



# APPENDIX B6

## Construction Air Quality Management Plan

*Early Works – Wave 1 & 3 (part)*

*Woolgoolga to Ballina*

*Pacific Highway Upgrade*

NOVEMBER 2015



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Appendix A Dust catchment areas and sensitive receivers

## Glossary/Abbreviations

CAQMP	Construction Air Quality Management Plan
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSWQMP	Construction Soil and Water Quality Management Plan
DLWC	Department of Land and Water Conservation
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPL	Environment Protection Licence
ERSED	Erosion and sedimentation
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statements
FM Act	<i>Fisheries Management Act 1994</i>
Golding	Golding Contractors Pty Ltd
Minister, the	Minister for Planning
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measures
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
Project, the	Early Works – Wave 1 & 3 (part), Woolgoolga to Ballina, Pacific Highway Upgrade
RMS	NSW Roads and Maritime Services
Secretary	Secretary of the Department of Planning and Environment (formerly known as the Director General)
SPIR	Submissions/Preferred Infrastructure Report November 2013

# 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 Early Works - Wave 1 and parts of wave 3 Project, which is part of the upgrade of the Pacific Highway between Woolgoolga and Ballina.

This CAQMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the mitigation measures listed in the *Pacific Highway Upgrade: Woolgoolga to Ballina Environmental Impact Statement December 2012* (the EIS), the *Submissions/Preferred Infrastructure Report November 2013* (SPIR), the requirements of the Project Specifications, and applicable legislation.

This Plan has been prepared for Wave 1 and 3 (part) of the project which broadly includes:

- Ground treatment and preparatory earthworks (soft soils treatments) between STN 83400 and 91200.
- Excavation of material taken from a highway cutting at Tyndale (at approximate STN 69000 to 69500) for the soft soil treatments.
- Excavation of material taken from highway cuttings North of McIntyres Lane, Gulmarrad (at approximate STN 77500 to 78400) for the soft soil treatments.
- Excavation of material south of McIntyres Lane, Gulmarrad - Greenhills cutting (at approximate STN 76000 to 77075) for the soft soil treatments. McIntyres Lane would be widened to support truck movements from this cutting.
- Relocation of utility services at various locations throughout STN 67200 to 95100.

These works would be located within Sections 4 and 5 of the Approved Project.

## 1.2 Background

The EIS 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 Golding 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 Golding personnel and contractors.

The review and document control processes for this Plan are described in *Section 1.6 and Chapter 10 of the CEMP*.

## 2 Purpose and objectives

### 2.1 Purpose

The purpose of this Plan is to describe how the Golding 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 infrastructure approval. To achieve this objective, Golding 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).
- *National Greenhouse and Energy Reporting Act 2007*.

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.
- Protection of the Environment Operations (Clean Air) Regulation, 2010.
- 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 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 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 concrete mixing and 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 dust and tracking of material onto public roads. All activities on the site shall be undertaken with the objective of preventing	Table 7-1

CoA No.	Condition requirements	Document reference
	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(vi)	Issues that shall be addressed through the Community Communication Strategy include (but are not necessarily limited to): (vi) air quality and dust;	Table 7-1
D25(d)(v)	measures to monitor and manage dust emissions including dust from stockpiles, blasting, traffic on unsealed public roads and materials tracking from construction sites onto public roads	Table 7-1

## 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 2007.

**Table 4-1 Korora air quality monitoring results**

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

### 4.2 Rainfall, soil dryness and wind

Climatic data for Yamba Pilot Station (BoM Station No. 058012) have been selected to reflect the potential conditions at the Project site due to its proximity to site and extent of available data (from 1877 to present). A summary of the climatic data from the Bureau of Meteorology is provided in Table 4-2. The Yamba station was selected as it provided an appropriate range of data that was not available for the Harwood Island station.

**Table 4-2 Summary of climatic data**

	Summer/autumn						Winter/spring						Year
	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	
<i>Mean rainfall (mm)</i>	117.2	139.2	159.3	182.9	162.8	156.5	134.4	101.6	75.5	59	78.9	93.8	1461.6
<i>Mean rain days</i>	9.0	10.2	11.0	13.4	11.4	10.5	8.8	7.6	6.7	6.4	7.7	8.2	138
<i>Mean clear days</i>	9.4	8.0	6.3	7.8	9.9	10.7	11.5	14.6	16.1	15.2	12.1	9.6	131.2
<i>Mean cloudy days</i>	10.0	10.7	10.7	11.7	9.4	10.7	9.5	7.6	6.2	5.6	8.2	9.9	110.2
<i>Mean 9am wind speed (km/h)</i>	12.7	13.6	13.8	13.7	12.9	11.9	12.7	12.5	12.7	12.9	13.5	12.9	13.0
<i>Mean 3pm wind speed (km/h)</i>	21.5	21.1	20.6	20.6	17.9	15.4	15.4	15.7	18.1	21.2	23.0	21.9	19.4
<i>Mean max. temp (°C)</i>	25.9	26.7	26.7	24.3	21.7	19.6	19.0	20.1	22.0	23.4	24.7	25.9	23.3
<i>Mean min. temp (°C)</i>	19.1	20.2	20.3	19.3	16.5	13.3	10.8	9.7	10.5	13.0	15.4	17.4	15.5

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 along with an indication of the potential for wind erosion ie dust emissions. The soil information is from the DLWC Soil Landscapes of the Coffs Harbour (1999), Woodburn (2011) and Lismore and Ballina (1994) 1:100,000 sheets and the CSIRO Atlas of Australian Soils (1960-1968) 1:2,000,000 sheets.

**Table 4-3 Soil type and characteristics**

Section	Soil type	Characteristics	Dust emission risk
4	No published soil landscape map is available for the southern portion of this section.  The northern portion is underlain by swamp and alluvial landscapes at lower elevations (ie <5 m) and erosional landscapes at higher elevations near Maclean.	Highly erodible.  Presence of soft soils throughout the Clarence River floodplain.	Potential for decreases in air quality during construction associated with dust generating activities and emissions from heavy construction machinery.
5	Mainly underlain by estuarine landscapes of the Clarence River delta and associated floodplains.  An area of disturbed landscape located on the southern bank of the Clarence River at the south of the section.	Prone to water erosion.	Potential for decreases in air quality during construction associated with dust generating activities and emissions from heavy construction machinery.

### 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 and fauna communities
- Sensitive agricultural and commercial industries.
- Road users
- Watercourses.

The nearest potentially affected non-residential sensitive receivers have been identified as, but not limited to, the following:

- The village of Harwood.

- Harwood Island Public School.
- Harwood Island Hotel, Harwood Island General Store and other commercial premises.
- Harwood Sugar Mill.
- Harwood Cricket Ground.
- United Petrol Station, Harwood.
- Agricultural land.
- Serpentine Channel flying fox camp

Residential sensitive receivers have been identified from their close proximity to the Project. These receivers have been grouped into dust catchment areas. The location of these catchments and the non-residential sensitive receivers listed above are shown in Appendix A.

Two sensitive receivers were present near Greenhill Cutting at the time of the EIS preparation, located to the north-west of the Greenhill cutting. A recently constructed structure is located approximately 180m to the west of the future highway alignment and the closest occupied house being more than 450m from the proposed work site, no additional controls beyond those already implemented are proposed.

## 5 Air quality criteria

The Environment Protection Authority (EPA) sets goals for ambient dust concentrations and dust deposition, which is a measure of the impacts of nuisance (EPA 2001).

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**

Pollutant	Annual concentration		Source
Deposited dust <sup>b</sup>	2 g/m <sup>2</sup> /month <sup>c</sup>	4 g/m <sup>2</sup> /month <sup>d</sup>	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

## 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 mulching.
- Bulk Earthworks.
- Drilling and Blasting
- Operating, crushing and screening.
- 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.
  - During sealing works.

### 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.



## 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 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, SPIR, 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
<b>GENERAL</b>					
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.	Induction	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 Site Representative	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 managed to minimise dust generation. Exposed surfaces will be stabilised progressively using the most practical site specific methods, including watering, smooth drum rolling and geofabrics for short term exposure and emulsion spray, spray grass, soil compaction and revegetation for longer term exposed areas or final finishes.	The Blue Book - Managing Urban Stormwater: Soils and Construction (Landcom) - Section 7 Site Stabilisation	Construction	Site Engineer/ Foreman	Submissions/PIR (AQ1)
AQ5	Construction activities, including ripping, drilling and rock hammering, will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase off-site 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 to accommodate prevailing conditions.		Construction	Site Engineer/ Foreman	G36, Submissions/PIR (AQ1)

ID	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
AQ7	Wherever possible stormwater, recycled water or other water sources shall be used in preference to potable water for construction dust control.		Construction	Site Engineer / Foreman	G38, Good practice
AQ8	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
AQ9	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
AQ10	Worker amenities shall be located so that they do not expose local residential properties or commercial premises to bad odour and will be operated to minimising omission of smoke and odours.		Construction	Site Engineer/ Foreman	G36, good practice
AQ11	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
AQ12	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 four weeks.		Construction	Site Engineer/ Foreman	G36, Submissions/PIR (AQ1)
AQ13	There will be no burning off of waste.		Construction	Foreman	G36
AQ14	An air quality program for the detection of airborne asbestos fibres shall be conducted in accordance with an asbestos management plan established if asbestos is identified in the workplace.	WHS Procedure – Asbestos Related Work	Construction	Site Engineer / Environmental Site Representative	G36
<b>VEHICLE MOVEMENT AND MATERIAL STORAGE</b>					
AQ15	Areas of disturbed material and access roads will be stabilised where possible by methods such as compaction. Compounds,		Construction	Superintendent	G36

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ID	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	ancillary facilities, administration access roads and standing areas will be hard surfaced.				
AQ16	Measures implemented to minimise dust, soil or mud from being deposited 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, the spilt material will be removed immediately.		Construction	Site Engineer/ Foreman	G36, Submissions/PIR (AQ1)
AQ17	Hardstand areas and surrounding public roads will be cleaned, as required, using methods including brooms, bobcat attachments or street sweepers, ensuring dust sweeping operations minimise dust emissions.		Construction	Site Engineer/ Foreman	Good practice
AQ18	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 may be implemented where dust generation persists.		Construction	Site Engineer/ Foreman	G36, Submissions/PIR (AQ1)
AQ19	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)
<b>PLANT AND EQUIPMENT</b>					
AQ20	Haul trucks and plant equipment will be switched off when not in operation for periods of more than 15 minutes.		Construction	Foreman/ Operators	G36
AQ21	Engines of plant parked next to residents will be switched off when not in operation.		Construction	Foreman/ Operators	Good practice
AQ22	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		Construction	Site Engineer/ Foreman	G36

ID	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	regulations. Periodic visual checks will be undertaken to ensure ongoing compliance, typically weekly.				
<b>BLASTING AND CRUSHING</b>					
AQ23	Where practical during blasting, a combination of the following mitigation measures will be used to suppress dust: <ul style="list-style-type: none"> <li>Weather reports checked prior to blasting to ensure wind blown dust will not reach surrounding residents.</li> <li>Controlled blasts to minimise dust produced.</li> </ul>		Construction	Site Engineer/ Foreman	Good practice
AQ24	Crushers will be positioned in protected areas, where practical, to reduce wind dispersion of dust particles (eg within cuts). Water spraying will be utilised if necessary.		Construction	Site Engineer/ Foreman	Good practice
<b>INSPECTION, MONITORING AND RECORDS</b>					
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 AQ16.		Construction	Site Engineer/ Foreman	G36
AQ26	Stockpiles, disturbed ground and unsealed roads will be inspected each day to determine potential for dust generation with regards weather forecast and site activities and stabilised accordingly.		Construction	Site Engineer / Foreman	G36
AQ27	Dust deposition gauges will be established three months prior to the commencement of construction to establish background dust 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 (AQ1)

ID	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
AQ28	Weather forecast will be reviewed on a daily basis and appropriate measures implemented where unfavorable weather conditions (dry weather, strong winds) are anticipated.		Construction	Environmental Site Representative/ Foreman	Good practice
AQ29	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 Site Representative	Good practice
AQ30	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 Site Representative/ Foreman	Good practice, Submissions/PIR (AQ1)

## 8 Compliance management

### 8.1 Roles and responsibilities

The 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
- 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.
- 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 Licences and permits

An EPL will be obtained for the Project. 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 licences 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.

Section 8.6 of the CEMP details how non-conformity are addressed and the Quality Plan describes the process for managing non-conforming work practises and initiating corrective/preventative actions or system improvements.

### 9.2 CAQMP update and amendment

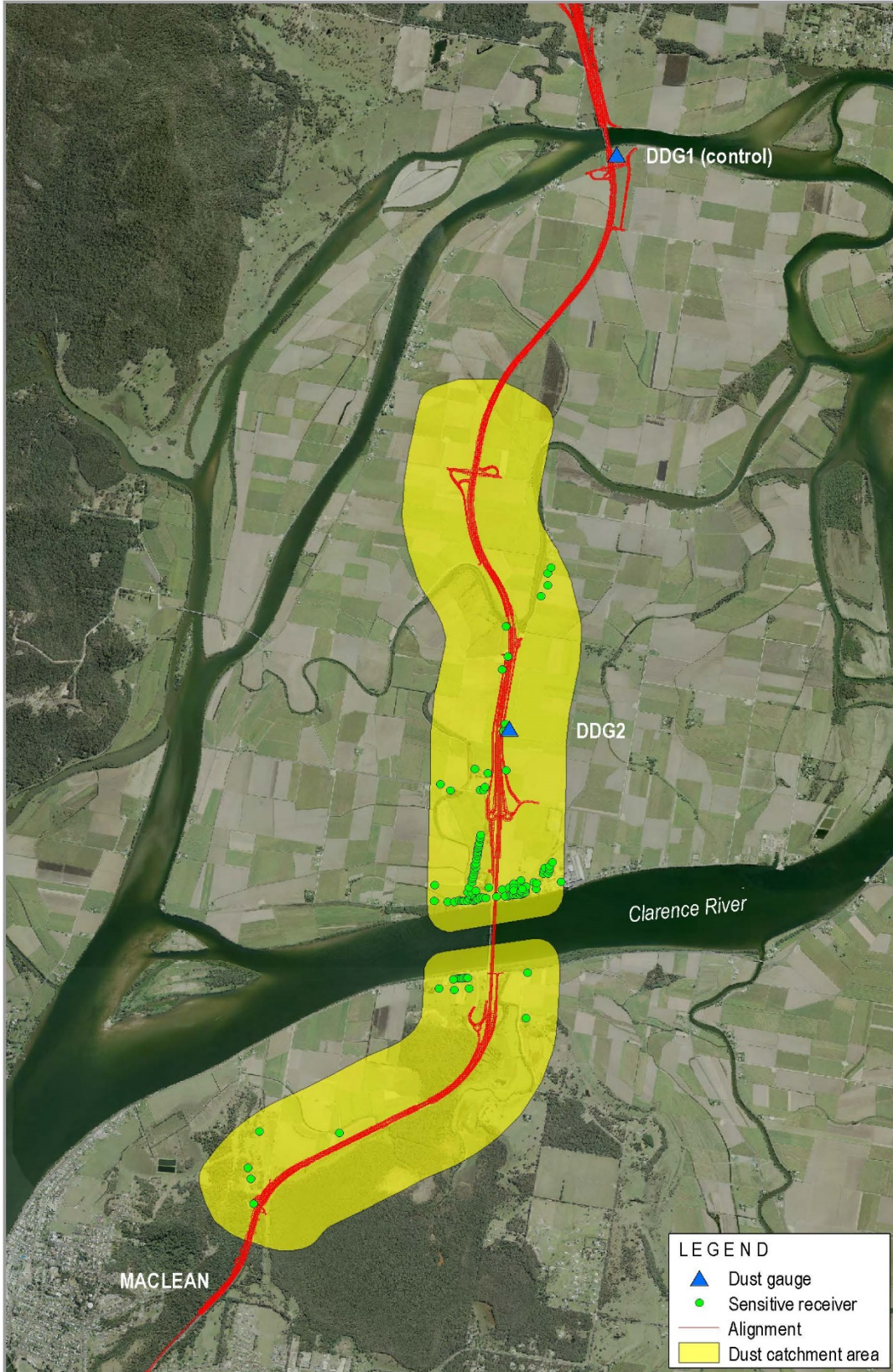
The processes described in *Section 8 and Section 9 of the CEMP* may result in the need to update or revise this Plan. This will occur as needed.

Any revisions to the CAQMP will be in accordance with the process outlined in *Section 1.6 of the CEMP*.

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

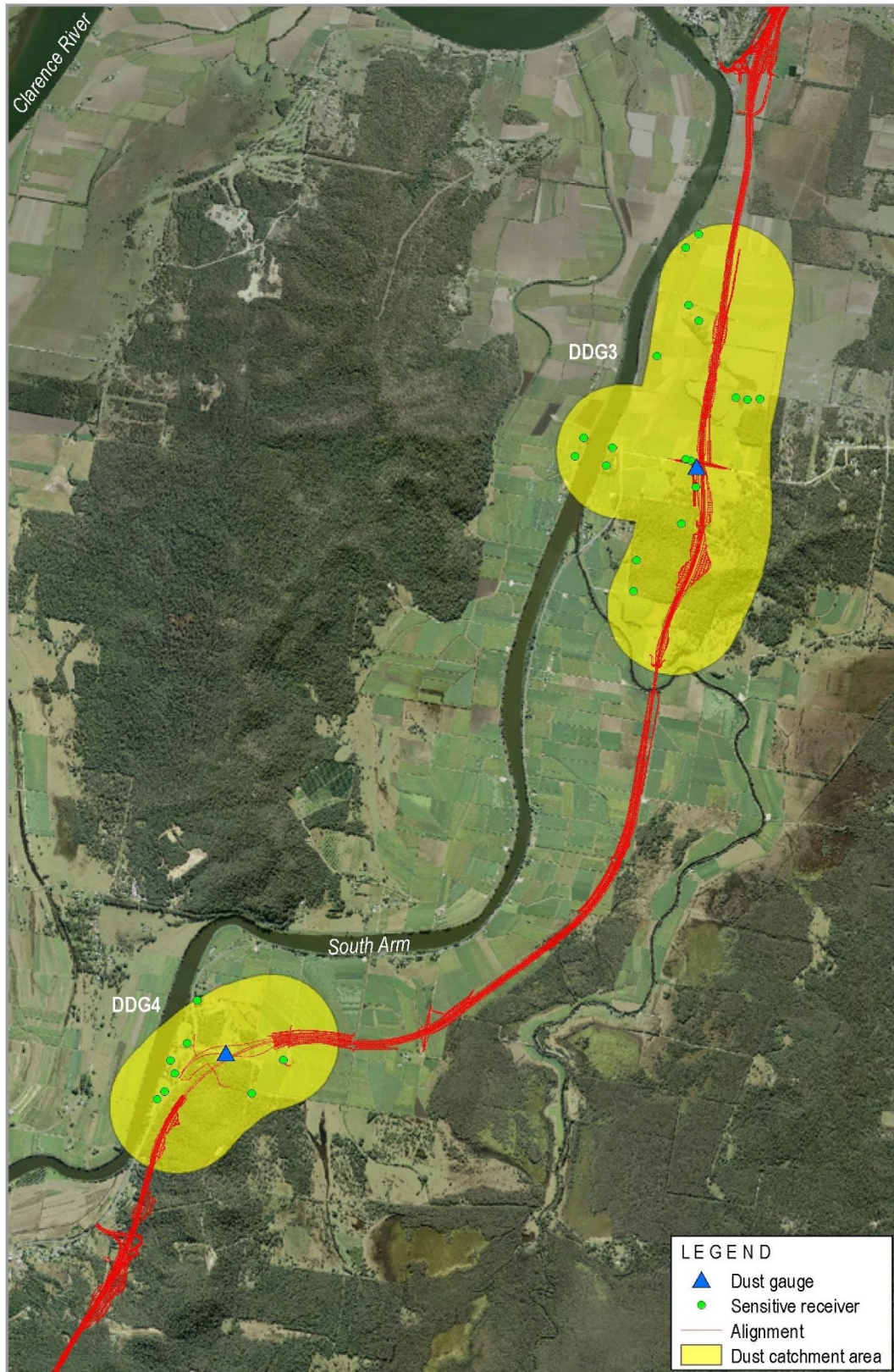
# **Appendix A**

## **Dust catchment areas and sensitive receivers**



Dust Catchment Areas and Gauge Locations - SHEET 1 of 2





0 1 km

### Dust Catchment Areas and Gauge Locations - SHEET 2 of 2