Holcim

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Air Quality Management Plan

Jandra Quarry

Holcim Australia Pty. Ltd.

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GLOSSARY / ABBREVIATIONS

AQMP	Air Quality Management Plan
B&RMP	Jandra Quarry Biodiversity & Rehabilitation Management Plan prepared in accordance with Condition 25, Schedule 3 of CoA
BoM	Australian Bureau of Meteorology
Compliance audit	Verification of how implementation is proceeding with respect to an environmental management system (EMS) which incorporates the relevant approval conditions
CoA	Conditions of Approval for Modification Application No. DA-231-10-99 MOD 5
Department, the	NSW Department of Planning and Environment
DP&E	NSW Department of Planning and Environment
EA	Jandra Quarry Intensification in Production Environmental Assessment Environmental Assessment
ECP	Environmental Compliance Planner (Guideline 4.1 Permits, Licences and Approvals, Attachment 4.1E, Issue Date: February 2014)
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EMS	Environmental management strategy
Environmental aspect	Defined by AS/NZS ISO 14001:2004 as an element of an organisation's activities, products or services that can interact with the environment
Environmental impact	Defined by AS/NZS ISO 14001:2004 as any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects
Environmental incident	A set of circumstances that causes, or threatens to cause, material harm to the environment; and/or breaches or exceeds the limits or performance measures/criteria in the Conditions of Approval
Environmental objective	Defined by AS/NZS ISO 14001:2004 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve
Environmental policy	Statement by an organisation of its intention and principles for environmental performance
Environmental target	Defined by AS/NZS ISO 14001:2004 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	Environment Protection Licence
Feasible	Feasible relates to engineering considerations and what is practical to build or carry out
HVAS	High Volume Air Sampler
Minister, the	Minister for Planning and Environment, or delegate
MOD 5	Modification Application No. DA 231-10-99 MOD 5

Non-compliance	Failure to comply with the requirements of the Project approval or any applicable license, permit or legal requirements
Non-conformance	Failure to conform to the requirements of Project system documentation or supporting documentation
OEH	NSW Office of Environment and Heritage
PIN	Penalty Infringement Notice
$PM_{2.5}$	Particulate matter less than 2.5µm in diameter
PM_{10}	Particulate matter less than 10µm in diameter
POEO Act	Protection of the Environment Operations Act 1997
Quarrying operations	The extraction, processing and transportation of extractive materials on the site and the associated removal of vegetation, topsoil and overburden
Quarry products	Includes all saleable quarry products, but excludes tailings and other wastes
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The restoration of land disturbed by the development to a good condition, ensuring it is safe, stable, non-polluting environment and appropriately vegetated
RL	Reduced level
Secretary, the	Secretary of the NSW Department of Planning and Environment (or delegate)
TSP	Total Suspended Particulate Matter
WMS	Work Method Statement

DOCUMENT CONTROL

Revision	Date	Description	By	Review	Approved
A		Draft report	D. Green	18/08/15	24/08/15
B		Draft report with Holcim review	D. Lidbetter & I. Shenton	25/08/15	26/08/15
Final draft		Final draft report	D. Green	31/08/15	31/08/15

1 INTRODUCTION

1.1 Context

An Air Quality Management Plan was developed for Jandra Quarry following the Environmental Impact Statement (EIS) and subsequent development consent issued on 30 March 2000 (DA-231-10-99).

This Air Quality Management Plan (AQMP or Plan) forms part of the Environmental Management Strategy (EMS) for the Jandra Quarry. This AQMP has been prepared to meet the requirements of the Minister's Conditions of Approval (CoA) for the Jandra Quarry Intensification in Production Modification (DA-231-10-99 MOD 5) and supersedes all previous versions.

This AQMP has been prepared to address the CoA, the mitigation measures listed in the Jandra Quarry Intensification in Production Environmental Assessment (EA) and all applicable legislation.

1.2 Background

Hard rock extraction involves blasting and the use of large bulk earthwork machinery, which combined with processing equipment such as crushers and the hauling of material by truck on unsealed roads, generate dust. The intensification in production is likely to generate additional dust per unit time and for longer periods of time than previous operations.

DA-231-10-99 MOD 5 included operating a mobile asphalt plant 24 hours a day on a campaign basis. Asphalt plants generate emissions as well as odour that have the potential to impact on nearby sensitive receivers. During consultation with the community surrounding the Jandra Quarry, receiver R2 raised concern over the odour that they had experienced during historical asphalt production campaigns.

1.3 Environmental Management Document System

The environmental management document system is described in Section 5.1 of the EMS.

The AQMP is part of Holcim's environmental management strategy for Jandra Quarry and is a requirement of Condition 14 of Schedule 3 of the CoA.

Management measures identified in this AQMP will be incorporated into relevant Work Method Statements (WMS). Work Method Statements are approved by the Quarry Manager. Operational personnel are required to undertake works in accordance with the safeguards identified in WMS.

The review, auditing and document control processes for this AQMP are described in Sections 9, 10 & 11 of the EMS.

1.4 AQMP Approval

This AQMP must be endorsed by the Holcim Quarry General Manager and Planning & Environmental Manager prior to submission to the Secretary of the Department of Planning & Environment (DP&E).

Submission of the AQMP for the approval of the Secretary is required no later than 31 August 2015 or as otherwise agreed by the Secretary.

2 PURPOSE AND OBJECTIVES

2.1 Purpose

The purpose of this AQMP is to describe how Holcim proposes to manage air quality impacts during the operational lifetime of Jandra Quarry.

2.2 Objectives

The key objective of the AQMP is to ensure that impacts to the local community and the built environment are minimised.

To achieve this objective, Holcim will undertake the following:

- ensure appropriate controls and procedures are implemented during the operation of the development to avoid or minimise air quality impacts and potential adverse impacts to sensitive receivers;
- ensure appropriate measures are implemented to address the relevant CoA outlined in **Table 1** and the EA mitigation measures detailed in **Table 6**; and
- ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in **Section 3.13.1.1** of this AQMP.

2.3 Targets

The following targets have been established for the management of air quality impacts during the operational lifetime of Jandra Quarry:

- minimise and manage potential air quality / dust impacts from the development in accordance with relevant legislative requirements and CoA;
- control dust and exhaust emissions of plant and equipment from quarrying activities;
- minimise adverse impacts on existing air quality;
- achieve particulate matter and dust concentrations that meet the approved air quality criteria; and
- complaints from the community and stakeholders are minimised and addressed in a timely manner.

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);
- National Greenhouse and Energy Reporting Act 2007;
- Protection of the Environment Operations Act 1997 (POEO Act); and
- Protection of the Environment Operations (Clean Air) Regulation 2000.

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

3.1.2 Guidelines and Standards

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

- *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (Department of Environment and Conservation NSW, 2007);
- *AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method* (Standards Australia); and
- *Holcim Environmental Standards for Aggregate Operations* (May, 2014).

3.2 Minister's Conditions of Approval

The CoA relevant to this AQMP are listed **Table 1**. A cross reference is also included to indicate where the condition is addressed in this AQMP or other environmental management documents.

Table 1 Conditions of Approval relevant to the AQMP

<table>
<tr><th>CoA No.</th><th>Requirement</th><th>Reference</th></tr>
<tr><td>Sch 3, 10</td><td>The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately-owned land.

Table 5 Long-term assessment criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10µm (PM_{10})</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr>
</table>
Table 6 Short-term impact assessment criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10µm (PM_{10})</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr>
</table>
Table 7 Long-term impact assessment criteria for deposited dust</td><td>Section 5; Section 7; Section 88.1</td></tr>
</table>

<table>
<tr><th>CoA No.</th><th>Requirement</th><th>Reference</th></tr>
<tr><td></td><td>
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table>
Notes:
(a) Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
(b) Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
(c) Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
(d) Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary in consultation with the EPA.</td><td></td></tr>
<tr><td>Sch 3, 11</td><td>The Applicant shall not cause or permit the emission of offensive odour beyond the boundaries of the site.</td><td>Section 6.2.4; Section 7; Section 8</td></tr>
<tr><td>Sch 3, 12</td><td>The Applicant shall:
(a) implement best practice management to minimise the odour and dust emissions of the development;
(b) carry out regular air quality monitoring to determine whether the development is complying with the relevant conditions of this consent;
(c) regularly assess air quality monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the air quality criteria in this consent;
(d) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d under Table 7); and
(e) minimise the area of surface disturbance and maximise progressive rehabilitation of the site,
to the satisfaction of the Secretary.</td><td>Section 7; Section 8; B&RMP</td></tr>
<tr><td>Sch 3, 13</td><td>The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Tables 5, 6, and 7 at any occupied residence on quarry-owned land unless:
(a) the tenant has been notified of any health risks associated with such exceedances in accordance with the notification requirements under Schedule 4 of this consent;
(b) the tenant of any land owned by the Applicant can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice;
(c) air quality monitoring is regularly undertaken to inform the tenant of the actual particulate emissions at the residence; and
(d) data from this monitoring is presented to the tenant in an appropriate format for a medical practitioner to assist the tenant in making informed decisions on health risks associated with occupying the property,</td><td>Section 7; Section 8; B&RMP; Section 7 of the EMS</td></tr>
</table>

CoA No.	Requirement	Reference
	to the satisfaction of the Secretary.	
Sch 3, 14	The Applicant shall prepare and implement an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be submitted to the Secretary for approval by 31 August 2015; (b) describe the measures that would be implemented to ensure: ▪ compliance with the relevant conditions of this consent; ▪ best practice management is employed; and ▪ the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events; (c) describe the proposed air quality management system; and (d) include an air quality monitoring program that: ▪ is capable of evaluating the performance of the development; ▪ includes a protocol for determining any exceedances of the relevant conditions of consent; ▪ effectively supports the air quality management system; and ▪ evaluates and reports on the adequacy of the air quality management system.	This Plan
Sch 3, 15	For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.	Section 8.2.1
Sch 3, 16	The Applicant shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.	Section 8.5

4 EXISTING ENVIRONMENT

The existing air quality in the area immediately surrounding the Jandra Quarry is influenced by a number of factors including traffic and agricultural activities. The EA determined that emissions from the existing quarry operations consist mainly of particulate matter, which is generated from a range of quarry activities, including drilling and blasting and the handling and transport of overburden / topsoil materials, shot rock and finished products. Wind erosion of disturbed areas and stockpiles / processing areas were determined to also have the potential to generate dust emissions under dry, windy conditions. However, emissions of pollutants from quarrying machinery and vehicle exhausts are of an insignificant nature given the small scale of the quarry.

4.1 Sensitive Receivers

A number of sensitive receivers surround the development. The nearest privately-owned sensitive receiver (R1) is located to the northeast of the site. Two residences owned by Holcim (R8 and R9) are located immediately south of the development consent boundary, on Holcim owned land. A further residence owned by Holcim (R10) is located within the eastern extent of the development consent boundary. The location of sensitive receivers surrounding the site are presented in **Figure 1**.

4.2 Neighbouring Pollutant Sources

Jandra Quarry is surrounded by agricultural land and moderate to heavily vegetated land. No major mining or any other significant industrial activities are conducted within the immediate locality. Possum Brush Quarry is located at Possum Brush, approximately 2 km west of the Pacific Highway, with an extraction limit of 200,000 tonnes of hard rock per annum. Failford Quarry is located at Failford, approximately 500 m east of the Pacific Highway. No detailed information is publicly available on this quarry.

Considering the distance and vegetative cover between these two quarries, it is unlikely that potential emissions from these quarries will significantly elevate the ambient pollutant concentrations at the sensitive receivers surrounding Jandra Quarry.

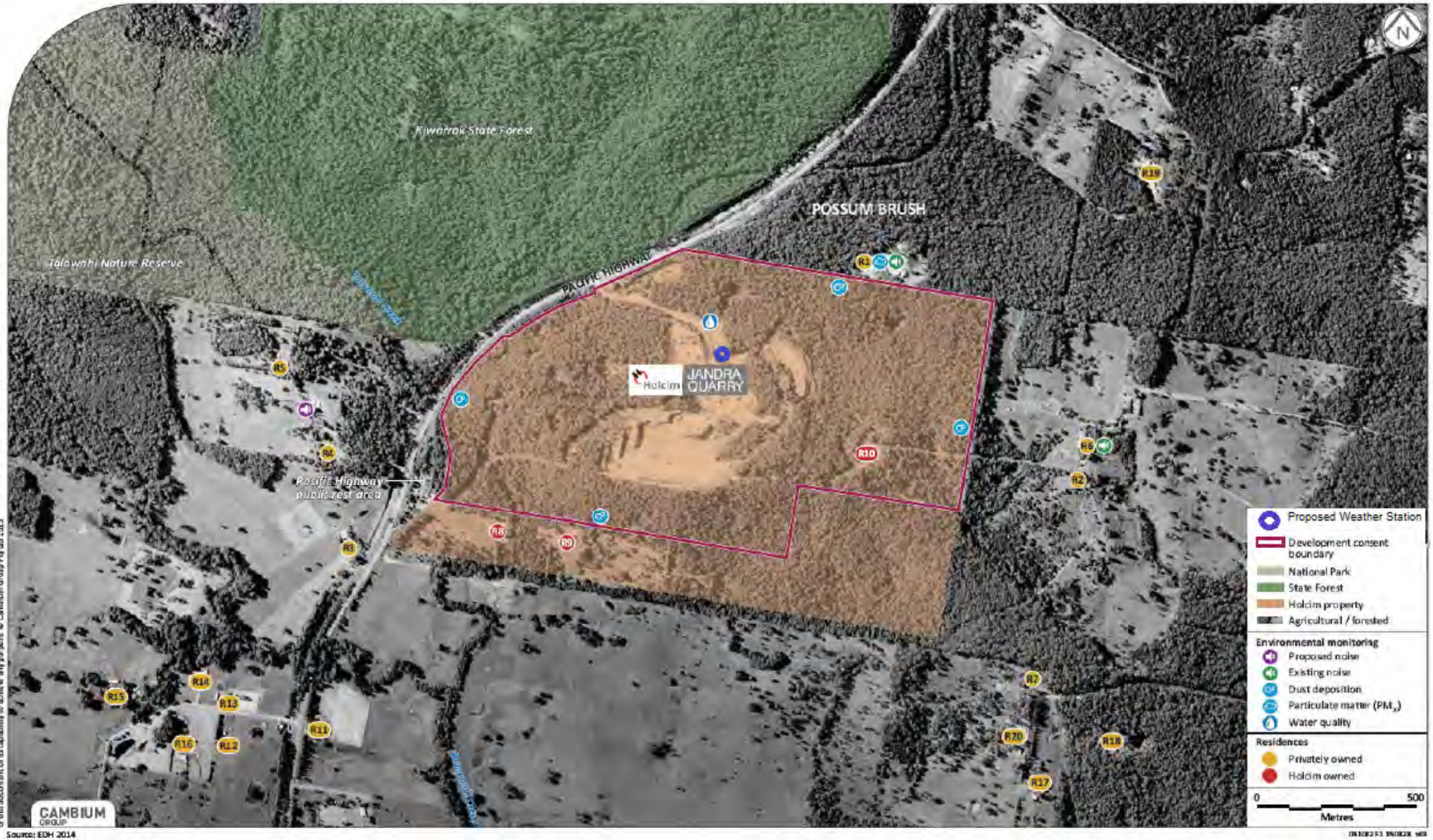
4.3 Estimated Background Particulate Level

The EA analysed ambient monitoring data recorded within the region to establish a regional background level. Based on the analysis of the available monitoring data, a monitoring site in Aberdeen operated by NSW Office of Environment and Heritage (OEH) was considered to be most suitable to establish a background level.

Background Particulate Matter less than 2.5µg ($PM_{2.5}$) and Total Suspended Particle (TSP) concentrations were estimated using the $PM_{2.5}/PM_{10}$ and PM_{10}/TSP ratio based on the data collected in the vicinity of coal mines and presented in the *Australian Coal Review* (Richardson 2000), as data for $PM_{2.5}$ and TSP was not available from any of the regional monitoring sites. The data showed that an average of 40% of TSP was found to consist of particles in the size range of PM_{10} and only 4% of TSP (or equivalently 10% of PM_{10}) was found to consist of particles in the size range of $PM_{2.5}$. Estimated background particulate concentrations are presented in

Table 2.

FIGURE 1
Surrounding land use, residences and environmental monitoring locations



Source: EDH 2014

It was noted in the EA that the ratios were related to coal mining operations, but in the absence of ratios related to hard rock quarry operations, the EA considered this approach to be appropriate.

Table 2 Estimated Background Particulate Levels

Pollutant	Averaging Period	Data (µg/m^3)
Particulate Matter as $PM_{2.5}$	24-Hours	Daily varying
	Annual	1.8
Particulate Matter as PM_{10}	24-Hours	Daily varying
	Annual	18.3
Total Suspended Particulate Matter (TSP)[2]	Annual	46

Notes:
1. Estimated assuming a $PM_{2.5}/PM_{10}$ ratio of 0.1
2. Estimated assuming a PM_{10}/TSP ratio of 0.4

No reliable dust deposition data was available to estimate the background level for the local area. Therefore, the EA did not assess the cumulative dust deposition rate. A predicted incremental dust deposition rate was compared with the NSW Office of Environment and Heritage (OEH) guideline for incremental dust deposition rate of 2 g/m²/month to assess compliance.

5 AIR QUALITY CRITERIA

The following section identifies the development's air quality criteria as approved in Condition 10 of Schedule 3 of the CoA.

5.1 Particulate Matter

The monitoring of the particulate matter criteria stipulated in **Table 3** and

Table 4 is to take into consideration incremental increase in concentrations of the development and background concentrations due to all other pollutant sources (i.e. total impact).

Table 3 Long-term assessment criteria for particulate matter

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter < 10µm (PM_{10})	Annual	30 µg/m^3

Table 4 Short-term assessment criteria for particulate matter

Pollutant	Averaging Period	Criterion
Particulate matter < 10µm (PM_{10})	24 hour	50 µg/m^3

The monitoring of particulate matter against the criterion stipulated in **Table 3** and

Table 4 is to exclude samples where the impact of extraordinary events listed below are likely to have influenced the monitoring results:

- bushfires;
- prescribed burning;
- dust storms;
- sea fog;
- fire incidents;
- illegal activities; or
- any other activity agreed to by the Secretary of DP&E, in consultation with the EPA.

5.2 Deposited Dust

Deposited dust is to be assessed as "insoluble solids" as defined in *Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method* (Standards Australia, AS/NZS 3580.10.1:2003). The long-term criteria for both incremental and total deposited dust levels for the development are outlined in **Table 5**.

Table 5 Long-term assessment criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

Measurement of the maximum increase in deposited dust level is to consider incremental increases in concentrations due to the development on its own (i.e. incremental impact). The measurement of maximum total deposited dust is to consider incremental increases in concentrations due to the development and background concentrations (i.e. total impact).

6 ENVIRONMENTAL ASPECTS & IMPACTS

6.1 Development Activities

Activities undertaken at Jandra Quarry utilising various heavy machinery, plant and equipment, likely to generate dust are identified below.

- clearing;
- earthworks;
- drilling and blasting;
- crushing and screening;
- stockpiling; and
- material handling and dispatch.

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

- vehicle and plant emissions; and
- emissions from asphalt plant operation.

6.2 Impacts

The EA estimated and assessed emissions from each stage of the quarry development. A number of activities including stripping topsoil and overburden with the bulldozer, maintaining haul roads with the grader, overburden transport by trucks and spreading overburden within the overburden emplacement area with the bulldozer, would occur on a campaign basis for a relatively short period of time (<3% of the year). These activities are unlikely to make any significant contributions to the predicted long term (annual) average air quality impact, however may contribute in elevating the short term (24-hour) average impact. To account for the contribution from these activities, potential daily maximum emission rates were estimated and utilised to predict the short term impact on surrounding sensitive receivers.

Predicted air quality impacts from each stage of the quarry development at the nearest sensitive receivers, are outlined in the following sections.

6.2.1 PM_{10} Concentrations

In the EA, the maximum 24-hour and annual average cumulative PM_{10} concentrations were predicted to be below the relevant ambient air quality criteria at each privately owned sensitive receiver for each stage of the quarry development.

A maximum of one day of exceedance of the 24-hour cumulative PM_{10} criteria was predicted at Holcim owned receiver R9 in Stage 1. A maximum of four days of exceedance of the 24-hour cumulative PM_{10} criteria was predicted at Holcim owned receiver R10 in Stage 3 of the quarry development.

6.2.2 TSP Concentrations

The EA predicted cumulative annual average TSP concentrations were below the relevant ambient air quality criteria at each sensitive receiver for each stage of the quarry development.

6.2.3 Dust Deposition

The EA predicted incremental annual average dust deposition rates would be below 0.1 g/m²/month. As the predicted incremental dust deposition rate is below the incremental dust deposition criteria at all sensitive receivers (2 g/m^2/month), the EA concluded that the development was unlikely to exceed the cumulative dust deposition criteria of 4 g/m²/month.

6.2.4 Odour

The EA identified and assessed the operation of a mobile asphalt plant, 24 hours a day on a campaign basis, as the only potential odour source at the site.

Odour concentrations at sensitive receivers were predicted to be well below the most stringent odour criteria when applying a similar modelling methodology to that which was used to predict particulate concentrations.

The EA therefore concluded that the operation of the mobile asphalt plant, 24 hours a day on a campaign basis, is unlikely to cause an odour nuisance at surrounding sensitive receivers.

7 ENVIRONMENTAL CONTROL MEASURES

A range of environmental requirements and control measures are identified in the EA, Conditions of Approval and Holcim Environmental Guidelines. Specific measures and requirements to address impacts on air quality are outlined in

Table 6.

Table 6 Environmental Controls & Mitigation Measures

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
PRE-EXISTING ENVIRONMENTAL CONTROL MEASURES					
AQMM1	Regular watering of haul roads and stockpiles.	Section 6.4.3 of EA	All stages	Quarry Manager	Guideline 4.22.2 Crushing, screening, stockpiling & ancillary processes Attachment 4.1E – Environmental Compliance Planner – Aggregates
AQMM2	Limiting speeds of vehicles on unsealed surfaces to 40 kph.	Section 6.4.3 of EA	All stages	Quarry Manager	Site Induction
AQMM3	Minimising vehicle kilometres travelled on unpaved roads.	Section 6.4.3 of EA	All stages	Quarry Manager	Site Induction
AQMM4	Rehabilitating disturbed areas as soon as practically possible.	Section 6.4.3 of EA	All stages	Quarry Manager	B&RMP
AQMM5	Conduct drilling and blasting during suitable meteorological conditions (i.e. not during high winds).	Section 6.4.3 of EA	All stages	Quarry Manager	Blast Management Procedure Attachment 4.1E – Environmental Compliance Planner – Aggregates
AQMM6	Drill holes capped with stemming to restrict the upward emission of dust.	Section 6.4.3 of EA	All stages	Quarry Manager	Blast Management Procedure Attachment 4.1E – Environmental Compliance Planner – Aggregates
AQMM7	Dust extraction units on drill rigs and crushing / screening plants to be well maintained.	Section 6.4.3 of EA	All stages	Quarry Manager	Guidelines 4.22 Crushing, screening, stockpiling & ancillary processes Attachment 4.1E – Environmental Compliance

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
					Planner – Aggregates
AQMM8	Seals and mist sprays on crushing and screening plants to be well maintained.	Section 6.4.3 of EA	All stages	Quarry Manager	Guidelines 4.22 Crushing, screening, stockpiling & ancillary processes Attachment 3.22B – Dust Control Hierarchy Attachment 4.23A – Dust Filter Maintenance Checklist – 3 Monthly Schedule Attachment 4.1E – Environmental Compliance Planner – Aggregates
AQMM9	Dust displaced during silo filling to be controlled by an appropriate filter (i.e. a reverse pulse silo filling filter or equivalent.	Section 6.4.3 of EA	All stages	Quarry Manager	Guidelines 4.22 Crushing, screening, stockpiling & ancillary processes Attachment 3.22B – Dust Control Hierarchy Guideline 4.23 Cement & dry powder delivery, storage and dust control Attachment 4.23B – Silo & Fill System Maintenance Checklist – 6 Monthly Schedule Attachment 4.1E – Environmental Compliance Planner – Aggregates Attachment 4.23C – Silo Fill Inspection Checklist
ADDITIONAL ENVIRONMENTAL CONTROL MEASURES STIPULATED IN THE EA					
AQMM10	Level 1 watering (<2 l/m^2/hr) of unsealed haul roads when dust is visible.	Section 6.4.3 of EA	All stages	Quarry Manager	Attachment 4.1E – Environmental Compliance Planner – Aggregates

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
AQMM11	Level 2 watering (>2 l/m^2/hr) of the processing and stockpile area.	Section 6.4.3 of EA	All stages	Quarry Manager	Guidelines 4.22 Crushing, screening, stockpiling & ancillary processes Guideline 4.24 Delivery & storage of sand, aggregate & bagged products Attachment 4.1E – Environmental Compliance Planner – Aggregates
AQMM12	Maintain the active pit and overburden emplacement area to the minimum size during all stages of the quarry development.	Section 6.4.3 of EA	All stages	Quarry Manager	Guideline 4.19 Quarry development Guideline 4.21 Extraction, load & haul
AQMM13	Limit the speed of graders maintaining unsealed surfaces to 8 kph.	Section 6.4.3 of EA	All stages	Quarry Manager	Site Induction
AQMM14	Extraction of shot rock materials and stripping, hauling and emplacement of overburden would not be undertaken simultaneously.	Section 6.4.3 of EA	All stages	Quarry Manager	Guideline 4.21 Extraction, load and haul
AQMM15	Receiver R2 would be notified prior to the commencement of asphalt production campaigns, for the first year following asphalt production (post approval). This would provide receiver R2 with the opportunity to monitor odour during asphalt production and provide feedback to Holcim's Quarry Manager. This feedback would allow Holcim to consider whether further odour management controls are required, where reasonable and feasible.	Section 6.4.3 of EA	All stages	Quarry Manager	Attachment 4.1E – Environmental Compliance Planner – Aggregates
AQMM16	Dust deposition gauges permanently placed along the four development consent boundaries and continuously monitored at monthly sample intervals.	Section 6.4.3 of EA	All stages	Quarry Manager	Attachment 4.1E – Environmental Compliance Planner – Aggregates
AQMM17	Compliance monitoring of PM_{10} is to be undertaken at a suitable frequency to ensure the development is complying with its approved air quality criteria.	Section 6.4.3 of EA	All stages	Quarry Manager	Attachment 4.1E – Environmental Compliance Planner – Aggregates
AQMM17	Holcim will procure and operate a weather monitoring station in accordance with Condition 15, Schedule 3 of the consent,	Condition 15, Schedule 3.	All stages	Quarry Manager	Section 8.2.1

ID	Measure / Requirement	Reference	When to implement	Responsibility	Where addressed
HOLCIM ENVIRONMENTAL STANDARDS – GUIDELINE 4.9 AIR EMISSIONS					
AQMM18	All internal paved/sealed roadways shall be maintained in a clean and dust free state to minimise dust from vehicle movement.	Guideline 4.9	All stages	Quarry Manager	Guideline 4.9 Air Emissions Guideline 4.24 Delivery & storage of sand, aggregate & bagged products
AQMM19	Dust emissions shall not be visible beyond the boundary of the site during operation.	Guideline 4.9	All stages	Quarry Manager	SHE Standard 5.1 – Incident Reporting, Recording & Investigation Attachment 3.22B – Dust Control Hierarchy Attachment 4.23A – Dust Filter Maintenance Checklist – 3 Monthly Schedule
AQMM20	Unsealed roadways and pavement areas that are subject to vehicle movement or dust generating activities shall be watered or treated to minimise dust emissions.	Guideline 4.9	All stages	Quarry Manager	Guideline 4.21 Extraction, load and haul Guidelines 4.22 Crushing, screening, stockpiling & ancillary processes
AQMM21	Roadways immediately beyond the site entrance shall be regularly inspected and swept to prevent build-up of material.	Guideline 4.9	All stages	Quarry Manager	Guideline 4.24 Delivery & storage of sand, aggregate & bagged products

8 COMPLIANCE MANAGEMENT

8.1 Inspections

Routine inspections by the Quarry Manager (or delegate) of air quality controls and monitoring equipment will occur throughout the operational lifetime of the development. Detail on the nature and frequency of these inspections are documented in Section 9 of the EMS.

8.2 Monitoring

8.2.1 Meteorological Conditions

Condition 15 of Schedule 3 of the CoA requires meteorological data to be sourced for the lifetime of the development from a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

Holcim propose to install a weather station at the dam within the Jandra Quarry (refer to Figure 1). This weather station will operate in accordance with the requirements of Condition 15, Schedule 3 of the CoA for the life of the development.

8.2.2 Air Quality

One high volume air sampler (HVAS) with a PM_{10} collection head will be installed at the closest sensitive receiver (refer to **Figure 1**). Holcim has chosen to install an HVAS with a PM_{10} collection head in favour of a TSP collection head, as it is recognised that the concentration of PM_{10} is of greater importance given the associated health issues. Installation of both a TSP and PM_{10} collection unit is unnecessary given the dust deposition results to date and the predicted dust deposition rates are well below the thresholds stipulated in the CoA. PM_{10} will be continuously monitored at 6 day sample intervals and results will be analysed with consideration of the criteria stipulated in **Section 5.1**.

Four dust deposition gauges have been permanently placed along the four development consent boundaries (refer to **Figure 1**). Dust deposition data will be continuously monitored at monthly sample intervals and results will be analysed with consideration of the criteria stipulated in **Section 5.2**.

Air quality compliance monitoring will be undertaken by a suitably trained professional at the sampling frequency stipulated in **Table 7**.

Table 7 Location and frequency of monitoring

Monitoring Location	Pollutant	Sampling Frequency
Northern boundary	Dust	Monthly
Eastern boundary	Dust	Monthly
Southern boundary	Dust	Monthly
Western boundary	Dust	Monthly
R1	PM_{10}	6 days

8.2.3 Evaluation of Monitoring Results

The Quarry Manager will review monitoring results against the air quality criteria cited in **Section 5**. In the event of the monitoring results exceeding the air quality criteria, the Quarry Manager or delegate will review:

- meteorological data;
- the occurrence of any extraordinary events during the sampling period;
- the location and duration of activities on site during the sampling period; and
- any other activities within the immediate region of Jandra Quarry.

If the monitoring results are found to be outside the sites air quality criteria the Quarry Manager will initiate the following protocol:

- As soon as becoming aware of the breach of results the Quarry Manager will notify the Holcim NSW Planning and Environment Manager and enter the incident into INX.
- The Quarry Manager will notify the Secretary of the DP&E of the EPA of the incident as soon practicable.
- A report will be prepared and submitted by the Quarry Manager to the DP&E and EPA within 7 days of becoming aware of the incident, this report will include:
    - Cause of the non-compliance.
    - Environmental Harm caused due to the non-compliance.
    - Actions undertaken to rectify the non-compliance and ensure.
- Following the reporting of subsequent review, should it be concluded that the Quarry is the source of elevated pollutant levels, the continuous improvement process outlined in Section 10 of the EMS is to be implemented and corrective actions identified.

8.3 Training

All employees and contractors working on site will undergo a site induction and training, which will cover issues relating to air quality management, including:

- the existence and requirements of this Plan;
- relevant legislation;
- dust control measures;
- location of sensitive receivers;
- energy saving measures;
- internal speed limits; and
- complaints reporting.

Further details regarding staff induction and training are outlined in the EMS.

8.4 Licenses and permits

EPL No. 2796 is currently in force for the scheduled activities of “Crushing, grinding or separating” and “Extractive activities”. EPL No. 2796 stipulates that the premises must be maintained in a condition which minimises or prevents the emission of dust.

A variation to EPL 2796 will be undertaken, given the new development consent for the site. Monitoring conditions and criteria contained within the CoA will be adopted in to EPL 2796.

8.5 Greenhouse Gas

Holcim collects information annually to record the extent of greenhouse gas production of its operations. Holcim keeps record of the following:

- diesel usage of plant and equipment;
- quantity of explosives utilised;
- electricity consumption;
- fuel usage by employees; and
- transport distance and fuel usage for product deliveries.

Holcim *Guideline 4.4 Energy & Resource Conservation* (May 2014) and *Energy Saving Guide for Aggregates and Ready Mix Concrete* (March 2009) identifies measures to be considered to improve energy efficiency and reduce greenhouse gas emissions from its operations.

8.6 Complaints and enquiries procedure

Wherever possible, a proactive approach will be adopted to engage the community in discussing activities which may affect them. Any complaints that are received relating to the Quarry's operations will be recorded and responded to according to Section 7.3 of the EMS.

Response to complaints and enquiries in accordance with Section 7.3 includes:

- An initial response acknowledging a complaint will be provided within 24 hours of a complaint being received. A further detailed response, including steps taken to resolve the issue(s) that led to the complaint, will be provided within 10 days.
- corrective actions are applied in consultation with the appropriate operational staff to ensure modifications and improvements in the management of any environmental issues which have resulted in community complaints.
- Records of complaints will be kept for a minimum of four years in accordance with condition M5.3 of EPL No. 2796 and will be recorded yearly in the annual review.

All community inquiries and complaints related to the Quarry's activities will be referred to the Jandra Quarry Manager (0429 790 627). A postal address (*Level 8, 799 Pacific HWY, Chatswood, NSW)* and on the Holcim website (*www.holcim.com.au)* that provides for receipt of complaints and enquiries.

Information to be recorded will include location of complainant, time of occurrence of alleged air quality impacts, perceived source, prevailing weather conditions and similar details that could be utilised to assist in the investigation of the complaint.

8.7 Auditing and reporting

Audits (both internal and external) and reporting will be undertaken to assess the effectiveness of environmental controls, compliance with this AQMP, CoA and other relevant approvals, licenses and guidelines. Audit requirements are detailed in Section 9.3 of the EMS.

These audit requirements include:

Internal Audits

- The EMS and this management plan.
- CoA requirements.
- Any relevant legal and other requirements (e.g. licenses, permits, regulations, contract and documentation).

An audit checklist will be developed and amended as necessary to reflect changes to this EMS, subsequent approvals and changes to Acts, regulations or guidelines.

Independent Audits

External auditing will be undertaken by an independent environment auditor in accordance with *ISO 19011:2003 - Guidelines for Quality and / or Environmental Management Systems Auditing,* as required by CoA Schedule 5, Condition 8. External auditing will be undertaken every three years, unless the Secretary directs otherwise, with the first audit being held before the 31 March 2016.

9 REVIEW AND IMPROVEMENT

9.1 Continuous improvement

Continuous improvement of this AQMP will be achieved in accordance with Section 10 of the EMS, through 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 is 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; and
- make comparisons with objectives and targets.

Continuous Improvement will be delivered through two performance reviews, these include:

Environmental Group Meetings

An environment group review is initiated by the Planning & Environment Manager and includes relevant operational personnel and stakeholders specific to the development. The group meet quarterly, or at other pre-determined periods, to review environmental management issues specific to the development.

Annual Management Review

By the end of March each year, management reviews are undertaken as part of the continual improvement process required by CoA Schedule 5, Condition 4.

A management review will involve the executive management team. This review will be held every 12 months (before the end of March) and will include a review of all activities and operations listed in Section 10.2 of the EMS:

9.2 AQMP update and amendment

The processes described in Section 9 (Inspections, Monitoring and Auditing) and Section 10 (Review and Improvement) of the EMS may result in the need to update or revise this AQMP.

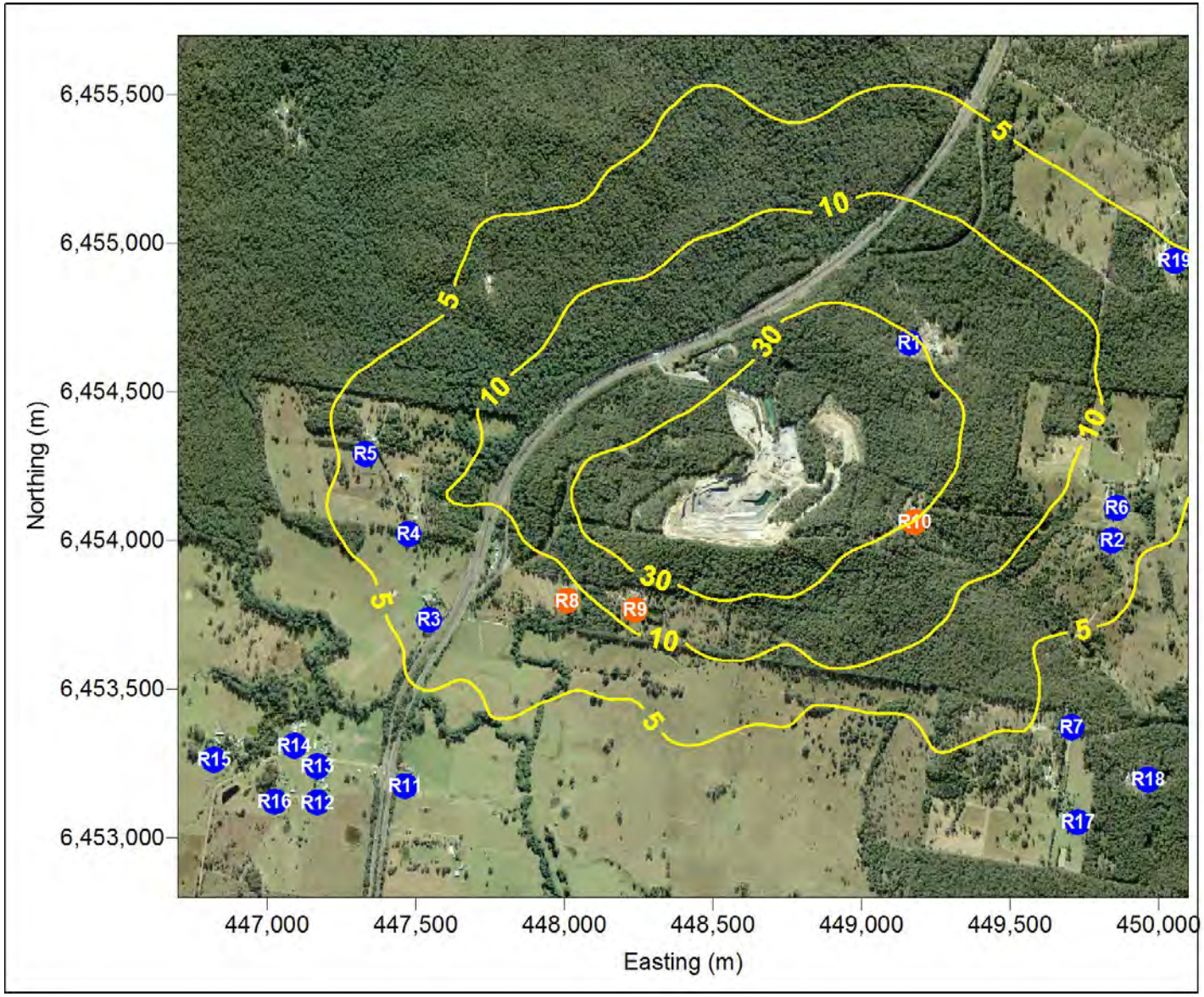
The approval of updates or revisions to the AQMP will need to be considered in accordance with Section 11.2 of the EMS. Updates will be reviewed by the Holcim Planning and Environment Manager and Quarry Manager before being sent to the Secretary for approval.

All amendments including a “minor amendment” will be submitted to the Secretary for approval as part of Holcim’s annual review of plans and programs.

APPENDIX A1 NOISE CONTOURS

Appendix A

Contour Plots



Maximum Predicted 24-Hour Average PM_{10} Concentrations (µg/m³)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

Dispersion Model: Calpuff V6.267
Modelling Period: Oct 2012 - Oct 2013
Modeller: FR

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Jandra Quarry Expansion Project

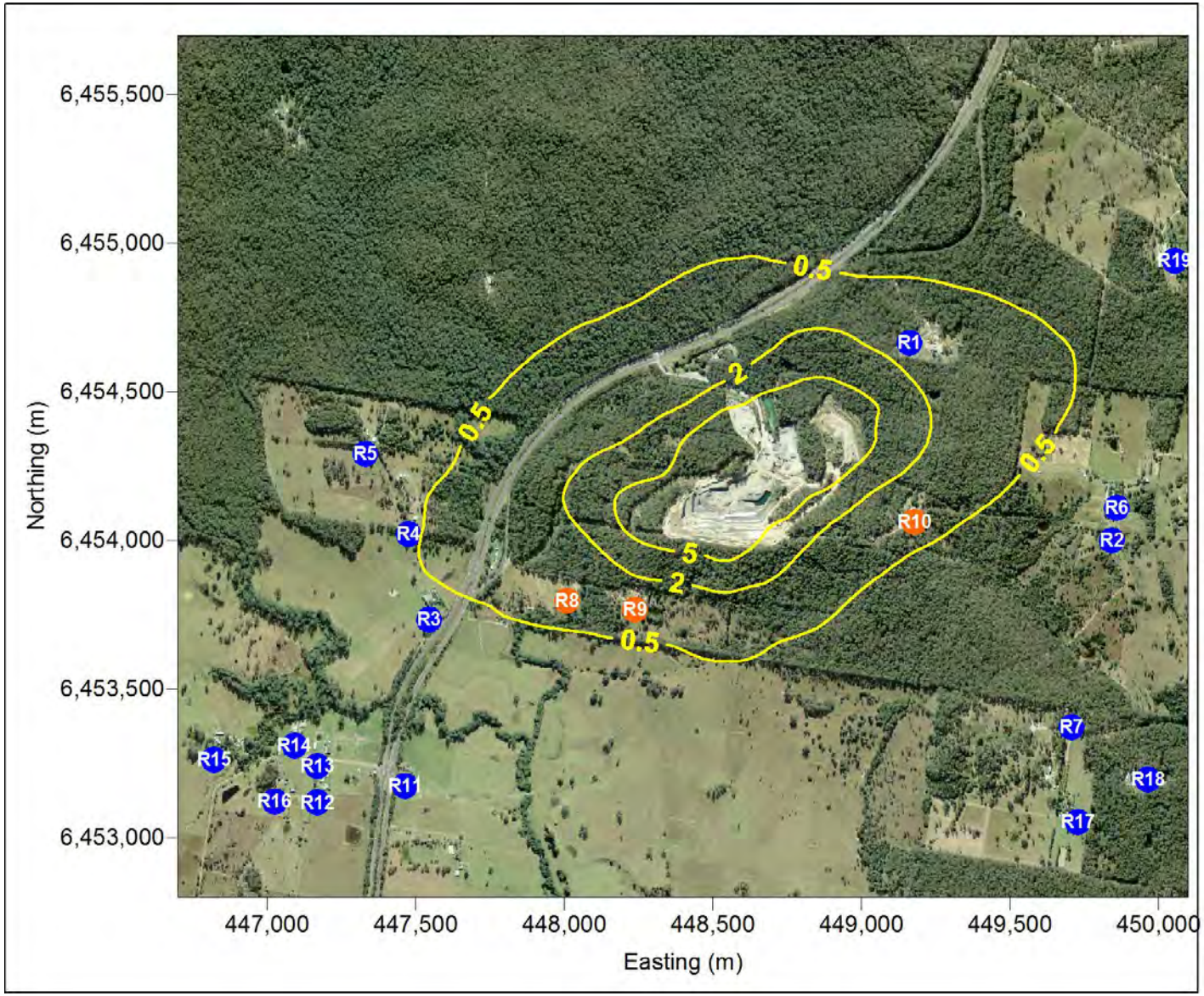
AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 1

Project No	610.13023	Date	03/06/2014

Appendix A

Contour Plots



Predicted Annual Average PM_{10} Concentrations (µg/m³)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

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Jandra Quarry Expansion Project

AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 1

Project No. 610.13023 | Date 03/06/2014

Appendix A

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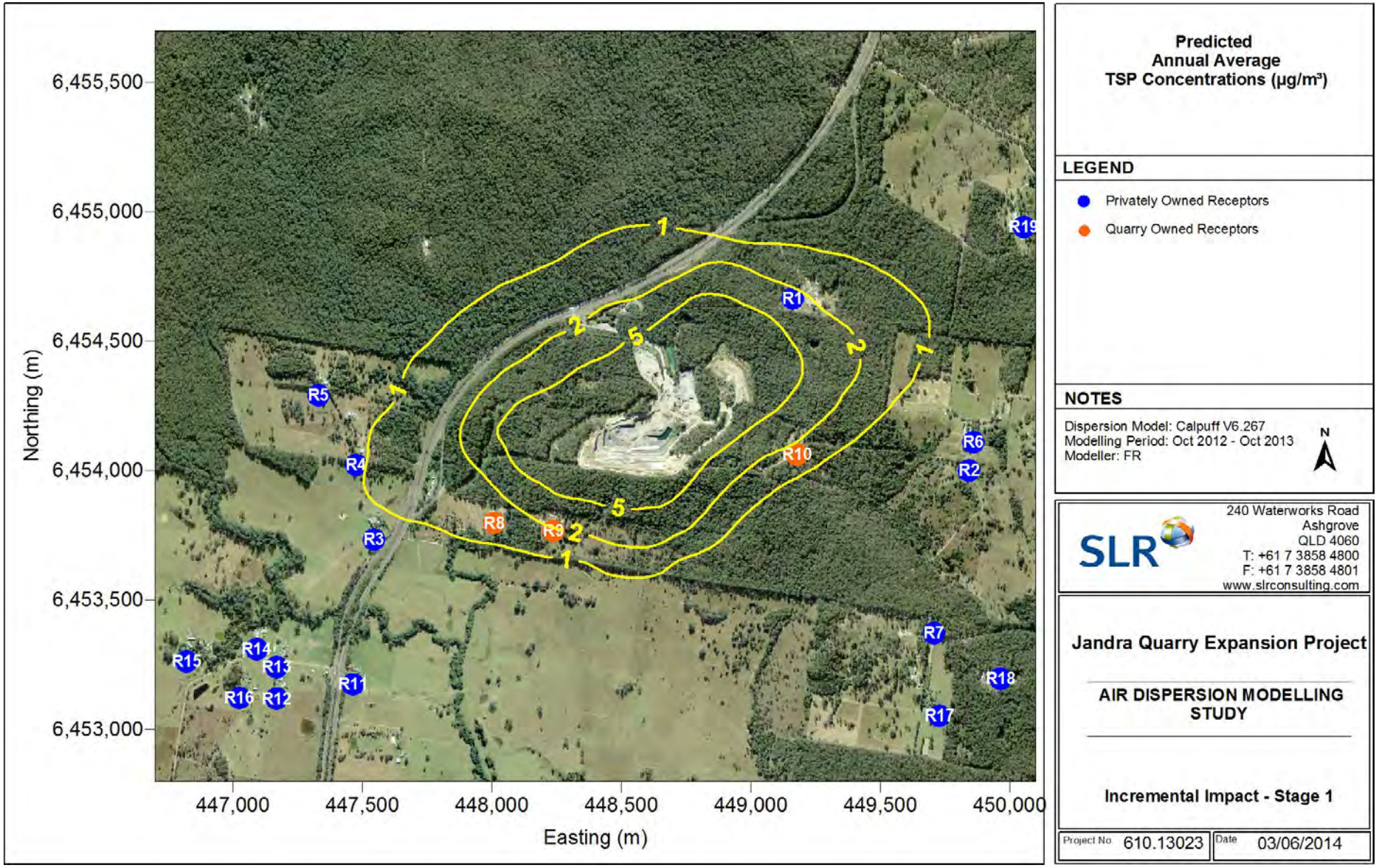

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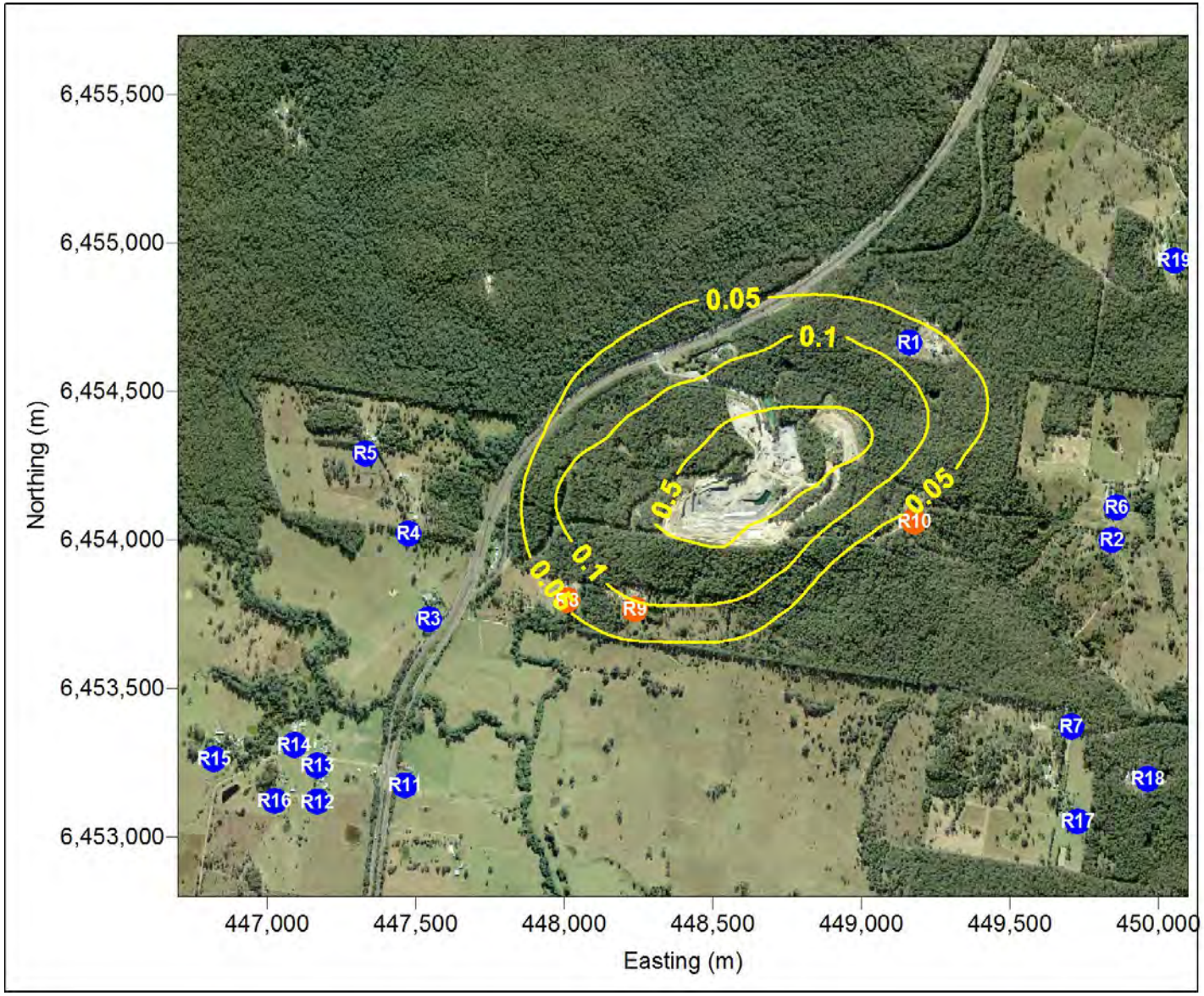
Contour Plots



Predicted
Annual Average
Dust Deposition (g/m²/month)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

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Jandra Quarry Expansion Project

AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 1

Project No.	610.13023	Date	03/06/2014

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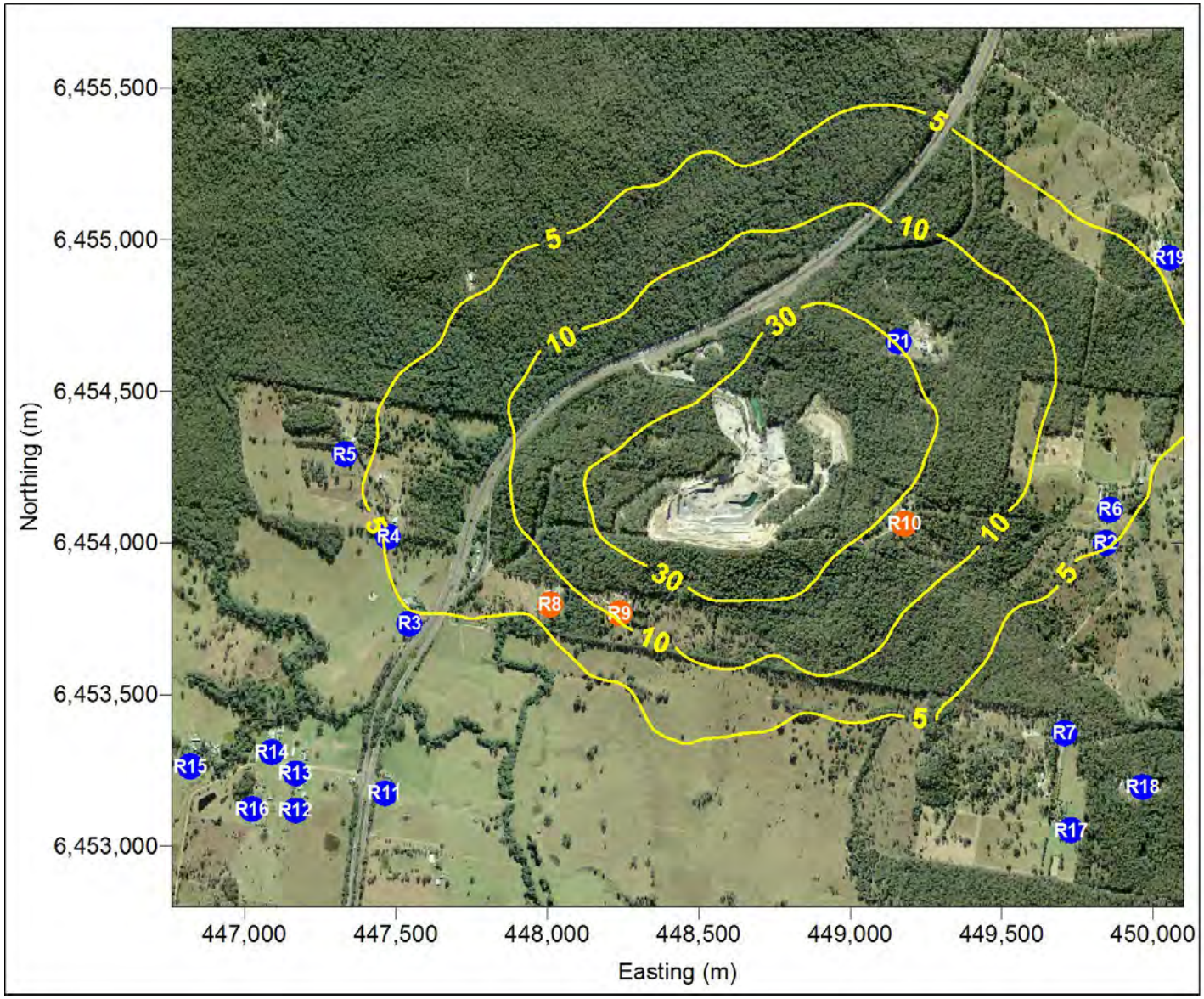

Maximum Predicted 24-Hour Average PM_{10} Concentrations (µg/m³)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

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Jandra Quarry Expansion Project

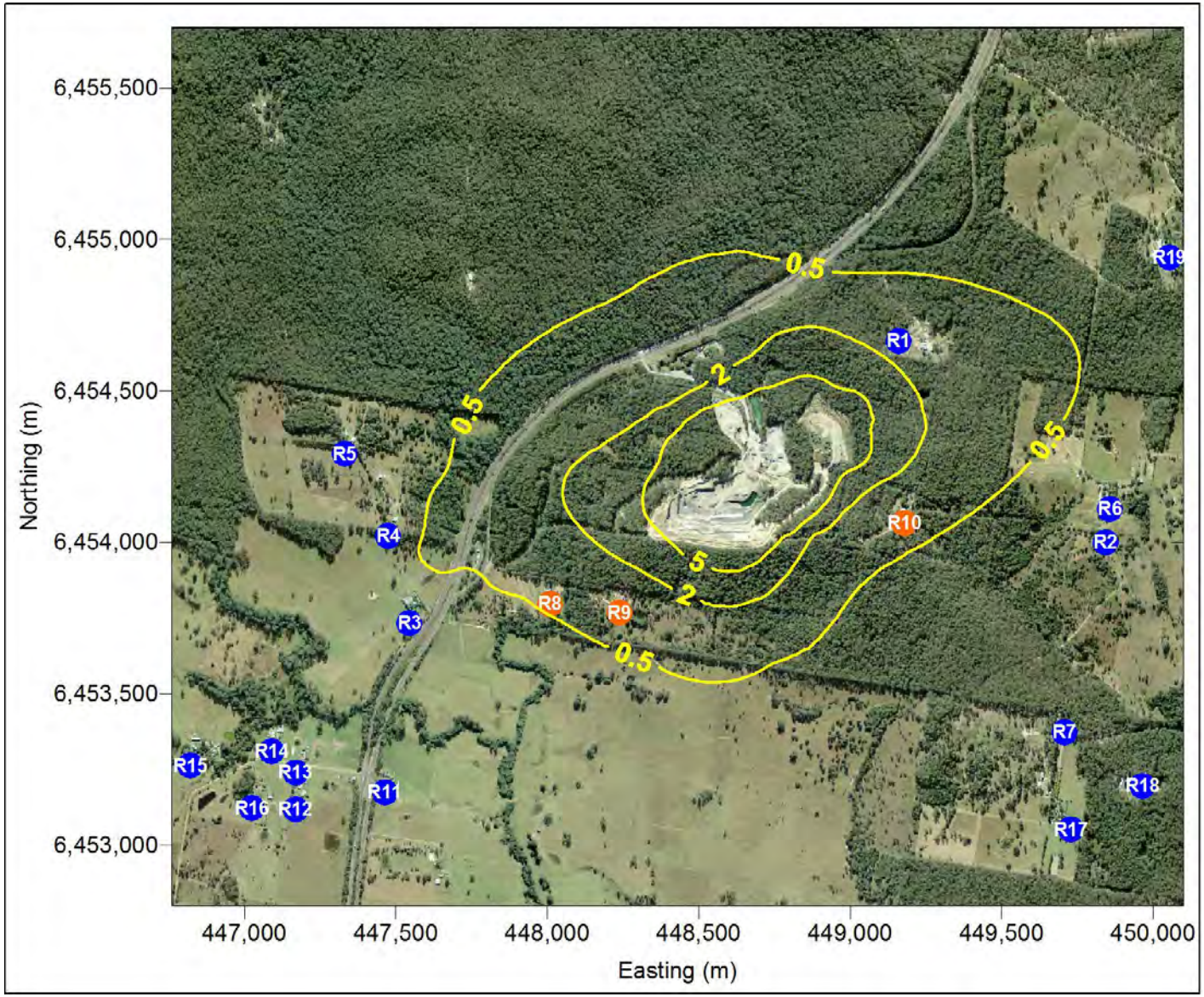
AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 2

Project No	610.13023	Date	03/06/2014

Appendix A

Contour Plots



Predicted Annual Average PM_{10} Concentrations (µg/m³)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

Dispersion Model: Calpuff V6.267
Modelling Period: Oct 2012 - Oct 2013
Modeller: FR

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Jandra Quarry Expansion Project

AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 2

Project No. 610.13023 | Date 03/06/2014

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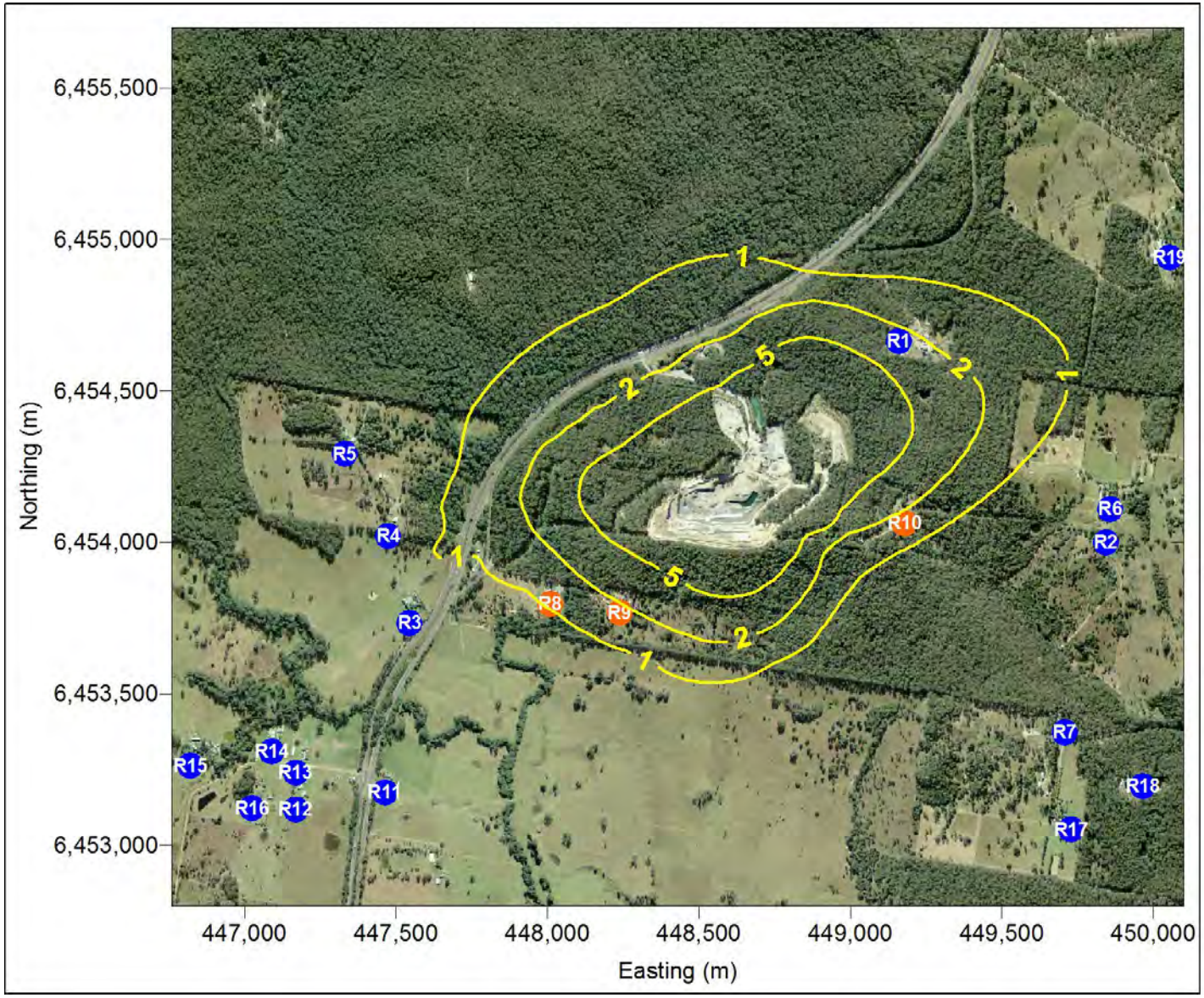

Predicted Annual Average TSP Concentrations (µg/m³)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

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Modeller: FR

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Incremental Impact - Stage 2

Project No	610.13023	Date	03/06/2014

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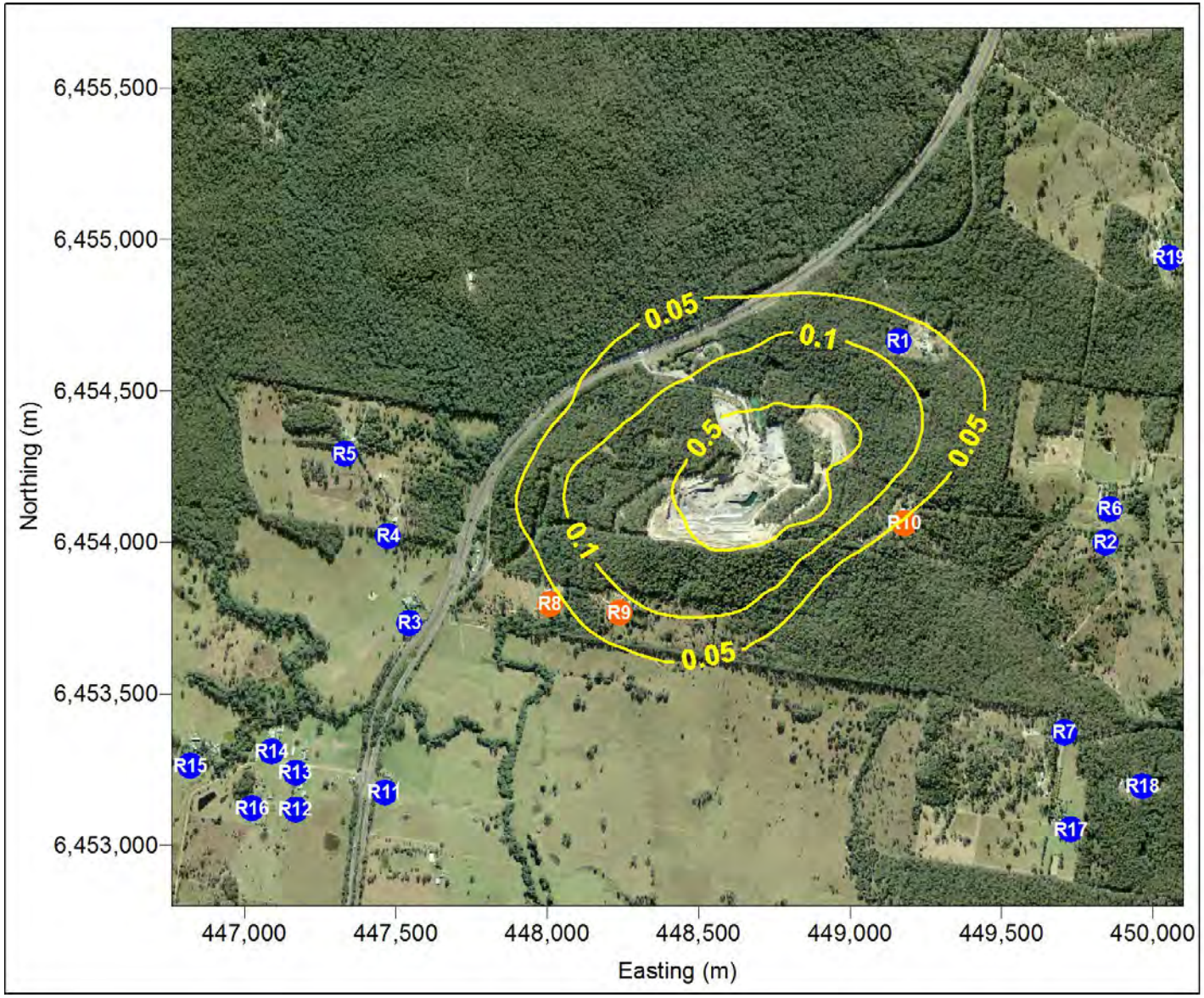

Predicted
Annual Average
Dust Deposition (g/m²/month)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

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AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 2

Project No.	610.13023	Date	03/06/2014

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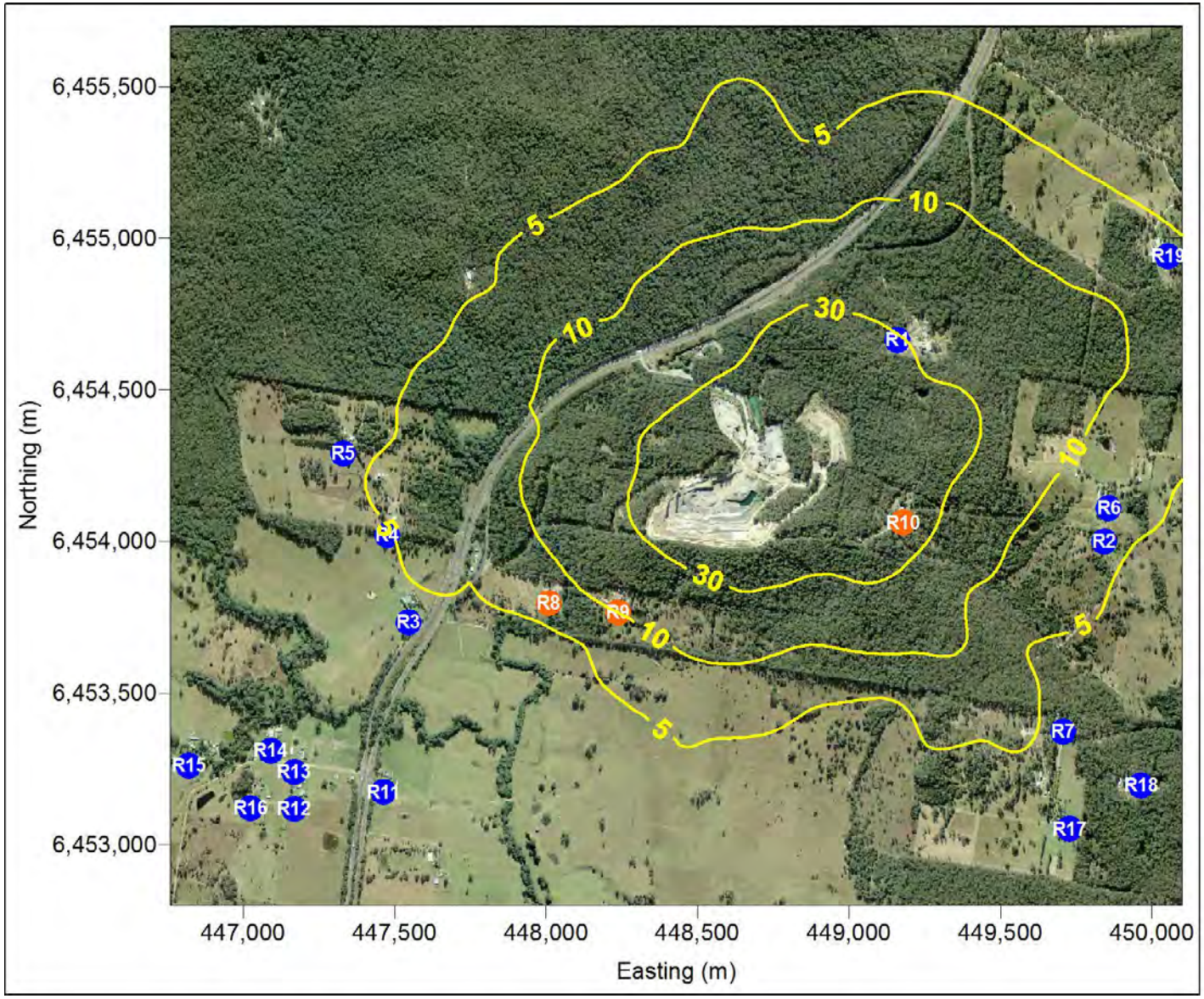

Maximum Predicted 24-Hour Average PM_{10} Concentrations (µg/m³)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

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Jandra Quarry Expansion Project

AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 3

Project No	610.13023	Date	03/06/2014

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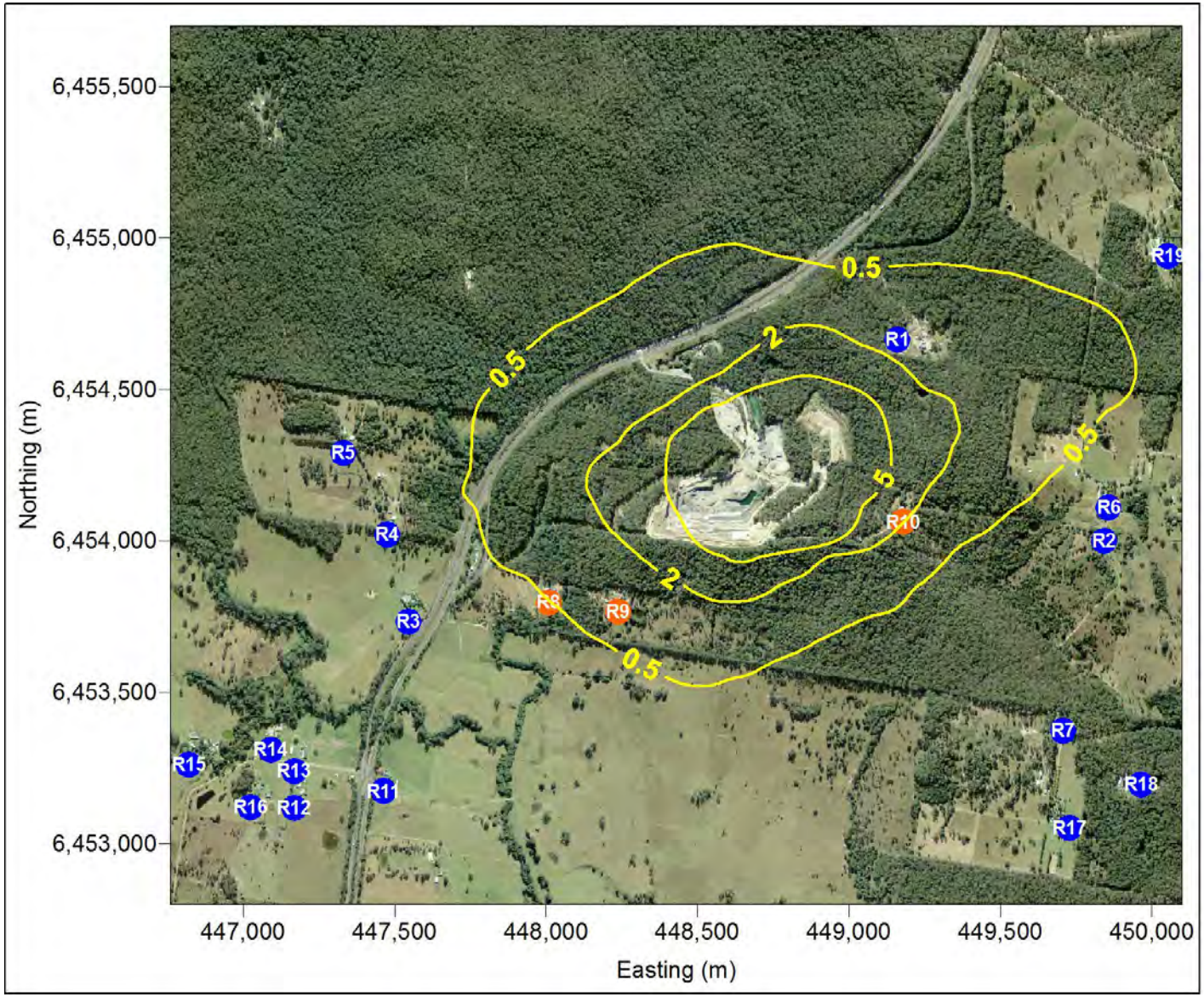

Predicted Annual Average PM_{10} Concentrations (µg/m³)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

Dispersion Model: Calpuff V6.267
Modelling Period: Oct 2012 - Oct 2013
Modeller: FR

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Jandra Quarry Expansion Project

AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 3

Project No. 610.13023 | Date 03/06/2014

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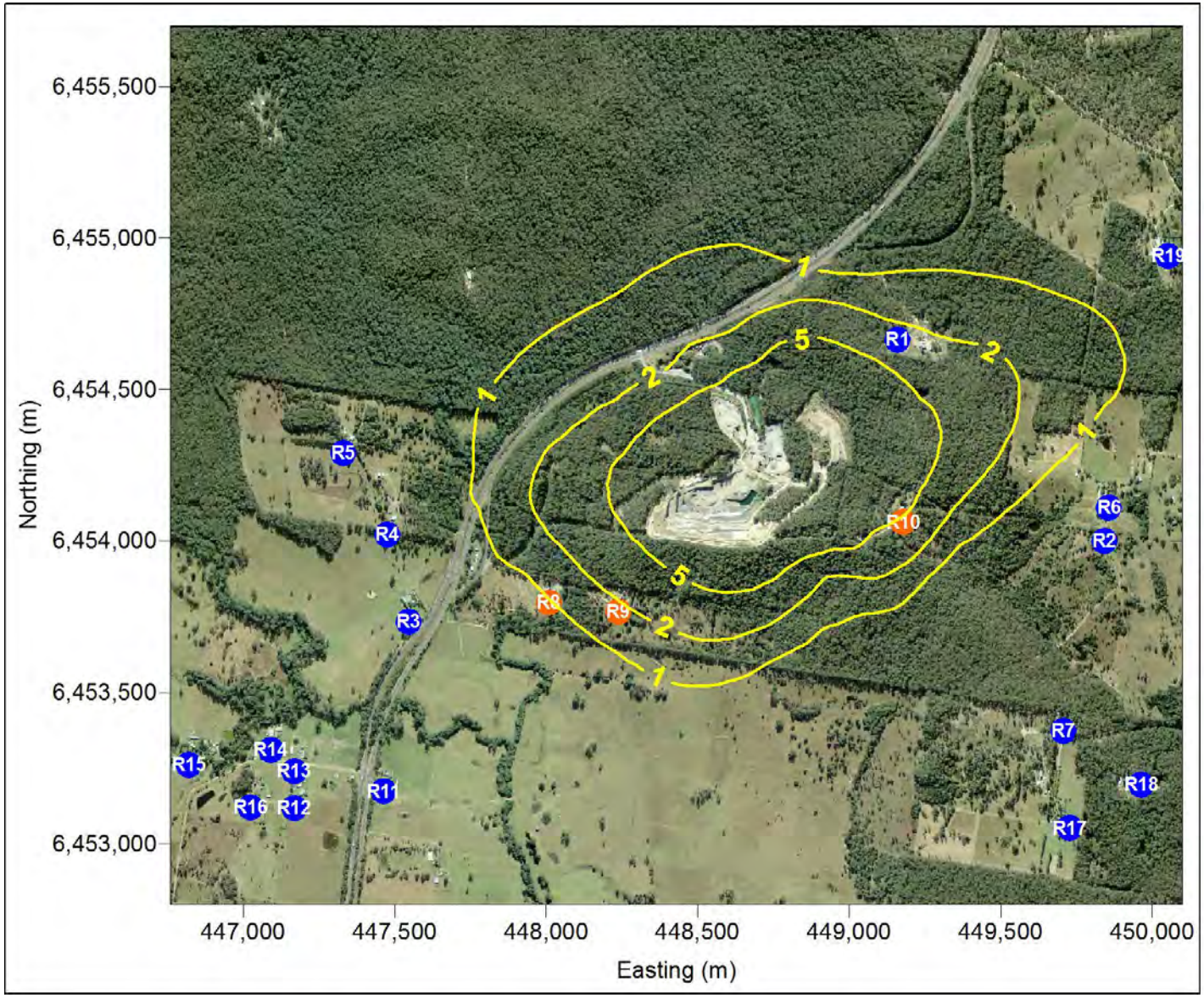

Predicted Annual Average TSP Concentrations (µg/m³)

LEGEND

- Privately Owned Receptors
- Quarry Owned Receptors

NOTES

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Jandra Quarry Expansion Project

AIR DISPERSION MODELLING STUDY

Incremental Impact - Stage 3

Project No	610.13023	Date	03/06/2014

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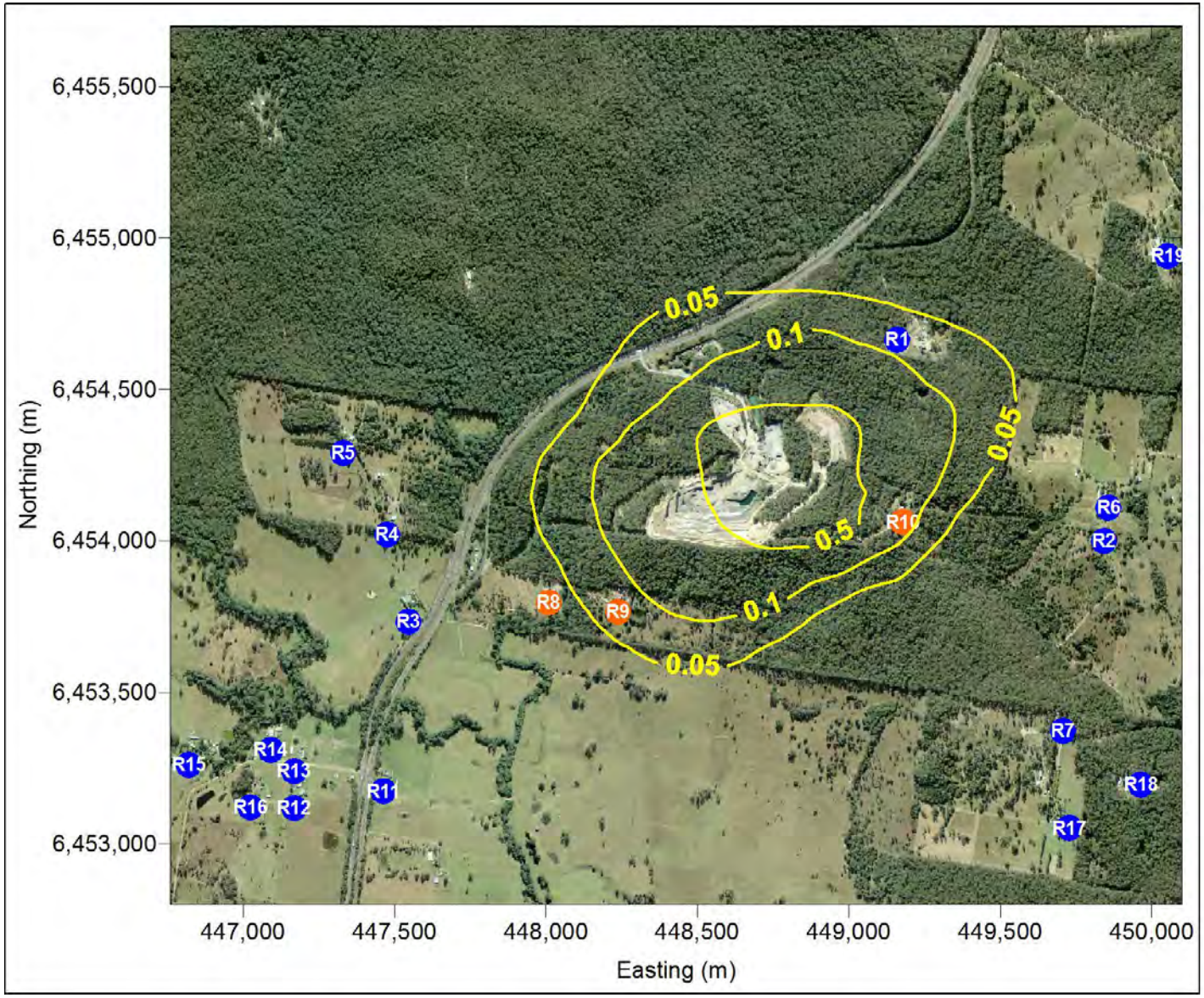

Predicted
Annual Average
Dust Deposition (g/m²/month)

LEGEND

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