tracking from construction sites onto public roads; The Plan shall be submitted for the approval of the Secretary no later than one month prior to the commencement of construction, or as otherwise agreed by the Secretary. The Plan may be prepared in stages, however, construction works shall not commence until written approval of the relevant stage has been received from the Secretary. The approval of a Construction Environmental Management Plan does not relieve the Applicant of any requirement associated with this SSI approval. If there is an inconsistency with an approved Construction Environmental Management Plan and the conditions of this SSI approval, the requirements of this SSI approval shall prevail.	

4 Existing environment

The following sections summarise what is known about factors influencing air quality within and adjacent to the Project corridor.

The key reference document is Chapter 18 of the EIS.

4.1 Air quality records

There is limited information about air quality in the vicinity of the Project. Long-term monitoring is not usually undertaken outside metropolitan and/or industrial areas, because pollutants typically do not exist in concentrations that would cause adverse environmental or health impacts. However, there has been short-term air quality monitoring adjacent to a dual carriageway section of the Pacific Highway at Korora, which is located in an urban area approximately 20 kilometres south of Woolgoolga. A monitoring station was established at Korora to monitor the ambient air quality from October 2005 to January 2006.

Table 4-1 Summary fo Korora air quality monitoring data

Pollutant	Averaging period	NEPM goals		Korora monitoring results	
		Maximum concentration	10-year goal (max allowable exceedence)	Maximum recorded concentration	Average recorded concentration
National standards and goals for ambient air quality					
Carbon monoxide	8hr	9.0 ppm (10 mg/m^3)	1 day a year	0.2 ppm (0.3 mg/m^3)	0.03 ppm (0.04 mg/m^3)
Nitrogen dioxide	1 hr	0.12 ppm (246 µg/m^3)	1 day a year	0.036 ppm (73.8 µg/m^3)	0.004 ppm (9.2 µg/m^3)
Particles as PM_{10}	1 day	50 µg/m^3	5 days a year	37.8 µg/m^3	20.3 µg/m^3
Advisory reporting goals					
$PM_{2.5}$	1 day	25 µg/m^3	Gather data to facilitate review of goal	15.4 µg/m^3	7.7 µg/m^3

The data in Table 4-1 shows that the pollutant concentrations on the Pacific Highway at Korora were below the relevant air quality criteria for pollutants.

4.2 Rainfall, soil dryness and wind

Rainfall records from Ballina Airport (BoM Station Number 058198) are considered representative of potential rainfall conditions in the vicinity of the Project site. Ballina Airport is located approximately 7km to the north east of the northern most section of the Project. A summary of the rainfall records from the Bureau of Meteorology is provided in Table 4 2.

Table 4-2 Summary of Climatic Data – Ballina Airport (BoM Station Number 058198)

Summary of rainfall record from 1992 to present													
	Summer / Autumn						Winter / Spring						
	Dec	Jan	Feb	Mar	Apr	Ma	Jun	July	Aug	Sep	Oct	Nov	Year
Mean rainfall (mm)	138.3	182.3	204.3	209.7	194.6	168.4	197.6	119.5	85	61.3	99.3	122.4	1782.1
Mean rain days	*9.7*	10.8	12.3	14	12	11.8	10.6	9	7.2	5.8	8.5	9.7	*121.4*
Mean 9am wind speed (km/h)	*14.2*	13.3	12.8	12.5	13.2	13.5	12.7	13.3	13.3	14.5	15.7	14.2	*13.6*
Mean 3pm wind speed (km/h)	*24.7*	24.4	23	21.5	18.9	16.8	15.9	18.1	19.9	23.7	24.8	24.8	*21.4*
Mean max temp (^{0}C)	*27.4*	28.2	27.9	27	24.9	22.4	20.3	19.9	21.2	23.6	24.9	26.2	*24.5*
Mean min temp (^{0}C)	*18.2*	19.7	19.5	18.2	15.3	12.1	9.8	8.6	8.7	11.5	14	16.5	*14.3*

Records from Ballina Airport (BoM Station Number 058198) for the period 1992-2010 indicate wind direction is predominantly from the south through to north east. Therefore sensitive receptors most likely to be affected by dust emmisions would be located west of the Pacific Highway.

The above table provides a consideration of typical climatic factors that contribute to the proliferation of dust particulates. In addition to the exposure of unconsolidated material during construction eg earthworks, climatic factors such as prolonged dry weather, combined with high winds, can increase the likelihood of dust particulate emissions.

It can be seen from the table that rainfall is typically higher during summer and autumn. Winter and spring are typically drier periods during the year.

4.3 Soil characteristics

The soil types along the Project are described in Table 4-3, with an indication of the potential for wind erosion ie dust emissions. The soil information is from the DLWC Soil Landscapes of the Lismore and Ballina (1994) 1:100,000 sheet.

Table 4-3 Soil type and characteristics

Section	Soil type	Characteristics	Dust emission risk
11	Section 11 is mainly underlain by alluvial landscapes.	Highly erodible.	*Low-moderate(wind*

Section	Soil type	Characteristics	Dust emission risk
		Prone to water erosion.	*erodibility factor for Empire Vale Soil Landscape from DLWC Soil Landscapes of the Lismore - Ballina (1994)1:100 000 Sheet)*
	The Project is underlain entirely by the Empire Vale soil landscape which is characterized by level to very gentle inclined deltaic alluil plain of the Richmond River. Slopes are in the order od 0-1%. The area is extensively cleared and almost entirely devoted to sugar cane. Soils are typically reactive, highly plastic with permanently high water tables. Localised low wet bearing strength and salinity exits with localized acid sulphate soil potential and is subject to flood hazards.		

4.4 Sensitive receivers

The construction of the Project will interact with a number of sensitive receivers and natural environments. The lands surrounding the Project have been considered for potential sensitivity to dust and air quality impacts. The potential sensitive receivers include:

- Residences.
- Native vegetation.
- Sensitive agricultural and commercial industries.
- Road users.
- Watercourses.

The location of potentially affected properties and residences are included in Figure 4-1. As detailed in Section 4.2, based on meterological records for wind speed and direction sensitive receptors most likely to be affected by dust emissions would be located west of the Pacific Highway.

~~Residential sensitive receivers for dust have been assumed to be as for noise, and dust catchments have also been assumed to be representative of noise catchment areas, as shown on Figure 4-1.~~

It is proposed to install five dust deposition gauges to monitor air quality impacts at sensitive receivers for the Project as detailed in Table 4-4. Dust gauge locations are also identified on Figure 4-1.

Table 4-4 Air Quality Base Data and Monitoring Locations

Dust Gauge Number	Purpose	Chainage / Offset	Property Detail	Location within Property
No. 1	Control	159425 / 175	DP1137966 / 10 Commercial property	Southern side near boundary fence
No. 2	Base / Construction	160377 / -420	DP1196174 / 9 Residential property	Eastern side of residential property

No. 3	Base / Construction	160190 / 575	DP811816 / 1 Residential property	Western side of house
No. 4	Base / Construction	162643 / -700	DP870715 / 2 Residential property	Eastern side of residential property
No. 5	Base / Construction	163348 / 380	DP755731 / 102 Commercial property	Western side of property boundary

Dust monitoring locations were determined in consultation with the EPA, RMS and the Environmental Representative.

In accordance with G36, dust levels are to be monitored to measure existing background levels until all disturbed areas have been stabilised.

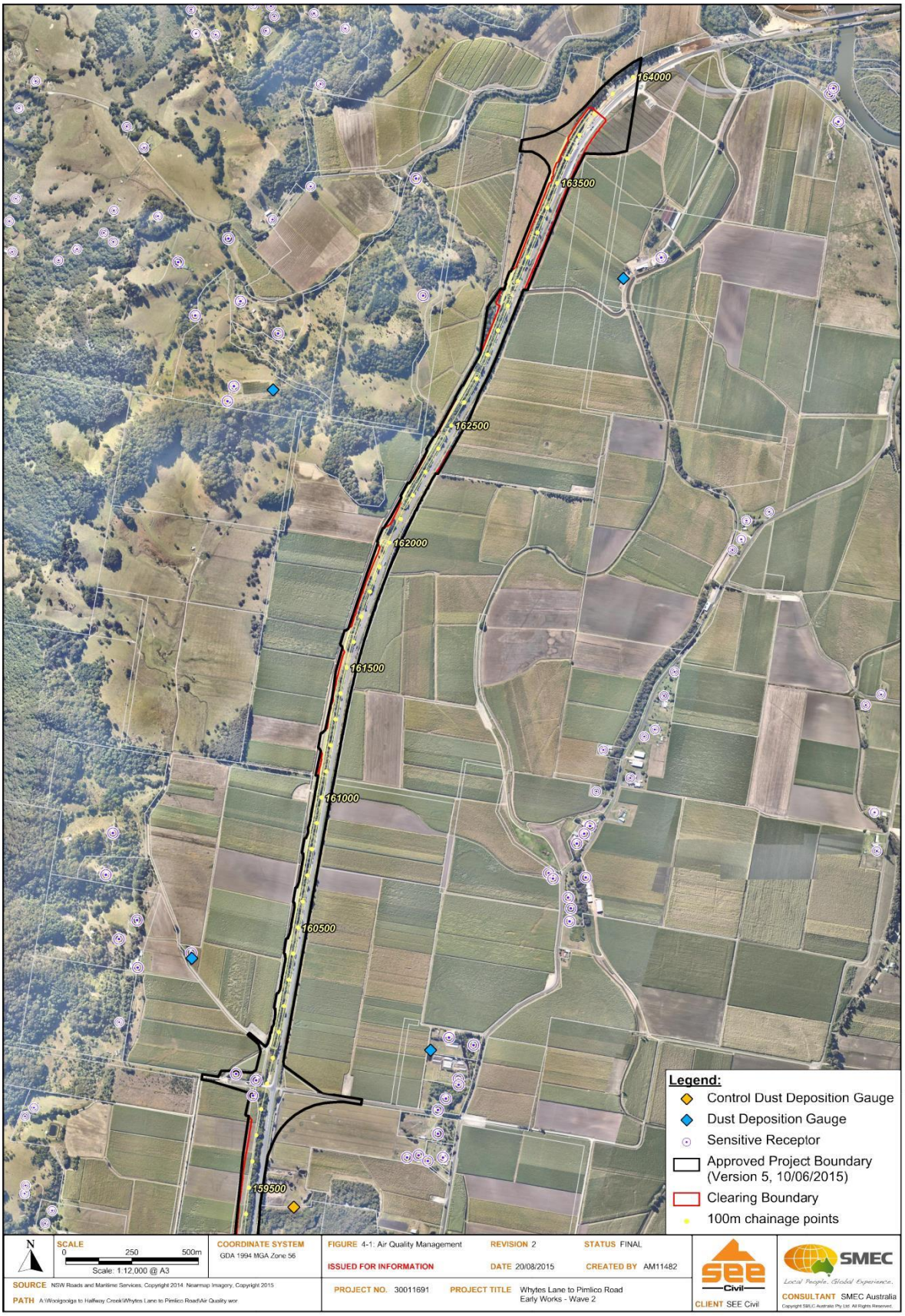

Figure 4-1 Sensitive Receivers and Dust Deposition Gauge Locations

5 Air quality criteria

The acceptable increment in annual average dust deposition depends on the existing deposition level. These are based on research by Dean (1990) and other investigations, which detail community response to dust fallout. It should be remembered that the air quality goals relate to the total dust burden in the air and not just the dust from the Project. In other words, there needs to be some consideration of background levels when using these goals to assess impacts.

Table 5-1 details the air quality monitoring criteria for deposited dust.

Table 5-1 Air quality monitoring criteria for deposited dust[a]

Pollutant	Annual concentration		Source
Deposited dust[b]	2 g/m2/month[c]	4 g/m2/month[d]	NERDDC (1998)

Note:

a. Adapted from DECCW guideline; Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (DECCW 2005).

b. Dust is assessed as insoluble solids as defined by AS 3580.10.1-1991 (AM-19).

c. Maximum increase in deposited dust level.

d. Maximum total deposited dust level.

e. Refer to G36 Section .4.4 Air Quality

Requirements of the Environment Protection Licence (EPL) once issued by the EPA are to be incorporated into this Plan.

6 Environmental aspects and impacts

6.1 Construction activities

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

- Dust and particulates.
- Gaseous.

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

- General earthworks particularly during site establishment.
- Vegetation clearing and chipping/mulching.
- Bulk Earthworks.
- Concrete cutting.
- Topsoil / material handling including stockpiling, material loading and material haulage.
- Vehicular movements over unpaved surface (including unsealed access roads).
- Wind erosion of exposed areas and temporary stockpiles.
- Tracking of dirt onto roads.

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

- Vehicle and plant exhaust emissions, which may be excessive if vehicles and plant are poorly maintained.
- Odours/gases released during:
  - Excavations of organic or contaminated materials.

6.2 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.
- Exposed surfaces – during construction non-vegetated surfaces will be exposed prior to revegetation, which are a key factor influence of dust emissions.

6.3 Impacts

The potential for impacts on air quality will depend on a number of factors. Primarily impacts will be dependent on the nature, extent and magnitude of construction activities and their

interaction with the natural environment. Potential impacts attributable to construction might include:

- Deposition of dust on surfaces where it may cause damage and/or lead to a need for increased cleaning or repair.
- Aesthetic effects that arise from visible airborne dust plumes and from deposits of dust on surfaces.
- Need for increased maintenance of air filtering systems (eg air conditioners etc).
- Potential adverse health effects including eye, nose and throat irritation from excessive inhalation of fine particles.
- Impacts on water quality and/or vegetation health from dust deposition.
- Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities.
- Complaints from the public relating to dust or odours.
- Dust deposition impacts on sensitive agricultural receivers, including blueberry farms and areas of sugar cane.

Some impacts on air quality attributable to the Project are anticipated and have been described in the EIS.

CoA B66 requires that:

- The SSI shall be constructed in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust and tracking of material onto public roads. All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Applicant shall identify and implement all feasible and reasonable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.

Chapter 7 provides a suite of mitigation measures that will be implemented to avoid or minimise dust impacts.

7 Environmental control measures

A range of environmental requirements and control measures are identified in the various environmental documents, including the EIS, Submission Preferred Infrastructure Report, supplementary assessments, Conditions of Approval and RMS documents, and from recent experience on similar road projects. Specific measures and requirements to address impacts on air quality are outlined in Table 7-1.

Table 7-1 Air quality management and mitigation measures

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
GENERAL					
AQ1	Training will be provided to all project personnel, including relevant sub-contractors on sound air quality control practices and the requirements from this plan through inductions, toolboxes and targeted training.		Pre-construction Construction	Construction Manager / Environment Manager	G38/G36 Good practice
AQ2	Air quality control measures from this plan will be included in relevant Environmental Work Method Statements (EWMS) and/or Erosion and Sediment Control Plans (ESCP).		Pre-construction / Construction	Site Engineer / Environmental Manager	Good practice
AQ3	Vegetation clearing will be staged where possible to minimise the area and time that surfaces are exposed.		Construction	Site Engineer / Foreman	G40, Submissions / PIR (AQ1)
AQ4	Exposed surfaces with no scheduled work for two weeks will be treated to minimise dust generation. Exposed surfaces will be stabilised progressively using the most practical site specific methods, including watering and geo-fabrics for short term exposure and emulation spray, spray grass, soil compaction and revegetation for longer term exposed areas or final finishes. Short term exposure is defined as up to one month, longer term exposure is in excess on one month.		Construction	Site Engineer / Foreman	Submissions / PIR (AQ1)
AQ5	Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase dust generation.		Construction	Site Engineer / Foreman	G36, Submissions / PIR (AQ1)
AQ6	Control measures including water carts, sprinklers, sprays, dust screens or the application of geo-binding agents will be utilised where applicable to control dust emissions. The frequency of use will be modified accommodate prevailing conditions.		Construction	Site Engineer / Foreman	G36, Submissions / PIR (AQ1) / EPL
AQ7	Erosion control structures will be checked regularly for build up of silt and other materials to ensure deposits do not become a dust source.		Construction	Site Engineer / Foreman	Good practice

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
AQ8	Waste will be segregated and collected on a regular basis to ensure odours associated with waste do not become an issue.		Construction	Site Engineer / Foreman	Good practice
AQ9	The application of pesticides will be modified, reduced or controlled during high or unfavourable wind conditions where wind can carry pesticides outside of the defined treatment area.		Construction	Site Engineer / Foreman	G36
AQ10	Stockpiles will be located in accordance with the criteria established in Appendix B8 of the CEMP. A suitable cover crop or provision of other covering over topsoil stockpiles will be established where stockpiles prone to wind erosion are in place for longer than 4 weeks. If stockpiles are in place less than 4 weeks, measures to reduce dust generation will include spraying of stockpiles with suitable stablilsing agents.		Construction	Site Engineer / Foreman	G36, Submissions / PIR (AQ1)
AQ11	There will be no burning off of waste.		Construction	Foreman	G36
AQ12	Stormwater, recycled water or other water sources shall be used, where feasible and reasonable, in preference to potable water for construction activities, including concrete mixing and dust control.		Construction	Site Engineer / Foreman	COA B35
AQ13	Adherence to vegetation clearing limits to minimise ground exposure.		Construction	Site Engineer / Foreman / Environmental Manager	Good practice
AQ14	Maintain dust control equipment to ensure its operability.		Construction	Site Engineer / Foreman / Environmental Manager	G36, Good practice
AQ15	Locate waste receptacles away from sensitive receivers and ensure wastes are regularly removed from the site to minimise odour generation.		Construction	Site Engineer / Foreman / Environmental Manager	Good practice
VEHICLE MOVEMENT AND MATERIAL STORAGE					
AQ16	Areas of disturbed material and access roads will be		Construction	Superintendent	G36

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	stabilised where possible by methods such as compaction. Compounds, ancillary facilities, administration access roads and standing areas will be hard surfaced.				
AQ17	Measures implemented to minimise dust, soil or mud from being deposited from vehicles on public roads. This will be achieved by implementing mitigation measures such as rumble grids and large aggregate at entry/exit points. Manual cleaning will also be carried out where appropriate. In the event of any spillage or tracking onto public roads, the spilt material will be removed immediately or when known.		Construction	Site Engineer / Foreman	G36, Submissions / PIR (AQ1) / EPL
AQ18	Hardstand areas and surrounding public roads will be cleaned, as required, using methods including brooms, bobcat attachments or street sweepers.		Construction	Site Engineer / Foreman	Good practice
AQ19	Vehicle movement will be confined to designated haul roads and areas. These roads will have speed limits of 40km/h in order to reduce dust generation. Reduced speed limit maybe implemented where dust generation persists		Construction	Site Engineer / Foreman	G36, Submissions / PIR (AQ1)
AQ20	All loaded haulage trucks will be covered where there is a risk of release of dust or other materials and at all times on public roads.		Construction	Site Engineer / Foreman	G36, Submissions / PIR (AQ1)
AQ21	Water carts will be used to supress dust on haul roads.		Construction	Site Engineer / Foreman	Good Practice Submissions / PIR (AQ1)
PLANT AND EQUIPMENT					
AQ22	Haul trucks and plant equipment will be switched off when not in operation for periods of more than 15 minutes.		Construction	Foreman / Operators	G36 / EPL
AQ23	Engines of plant parked next to residents will be switched off when not in operation.		Construction	Foreman / Operators	Good practice
AQ24	Exhaust systems of construction plant, vehicles and machinery will be maintained in accordance with manufacturer's specifications to ensure that emissions do not exceed EPA regulations. Periodic visual checks will be undertaken to ensure ongoing compliance, typically weekly. If visible smoke emissions are detected from plant and equipment, the plant and equipment will be tagged out of		Construction	Site Engineer / Foreman	G36 / EPL

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	service until such time as it has been inspected by a mechanic and either repaired, maintained, or shown to be in compliance with EPA regulations.				
INSPECTION, MONITORING AND RECORDS					
AQ25	Public roads will be inspected each day at main entry and exit points to and from areas where construction activities are taking place and compound. Material tracked onto the road pavement will be removed in accordance with AQ17.		Construction	Site Engineer / Foreman	G36
AQ26	Dust levels are to be monitored to measure existing background levels. Monitoring equipment will remain in place until completion of the construction works and/or where ground conditions are stable. Results will be captured on a monthly basis and collected in accordance with DEC's "Approved Method for the Sampling and Analysis of Air Pollutants in NSW" guidelines.		Pre-construction / Construction	Site Engineer / Foreman	G36, Submissions / PIR
AQ27	Weather forecast will be reviewed on a daily basis and appropriate measures implemented where unfavourable weather conditions (dry weather, strong winds) are anticipated.		Construction	Environmental Manager / Foreman	Good practice
AQ28	An onsite weather station will be established to record weather data. Rainfall at the premises will be measured and recorded in millimetres per 24-hour period at the same time each day from the time that the site office is established.		Pre-construction / Construction	Environmental Manager	Good practice
AQ29	Dust control and operational procedures will be reviewed and modified if results exceed the air quality criteria and are attributable to construction activities.		Construction	Environmental Manager / Foreman	Good practice, Submissions / PIR (AQ1)

8 Compliance management

8.1 Roles and responsibilities

The SEE Civil Project Team's organisational structure and overall roles and responsibilities are outlined in Section 4.2 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Chapter 7 of this Plan.

8.2 Training

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

- Existence and requirements of this sub-plan.
- Relevant legislation.
- EPL conditions (eg. specifically dust management competency and maintenance of plant and equipment conditions, and the Dust Assessment Handbook).
- Roles and responsibilities for air quality management.
- Air quality mitigation and management measures.
- Procedure to be implemented in the event of an incident (eg release of dust or gaseous emissions from site).

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:

- ERSED control installation methodology.
- Planning and preparedness for high wind events / dust risk periods.
- Lessons learnt from dusty periods, incidents and other event eg low rainfall/high wind.

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

8.3 Monitoring and inspection

Regular monitoring and inspections will be undertaken during construction. Monitoring and inspections will include, but not be limited to:

- Monthly dust monitoring in accordance with DEC's "Approved Method for the Sampling and Analysis of Air Pollutants in NSW" guidelines. Refer to Appendices for further details.
- Weather data at the premises, including rainfall measured and recorded in millimetres per 24-hour period at the same time each day from the time that the site office is established.

Additional requirements and responsibilities in relation to inspections are documented in Section 8.2 of the CEMP.

8.4 Licenses and permits

An EPL will be obtained by SEE Civil for the scheduled activity "road construction". The EPL typically prescribes air quality parameters to be measured. The air quality monitoring criteria for the Project is listed in Table 5-1 *[*

Any other relevant licenses or permits will be obtained in the lead up to and during construction as required.

8.5 Auditing

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

Audit requirements are detailed in Section 8.3 of the CEMP.

8.6 Reporting

Reporting requirements and responsibilities are documented in the Sections 8.3 and 8.5 of the CEMP.

9 Review and improvement

9.1 Continuous improvement

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

The continuous improvement process will be designed to:

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

9.2 CAQMP update and amendment

The processes described in Section 8 and Section 9 of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

Only the Environment Manager, or delegate, has the authority to change any of the environmental management documentation.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 10.2 of the CEMP.

Appendix A
Dust Deposition Gauge Procedure

Appendix B
Dust Deposition Gauge Sampling Field Sheet