# APPENDIX B6

## Construction Air Quality Management Sub-plan

## Foxground and Berry bypass

**September 2017**

# Document control

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Plan approved by:

| | | |
|---|---|---|
| *Michael Phillips-Ryder* | *Jacob Cooper* | *Ryan Whiddon* |
| Contractor Project Director | Contractor EM | RMS representative |

# Revision history

| Revision | Date | Description | Approval |
|---|---|---|---|
| G | 11/09/17 | Update to project personnel | |
| F | 26/10/15 | Construction phase revision<br>Updated with minor editorial changes (tracked) to Sections 3, 5 and 6. | |
| E | 26/08/14 | Fifth draft in response to DP&E comments. Updated Glossary / Abbreviations to include Director General and 'Secretary'.<br>Section 6.3 - Added DMG 5 as suggested by EPA and updated section accordingly. | |
| D | 28/07/14 | Fourth draft for submission to DP&E. All comments addressed. | |
| C | 21/07/14 | Third draft for review by RMS and ER. Comments from RMS and ER addressed. Comments from EPA pending. | |
| B | 25/06/14 | Second draft for EPA review and comment | |
| A | 23/04/14 | Draft for RMS and ER review | |

# Distribution of controlled copies

| Copy no. | Issued to | Version |
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| 1 | RMS – Ryan Whiddon | Rev G |
| 2 | Project ER – Toby Hobbs | Rev G |
| 3 | Fulton Hogan – Michael Phillips Ryder | Rev G |

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# Glossary / Abbreviations

| | |
|---|---|
| Ancillary facility | Defined by the Project Approval as a temporary facility for construction, including for example an office and amenities compound, construction compound, batch plant (concrete or bitumen), materials storage compound, maintenance workshop, testing laboratory. |
| CAQMP | Construction Air Quality Management Sub-plan |
| CEMP | Construction Environmental Management Plan |
| CoA | Condition of Approval |
| CRM | Community Relations Manager |
| CSWQMP | Construction Soil and Water Quality Management Sub-plan |
| CWEMP | Construction Waste and Energy Management Sub-plan |
| DEC | NSW Department of Environment and Conservation |
| DECC | NSW Department of Environment and Climate Change |
| DP&E | Department of Planning and Environment |
| Director General | Director General of the NSW Department of Planning and Infrastructure (or delegate). Now the Secretary of the Department of Planning and Environment. |
| EA | Environmental Assessment |
| EEC | Endangered Ecological Community |
| EPA | Environment Protection Authority |
| EP&A Act | *Environmental Planning and Assessment Act 1979* |
| EPL | Environmental Protection Licence |
| ER | Environmental Representative |
| EWMS | Environmental Work Method Statements |
| FM Act | *Fisheries Management Act 1994* |
| NEPC | National Environment Protection Council |
| NERDDC | National Energy Research, Development and Demonstration Council |
| NOW | NSW Office of Water |
| OEH | Office of Environment and Heritage |
| PESCP | Progressive Erosion and Sediment Control Plan |
| POEO Act | *Protection of the Environment Operations Act 1997* |
| Project, the | The Princes Highway Upgrade - Foxground and Berry Bypass Project, defined as *"The construction and operation of approximately 11.6 kilometres of two lane divided carriageways (with the exception of the cutting through Toolijooa Ridge which comprises two lanes plus a climbing lane in each direction), with provisions for the possible future widening to three lanes within the road corridor (if required in the future)."* |

| | |
|---|---|
| RMS | Roads and Maritime Services |
| Secretary | Secretary of the Department of Planning and Environment |
| SoC | Revised Statement of Commitments included in the Submissions Report |
| TSP | Total suspended particulates |
| WHO | World Health Organisation |

# 1 Introduction

## 1.1 Purpose

This Construction Air Quality Management Sub-plan (CAQMP) describes how Fulton Hogan will manage and control air quality impacts related to dust during construction of the Foxground and Berry bypass Project (the Project).

Gaseous emissions from the Project, such as those generated by vehicle exhausts, are not considered to present a significant risk to the environment and community and therefore, are not considered in this CAQMP. Refer to the Construction Waste and Energy Management Sub-plan (CWEMP) for measures to reduce greenhouse gas emissions during construction.

This CAQMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the RMS Statement of Commitments (SoC), the mitigation measures listed in the *Foxground and Berry bypass Environmental Assessment* (EA) (AECOM, 2012) and applicable legislation.

## 1.2 Background

Air quality was not identified as a key issue in the Director General's requirements (DGRs) for the project. However, an Air Quality Technical Paper was prepared and included in Volume 2 of the EA. A summary of the air quality assessment was presented in Section 8.2 of the EA.

The EA identified that dust emissions as a result of earthworks activities would be unlikely to cause any significant adverse impacts at the nearest sensitive receivers. There may be some short-term amenity impacts at locations adjacent to the construction site when wind speeds are high. The potential impacts on sensitive receivers from ancillary facilities would also be minor.

The implementation of the mitigation measures in this CAQMP will assist to substantially reduce emissions and minimise potential impacts on sensitive receivers.

## 1.3 Structure of CAQMP

This CAQMP is part of Fulton Hogan's environmental management framework for the Project and is supported by other documents such as the strong wind work modification record and environmental work method statements. The review and document control processes for this CAQMP are described in Chapter 10 of the CEMP.

## 1.4 Consultation for preparation of the CAQMP

This CAQMP has been developed in consultation with the EPA. A summary of consultation undertaken during the preparation of this CAQMP is provided in Appendix A2 of the CEMP.

# 2 Legal and other requirements

## 2.1 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 2010*, *and*
- *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 Sub-plan (CWEMP).

## 2.2 Guidelines and standards

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

- National Environment Protection Council's (NEPC) – National Environment Protection Measure (NEPM) for Ambient Air Quality
- AS 3580.1.1:2007 Methods for sampling and analysis of ambient air: Part 1.1: Guide to siting air monitoring equipment
- AS 3580.10.1:2003 Methods for sampling and analysis of ambient air: Method 10.1: Determination of particulate matter – Deposited matter – Gravimetric method
- AS/NZS 3580.12.1:2001 Methods for sampling and analysis of ambient air - Determination of light scattering - Integrating Nephelometer method
- *Action for Air* (NSW EPA, 1998), and
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (Department of Environment and Conservation NSW (DEC), 2005).

The abovementioned DEC 2005 publication outlines the impact assessment criteria for deposited dust and details the allowable increase in dust deposition concentration over the ambient (background) level. Refer to Table 2-1.

**Table 2-1 Criteria for deposited dust**

| Pollutant | Averaging period | Goal | Source |
|---|---|---|---|
| Deposited dust[a] | Annual | 2 g/m$^2$/month[b]<br>4 g/m$^2$/month[c] | NERDDC (1988)[d] |

*Notes:*

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

b. Maximum increase in deposited dust level due to construction.

c. Maximum total deposited dust level.

*d.* NERDDC – National Energy Research, Development and Demonstration Council.

## 2.3 Minister's Conditions of Approval

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

**Table 2-2 Conditions of Approval relevant to this CAQMP**

| CoA No. | Condition Requirements | Document Reference |
|---|---|---|
| CoA C2 | The Proponent shall employ feasible and reasonable measures (including cessation of relevant works, as appropriate) to ensure that the Project is constructed in a manner that minimises dust generation, including wind-blown dust, traffic-generated dust, dust from stockpiles and material tracking from construction and ancillary facility sites onto public roads. | Chapter 5 |
| CoA B35(e)(i) | …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. | Chapter 5<br>Section 6.3 |

## 2.4 Statement of commitments

Relevant SoC are listed in Table 2-3 below. This includes reference to required outcomes and the timing of when the commitment applies. A cross reference is also included to indicate where the condition is addressed in this CAQMP or other project / environmental management documents.

**Table 2-3 Statements of commitment relevant to this CAQMP**

| Outcome | Ref # | Commitment | Timing | CAQMP Reference |
|---|---|---|---|---|
| Minimise dust impacts to sensitive receivers. | AQ1 | Standard dust and emission control measures will be implemented to manage construction air quality impact at sensitive receivers. | Construction | Chapter 5 |
| Air quality environmental management measures are effective. | AQ2 | Monitoring will be undertaken to assess the effectiveness of the air quality environmental management measures. Where required, additional feasible and reasonable environmental management measures will be used. | Construction | Chapter 5<br>Section 6.3 |

# 3 Existing environment

The existing air quality in the project area is mainly influenced by local road traffic. Agricultural and manufacturing activities, such as dairy and beef production and turf farming, also contribute to air quality in the region, particularly dust emissions. However, the effects of agriculture and manufacturing on air quality are relatively small and localised only.

## 3.1 Sensitive receivers

The proximity of sensitive receivers such as residences will determine the extent of the potential nuisance caused by construction activities. Additionally, weather conditions such as those discussed in Section 4.1 will substantially influence the day to day potential for dust generation and deposition.

A total of 169 sensitive receivers are located in the vicinity of the Project as shown in Figure 3-1.

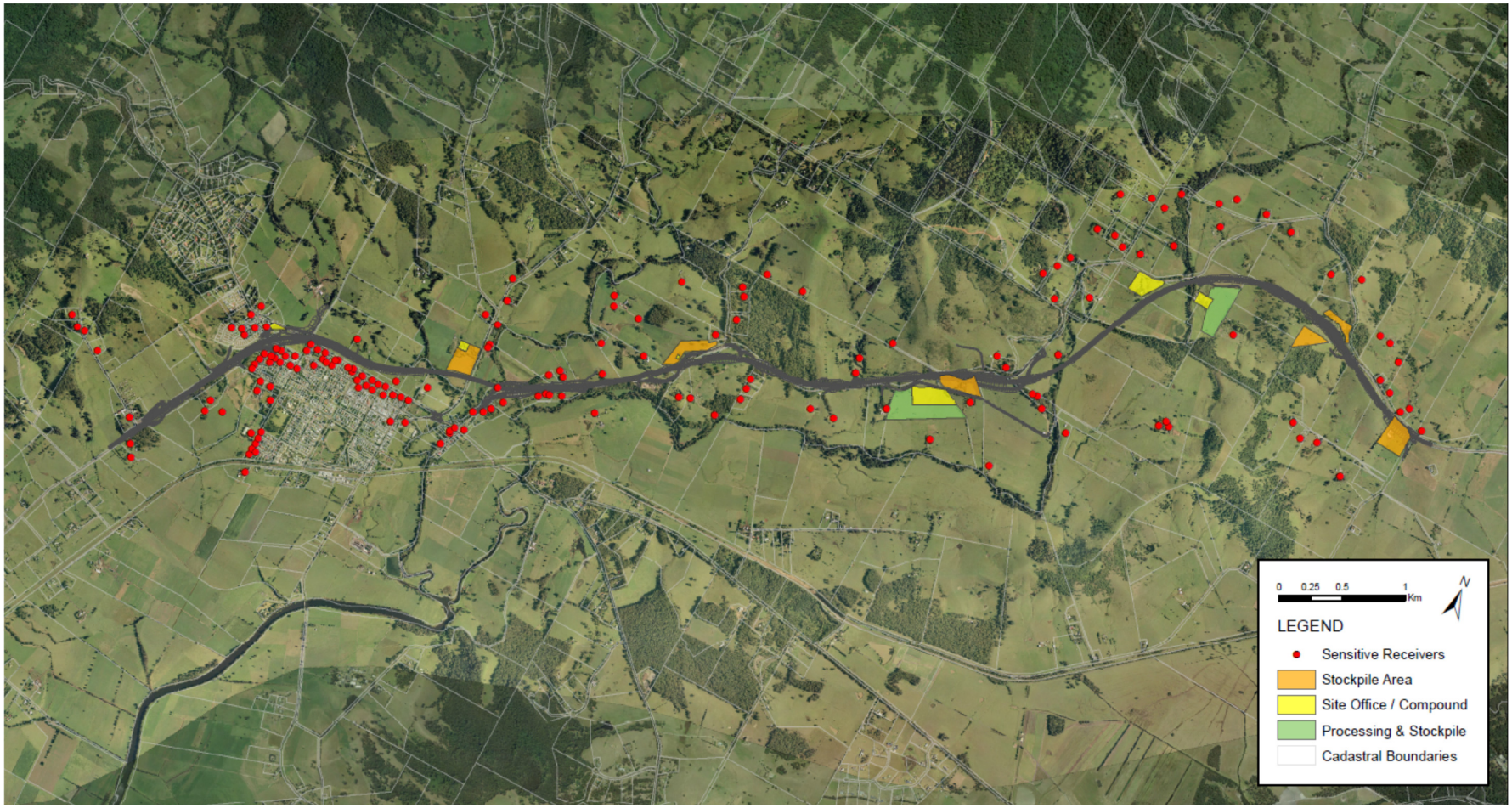


**Figure 3-1 Location of sensitive receivers in the vicinity of the project**

# 4 Environmental aspects and impacts

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

## 4.1 Factors likely to affect dust generation and impacts

In addition to the Project construction activities, a number of other environmental factors will also affect dust emissions including:

- 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; and
- rainfall or dew – rainfall or heavy dew that wets the surface of the soil and reduces the risk of dust generation.

# 5 Environmental mitigation measures

Specific mitigation measures to address dust impacts on air quality are outlined in Table 5-1.

**Table 5-1 Air quality mitigation measures**

| ID | Mitigation Measure | Timing | | Responsibility |
|---|---|---|---|---|
| | | PC[1] | C[2] | |
| **GENERAL** | | | | |
| CAQMM1 | Provide training to all Project personnel, including relevant sub-contractors on air quality control practices and the requirements from this CAQMP through inductions, toolboxes and targeted training. | ✓ | ✓ | Environmental Manager |
| CAQMM2 | Include air quality mitigation measures from this CAQMP in relevant Environmental Work Method Statements (EWMS) and / or Progressive Erosion and Sediment Control Plans (PESCP). | ✓ | ✓ | Project / Site Engineer<br>Environmental Officer |
| **DUST** | | | | |
| CAQMM3 | Progressively revegetate all disturbed areas and long term stockpiles (unused for longer than 4 weeks) as soon as practicable to minimise wind-blown dust. Spray shorter term stockpiles with water or stabilising agent to reduce dust emissions. | | ✓ | Foreman<br>Project / Site Engineer<br>Superintendent<br>Environmental Officer<br>Construction Manager |
| CAQMM4 | Water unsealed areas, including stockpiles and haul roads, during working hours to minimise wind-blown or traffic generated dust emissions. | | ✓ | Foreman |
| CAQMM5 | Cover unsealed roads with densely graded road base or dust control water cart additives where practicable if dust is excessive. | | ✓ | Foreman |
| CAQMM6 | Restrict speeds of construction traffic to 20km/h or 40km/h for haul roads. Signpost the speed limit. | | ✓ | Foreman |
| CAQMM7 | Restrict construction traffic to designated roadways. | | ✓ | Foreman |
| CAQMM8 | Prevent 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 |
| CAQMM9 | 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 |
| CAQMM10 | Modify or stop construction activities during periods of strong wind (in excess of 40km/h) and in response to strong wind weather forecasts. Promote this in the internal communications - site weather update and record any specific actions implemented in the *Strong Wind Work Modification Record* included in Appendix A. | | ✓ | Foreman<br>Environmental Officer |

| ID | Mitigation Measure | Timing | | Responsibility |
|---|---|---|---|---|
| | | PC[1] | C[2] | |
| CAQMM11 | Maintain all vehicles and construction equipment in good working order to prevent excessive exhaust emissions in accordance with the manufacturer's specification to comply with all relevant legislation. | | ✓ | Procurement Manager<br>Foreman |
| CAQMM12 | Turn machinery and vehicles off when not in use. | | ✓ | Subcontractors<br>Foreman |
| CAQMM13 | Cover all loads that enter or leave the site, and check that tyres and trailer draw bars are cleaned of sediment or debris that may be tracked onto public roads. | | ✓ | Subcontractors<br>Foreman |
| CAQMM14 | Use dust suppressants including soil stabilisers, polymers, temporary ground covers such as hydromulch as much as possible to progressively stabilise batters, stockpiles and large surface areas. | | ✓ | Foreman<br>Environmental Manager |
| CAQMM15 | Ensure temporary batching plants are fitted with dust filters to minimise air quality impacts from batching operations (Refer to G36 Cl 4.7.1 (w)). | | ✓ | Foreman<br>Environmental Manager |
| CAQMM16 | Establish and operate temporary batching plants in accordance with the *Concrete batching establishment and operation* EWMS. | | ✓ | Environmental Manager<br>Project Engineers<br>Foreman |
| CAQMM17 | Locate temporary batching plants in accordance with the *Ancillary facilities assessment* included in *Appendix A5 of the CEMP*. | ✓ | ✓ | Environmental Manager |

[1] PC means pre-construction
[2] C means construction

# 6 Compliance management

## 6.1 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 5-1 of this CAQMP.

## 6.2 Training

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

- existence and requirements of this CAQMP
- relevant legislation
- roles and responsibilities for air quality management, and
- air quality mitigation measures.

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, and
- 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.

## 6.3 Monitoring and inspections

Regular monitoring and inspections will be undertaken during construction in accordance with the table below. Additional requirements and responsibilities in relation to inspections and monitoring are documented in Sections 8.1 and 8.2 of the CEMP.

**Table 6-1 Monitoring and inspection**

| Monitoring details | Area | Record | Responsibility | Frequency |
|---|---|---|---|---|
| Dust deposition monitoring | Dust Monitoring Gauge Sites (Refer to Table 6-2 for locations) | Laboratory results and Monthly Environmental Reports | Environmental Officer | Monthly |
| Meteorological data including daily rainfall, temperature, relative humidity, wind (direction and speed) and barometric pressure | All | Automatic weather station web portal | Environmental Officer | Daily |
| Visual observations during daily site inspections, including activities observed outside of the Project | All | Strong Wind Work Modification Record, where wind in excess of 40km/h<br>Noted by | Foreman | Daily |

| Monitoring details | Area | Record | Responsibility | Frequency |
|---|---|---|---|---|
| that may impact on dust levels captured in DMG. | | Foreman in site diary | | |

### 6.3.1 Dust monitoring

Dust will be monitored monthly during construction using gravimetric Dust Monitoring Gauges (DMG) to assess compliance with the criteria detailed in Table 2-1.

Dust monitoring will begin at least three months prior to the commencement of construction activities in the subject area, to determine existing background dust levels. Dust monitoring will continue during construction of the Project until all disturbed areas activities in the subject area have been stabilised.

Additional DMG's may be installed along the alignment on an as-needs basis when there is evidence that current dust mitigation measures are not effective, or in response to complaints.

### 6.3.2 Dust monitoring locations

Five dust gauge monitoring locations have been selected near potential dust sensitive receivers and potentially high dust generating activities. Two additional DMG locations have been selected as 'controls'. These are located away from the influence of Project related activities for the purposes of monitoring and evaluating meteorological and other regional non-Project related variances in ambient dust levels.

Refer to Table 6-2 for the proposed location and rationale for all DMGs associated with the Project. These DMGs are also shown in Figure 6-1. The location of sensitive receivers and DMGs are also shown on the Sensitive Area Plans (refer to CEMP Appendix A6).

The precise location (eastings and northings) of the DMGs will be determined during the detailed design stage of the project subject to agreement with landowners where relevant.

All DMGs will be sited in the field in accordance with *AS 3580.1.1:2007 Methods for sampling and analysis of ambient air: Part 1.1: Guide to siting air monitoring equipment.*

**Table 6-2 Indicative dust monitoring gauge locations**

| DMG No. | Location | Reason | Approximate chainage |
|---|---|---|---|
| DMG 1 | Adjacent to houses at 25 and 455 Princes Highway | To monitor potential dust impacts from earthworks and blasting activities at Toolijooa Ridge. | 9400 |
| DMG 2 | Near Austral Park materials processing facility | To monitor potential dust impacts on sensitive receivers located near Austral Park Road and the materials processing facility. | 12600 |
| DMG 3 | Tindalls Lane Interchange adjacent to house at 200 Princes Highway | To monitor potential dust impacts on sensitive receivers from activities at Tindalls Lane Interchange | 13750 |

| DMG No. | Location | Reason | Approximate chainage |
|---|---|---|---|
| DMG 4 | North Street, Berry | To monitor potential dust impacts on Berry township residents from earthworks activities. This includes amenity impacts due to dust deposition. | 17000 |
| DMG 5 | Kangaroo Valley Road/ North Street/ Huntingdale Park Road | To monitor potential dust impacts on residents in this area from earthworks activities.<br>This dust monitoring gauge location was suggested by EPA in letter dated 24 July 2014. | 17700 |
| DMG CONTROL 1 | Near the start of the Project, outside the project boundary | Control - away from the influence of the project | 7550 |
| DMG CONTROL 2 | Outside the project boundary | Control - away from the influence of the project | 15000 |

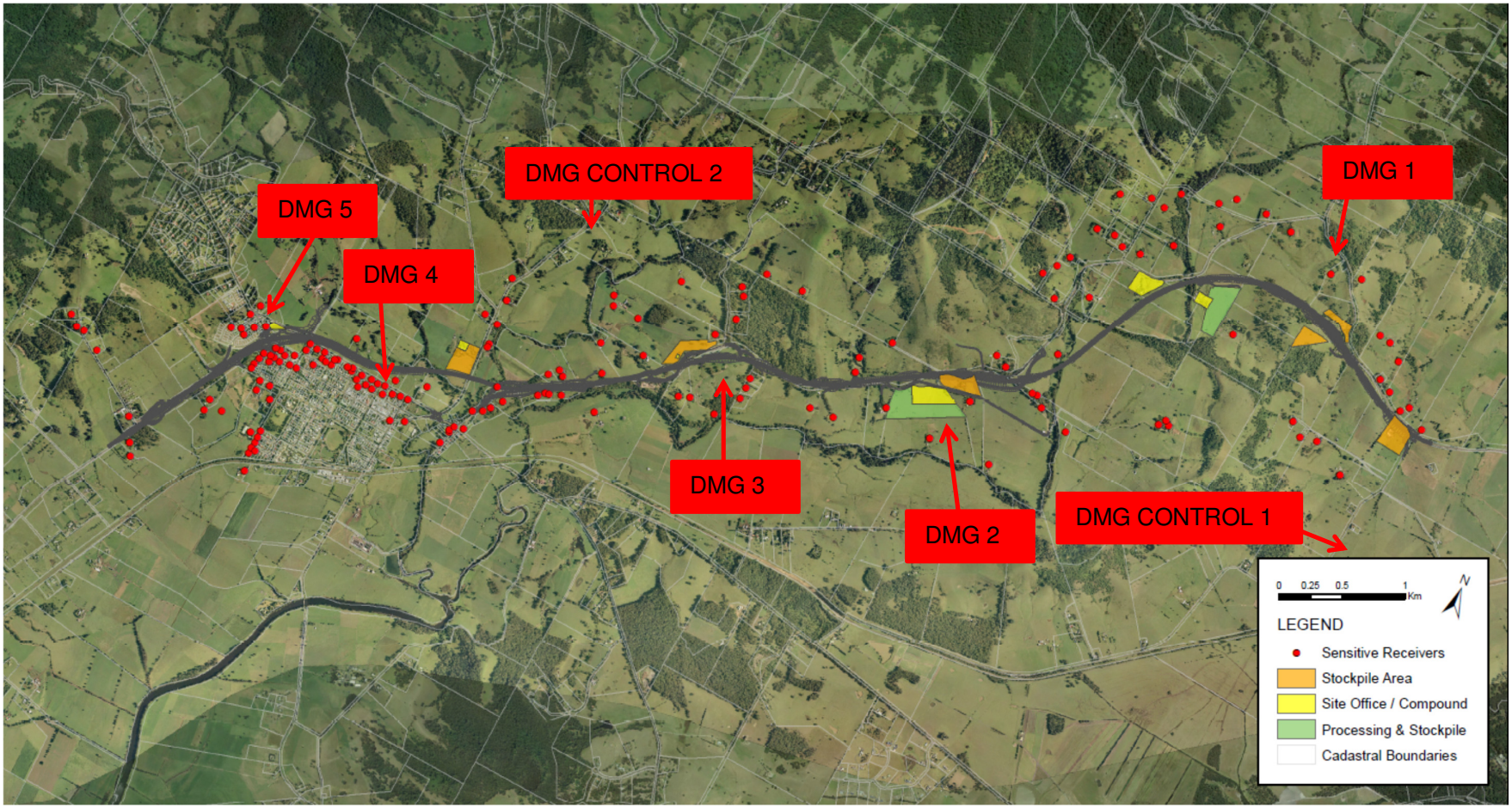


**Figure 6-1 Map showing indicative locations of dust monitoring gauges**

## 6.4 Non-conformances

Non-conformances will be dealt with and documented in accordance with Section 8.5 of the CEMP.

## 6.5 Complaints

Complaints will be recorded and addressed in accordance with Section 6.3 of the CEMP and the Community Communication Strategy (CCS).

## 6.6 Audits

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this CAQMP, CoA and other relevant approvals, licenses and guidelines. Audit requirements are detailed in Section 8.4 of the CEMP.

# 7 Review and improvement of CAQMP

The CAQMP will be reviewed annually 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
- a second party audit, and/or
- an inclusion as a separate item at a site meeting.

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

- significant changes in construction activities occur
- where targets are not being achieved, or
- in response to audits and nonconformity reports.

Minor changes to the CAQMP will be approved by the Environmental Representative in accordance with section 1.7 of the CEMP.

# Appendix A
Strong Wind Work Modification Record

**Strong Wind Work Modification Record**

| Item | Detail |
|---|---|
| Date | |
| Time | |
| Location | |
| Wind speed and direction | |
| Existing controls in place to minimise dust generation | |
| Modifications to work practices implemented | |
| Additional controls implemented (e.g. barriers, non-toxic biodegradable polymer binder, mist cannons) | |
| Outcome | |
| Any other comments | |

Completed by:

Date: / /

Related Sub-plan: Construction Air Quality Management Sub-plan

**File in [insert reference] Air quality and dust records**