



Hanson

ABN: 90 009 679 734

Annual Review for the period 1 January 2014 to 31 December 2014



for the

East Guyong Quarry



R.W. CORKERY & CO. PTY. LIMITED

May 2015



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Prepared for:

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May 2015



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1. INTRODUCTION

1.1 BACKGROUND

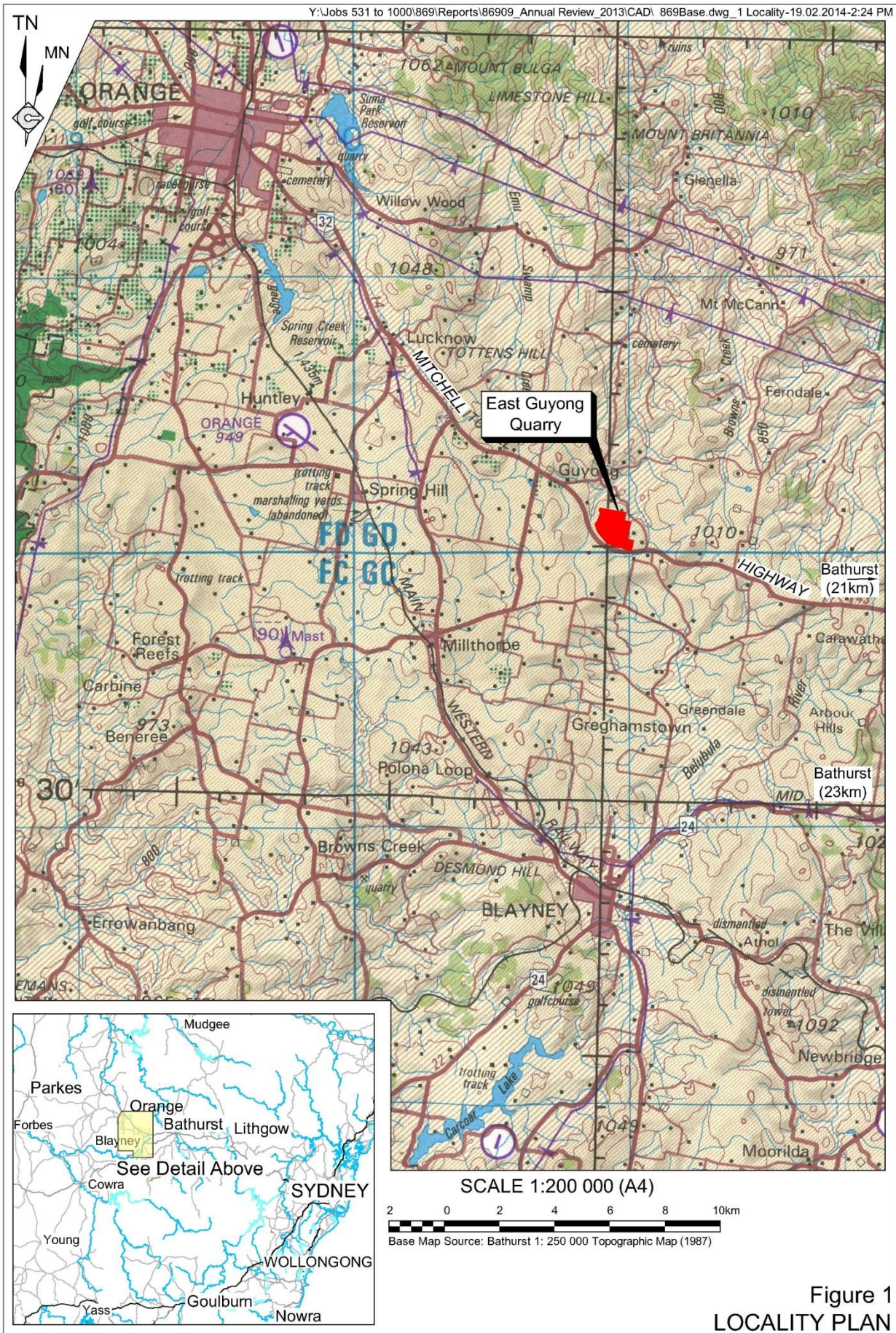
This document is the third *Annual Review* prepared for the East Guyong Quarry (the Quarry) owned and operated by Hanson Construction Materials Pty Ltd (the Company). The Quarry is located approximately 22km by road southeast of Orange and 36km west of Bathurst (**Figure 1**). This report documents the works undertaken and environmental monitoring results from 1 January to 31 December 2014 (the Reporting Period).

This document has been prepared in accordance with the requirements of Condition 5(3) of Project Approval PA06_0193. PA06_0193 was granted by the Land and Environment Court on 21 May 2012 and was modified to permit a revised access route on 24 December 2012. Condition 5(3) of PA06_0193 is reproduced below.

“By 31 March 2012, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:

- (a) describe the works (including rehabilitation) that were carried out in the previous calendar year, and the works that are proposed to be carried out over current calendar year;
- (b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against:
 - the relevant statutory requirements, limits or performance measures/criteria;
 - the monitoring results of previous years; and
 - the relevant predictions in the EA;
- (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- (d) identify any trends in the monitoring data over the life of the project;
- (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
- (f) describe what measures will be implemented over the next year to improve the environmental performance of the project.”

Finally, it is noted that PA06_0193 was approved by the Land and Environment Court on 21 May 2012, after the date on which the initial Annual Review was required to be provided. As a result, the Department of Planning and Environment agreed on 12 August 2013 that the initial *Annual Review* should be submitted for the period to 30 June 2013. A report reviewing the six months from 1 July to 31 December 2013 was submitted in February 2014 which brought the reporting periods into line with the reporting periods identified in Condition 5(3) of PA06_0193. This report is the first Annual Review to review a complete 12 month period of operations at the Quarry.



1.2 APPROVALS AND LICENCES

Table 1 presents the approvals and licences held in relation to the Quarry.

Table 1
Approvals and Licences

Type	Number	Date of Issue	Expiry	Comments
Project Approval	PA06_0193	21/5/2012	31/12/2042	Modified 24/12/2012
Environment Protection Licence	EPL20190	13/11/2012	-	
Groundwater Access Licence	80AL722920	10/03/2014	-	Share component 40ML
Source: Hanson Construction Materials Pty Ltd				

1.3 APPROVED ACTIVITIES

The approved activities at the Quarry comprise the following (Figure 2).

- Establishment and use of an extraction area to extract basalt using standard drill, blast, load and haul techniques.
- Construction and use of a processing plant to process the extracted basalt to produce a range of quarry products, including aggregates and road base, and stockpiling of the resulting products within an identified Infrastructure Area.
- Construction and use of a site access road and intersection with the Mitchell Highway.
- Transportation of up to 400 000t per year of quarry products via the Mitchell Highway using truck and dog and B-Double trucks.
- Construction of a range of bunds and mounds and establishment of native vegetation to provide visual screening for the quarry operations.

1.4 THE COMPANY

Hanson Construction Materials Pty Ltd operates over 50 quarries in Australia and supplies aggregates, sand and premixed concrete materials for the construction industry. The Company also produces precast concrete. The Company is a subsidiary company of Heidelberg Cement which internationally employs approximately 52 000 people at 2 500 locations in more than 40 countries.

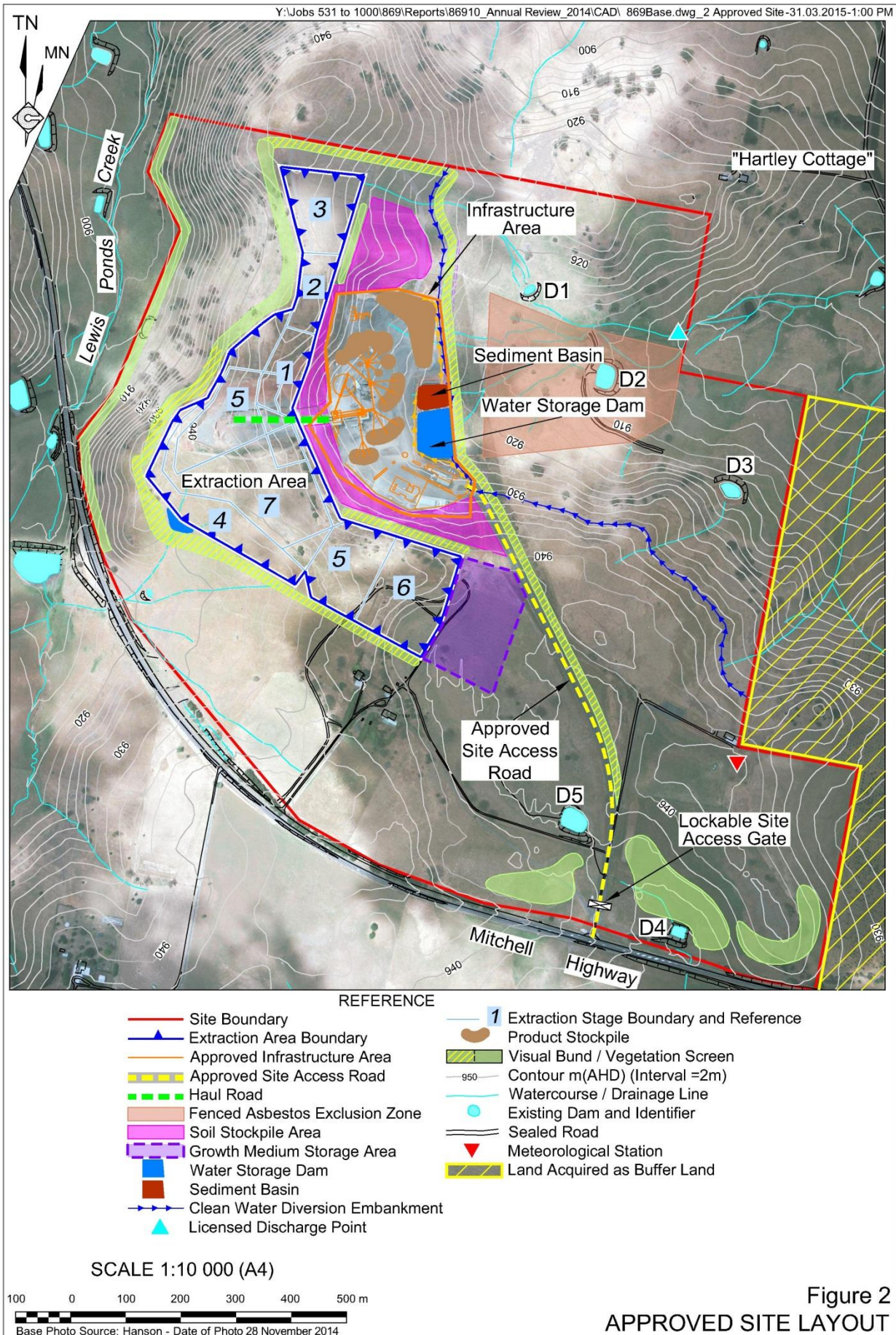


Figure 2
 APPROVED SITE LAYOUT

1.5 FORMAT OF THE ANNUAL REPORT

This document is presented in four sections as follows.

Section 1: Introduction – provides a background to the Quarry, including the approvals and licences held, the approved activities, an overview of the Company and information in relation to preparation of this document.

Section 2: Operational Overview – outlines the documentation used to guide activities at the Quarry, as well as the construction, extraction, processing and rehabilitation operations implemented during the Reporting Period and other relevant operational information.

Section 3: Environmental Monitoring and Management – describes impacts predicted in the application for project approval and the relevant performance criteria for the Quarry. Environmental performance based on site observations and monitored parameters are also reviewed against the predicted impacts and the relevant performance criteria.

Section 4: Environmental Management during the Next Reporting Period – describes the environmental management strategies to be implemented during the next Reporting Period.

Appendices:
Appendix 1 Minutes of meetings of the East Guyong Quarry Community Consultative Committee.

Appendix 2 A summary of Asbestos Monitoring Data.

Appendix 3 Attended Noise Monitoring Reports compiled by EMBA Mitchell McLennan during the Reporting Period.

1.6 DOCUMENT PREPARATION

This document has been prepared by Mr Nicholas Warren (B.Sc., M.Bus, M.Env.Sc.), Environmental Consultant, with internal peer review provided by Mr Mitchell Bland (B.Sc (Hons), MEconGeol, LLB (Hons)), Principal Environmental Consultant with R.W. Corkery & Co Pty. Limited (RWC). Mr Pere Riini, (Diploma of Surface Operations Management, Production Managers Permit), Quarry Manager, Hanson Construction Materials Pty Ltd provided technical input and information on Quarry operations and environmental performance during the Reporting Period.

2. OPERATIONAL OVERVIEW

2.1 INTRODUCTION

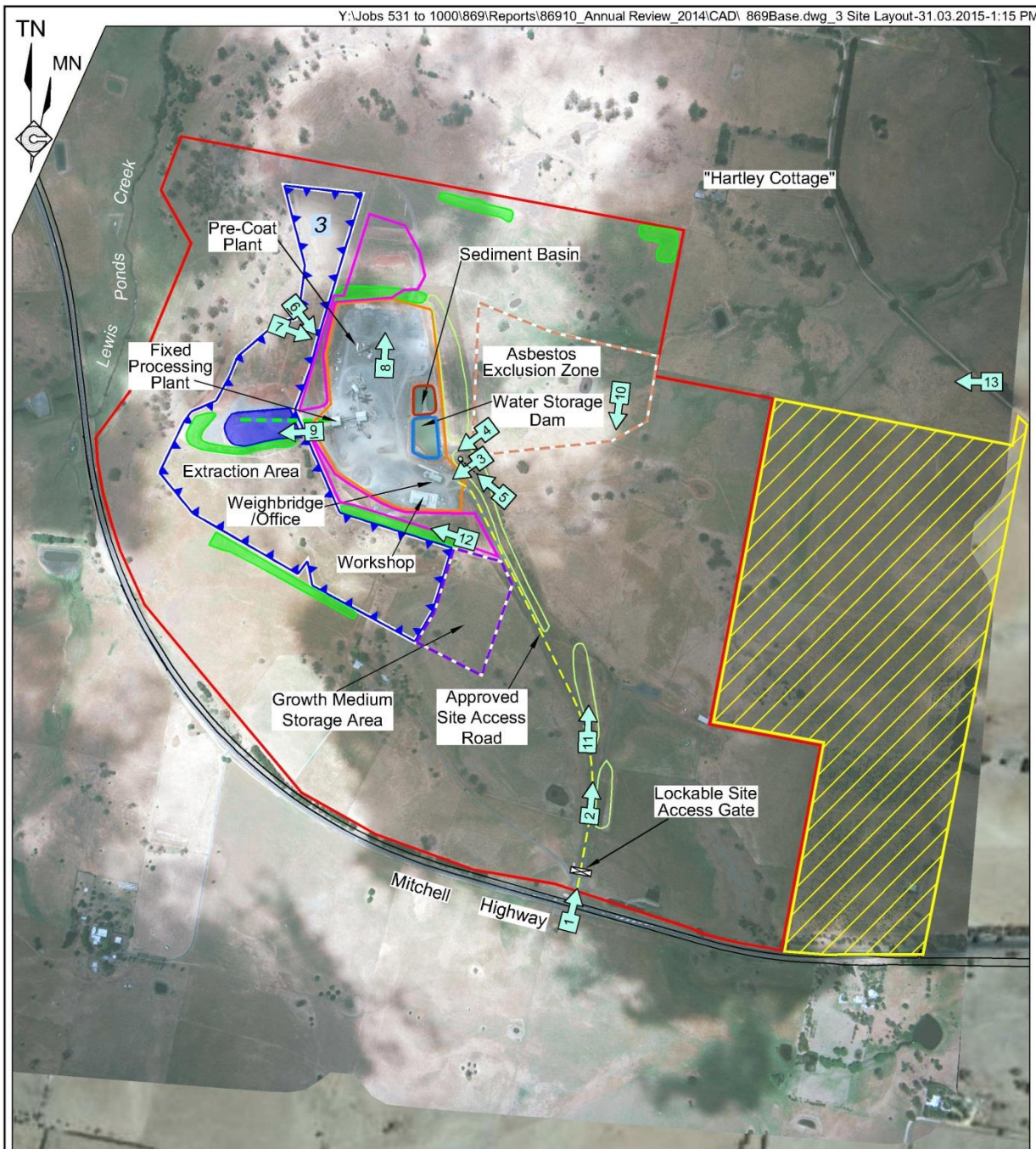
Figure 3 presents an overview of the Quarry layout at the end of the current Reporting Period while **Figure 4** presents an overview of the anticipated layout of the Quarry at the end of the next Reporting Period. In addition, **Plates 1 to 12** present views of Quarry on 11 February 2015 and 24 March 2015.

2.2 QUARRY DOCUMENTATION

Table 2 presents the documentation used by Quarry management to guide day-to-day operations at the Quarry.

Table 2
Quarry Documentation

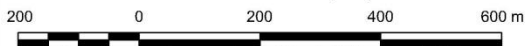
Document Title	Date Finalised/Approved
Supporting Documentation for Project Approval	
<i>Environmental Assessment</i>	21/5/2012
<i>Environmental Assessment Modification 1</i>	24/12/2012
<i>Asbestos Management Plan</i>	21/5/2012
Environmental Management Plans	
<i>Environmental Management Strategy</i>	Submitted, yet to be approved
<i>Noise Management Plan</i>	20/2/2013
<i>Blast Management Plan</i>	20/2/2013
<i>Air Quality Monitoring Program</i>	20/2/2013
<i>Soil and Water Management Plan</i>	20/2/2013
<i>Landscape Management Plan</i>	Submitted, yet to be approved
<i>Aboriginal Cultural Heritage Management Plan</i>	20/2/2013
<i>Crisis Management Plan</i>	Not required
<i>Emergency Management Plan</i>	Not required



REFERENCE

- | | | | |
|--|---|--|----------------------------|
| | Site Boundary | | Approved Water Storage Dam |
| | Approved Extraction Area Boundary | | Approved Sediment Basin |
| | Approved Infrastructure Area | | Growth Medium Storage Area |
| | Approved Site Access Road | | Sealed Road |
| | Extraction Activities (this Reporting Period) | | Plate Number and Direction |
| | Amenity Bund (this Reporting Period) | | |
| | Amenity Bund (Previous Reporting Period) | | |
| | Haul Road | | |
| | Fenced Asbestos Exclusion Zone | | |
| | Soil Stockpile Area | | |
| | Land Acquired as Buffer Land | | |

SCALE 1:12 500 (A4)



Base Photo Source: Hanson - Date of Photo 28 November 2014

Figure 3
SITE LAYOUT - 31 DECEMBER 2014

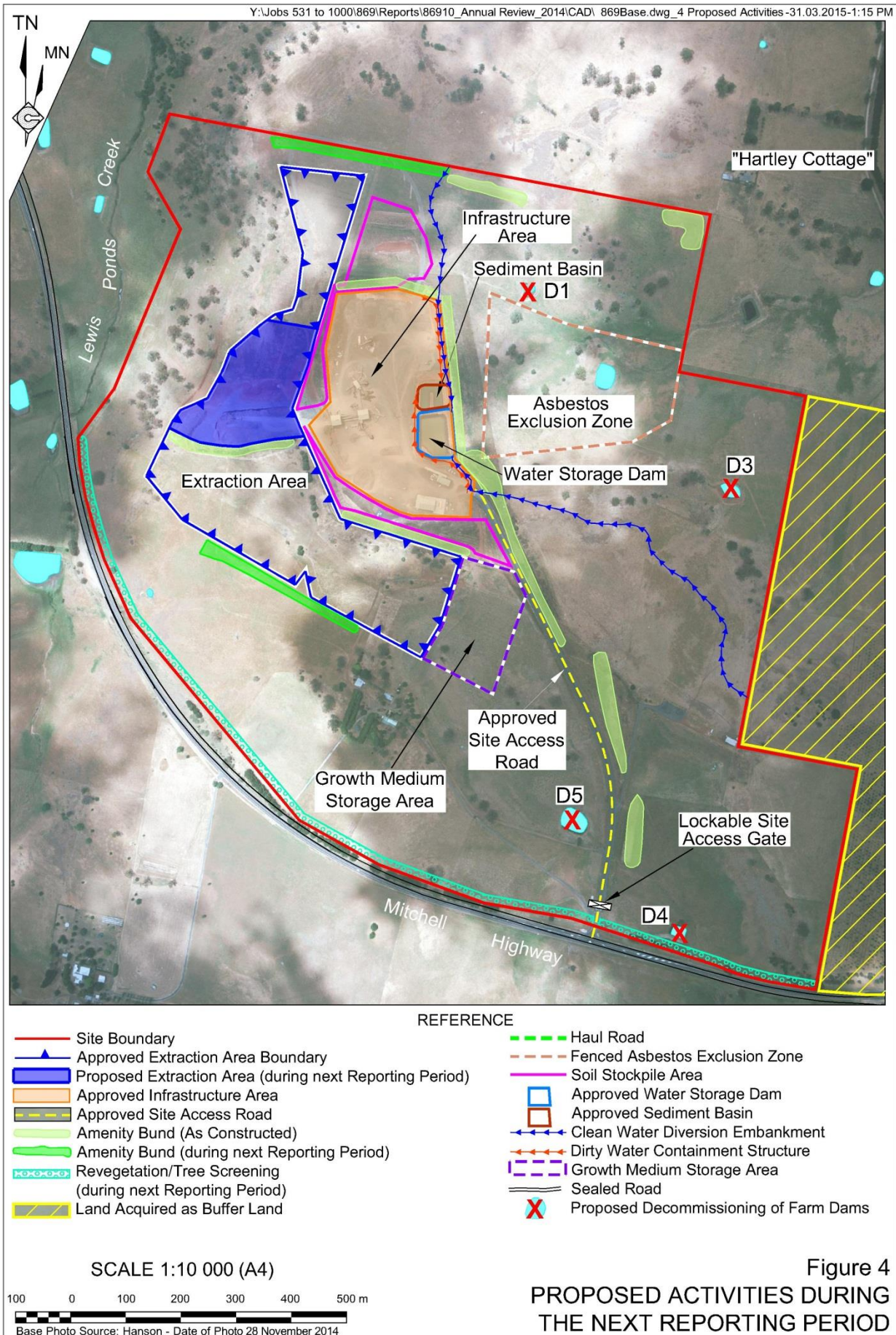


Figure 4
**PROPOSED ACTIVITIES DURING
 THE NEXT REPORTING PERIOD**



Plate 1 View of site entrance including lockable gate and sealed Site Access Road
(Ref: E869G_001)

Plate 2 View of sealed Site Access Road
(Ref: E869F_002)



Plate 3 View of Site Office and Workshop buildings
(Ref: E869G_003)

Plate 4 View of Weighbridge and Site Office building
(Ref: E869F_007)





Plate 5 View of Water Storage Dam and Sediment Basin (foreground) with the northern section of the Infrastructure Area in the background (Ref: E869G_004)

Plate 6 View of the southern section of the Infrastructure Area including the Pre-Coat Plant (left) and Fixed Processing Plant (right) in foreground and Water Storage Dam, Workshop, Site Office and Weighbridge in the background (Ref: E869F_006)



Plate 7 View of the northern section of the Infrastructure Area including the Pre-Coat Plant, various aggregate stockpiles and Pugmill (background) (Ref: E869F_005)

Plate 8 View of aggregate stockpiles within the northern section of the Infrastructure Area (Ref: E869G_010)





Plate 9 View of the southern and western faces of the Extraction Area facing west
(Ref: E869G_008)

Plate 10 View of fencing and warning signs limiting access to a rock outcrop that contains naturally occurring asbestos
(Ref: E869G_006)



Plate 11 View of the tubestock planted on the amenity bund located along the Site Access Road
(Ref: E869G_002)

Plate 12 View of tubestock planting on the amenity bund located on the southern boundary of the Infrastructure Area
(Ref: E869G_011)



2.1 CONSTRUCTION OPERATIONS

2.1.1 Current Reporting Period

The following construction-related activities were undertaken during the Reporting Period.

- Site Access Road.
 - Sealing and construction of site entrance and lockable gate (**Plate 1**).
 - Sealing and fencing of the Site Access Road (**Plate 2**).
- Infrastructure Area. .
 - Completion of the Site Office and Weighbridge (**Plate 3** and **Plate 4**).
 - Completion of Workshop construction (**Plate 3**).
 - Completion of the high voltage power line installation.
 - Installation of ancillary infrastructure such as sediment and erosion controls, power distribution infrastructure, waste water treatment facilities, etc.
 - Completion of processing infrastructure construction including the Pre-Coat Plant, Fixed Plant and Pugmill (**Plate 6, Plate 7 and Plate 8**).
 - Completion of the earthworks and retaining wall associated with the primary crusher and feed hopper.
 - Completion of fencing of the Infrastructure Area.
- Other site areas.
 - Completion of fencing of the Asbestos Exclusion Zone and any rock outcrops potentially containing asbestos (**Plate 10**).

There are no construction activities planned during the next Reporting Period.

2.2 MATERIAL MOVEMENTS

Table 3 presents the material movements during the Reporting Period and the anticipated movements during the next Reporting Period.

Table 3
Annual Material Movements (tonnes)

	Start of Reporting Period	End of Reporting Period	End of Next Reporting Period
Topsoil inventory (cumulative)	13 500 ¹	15 500	20 500 – 25 500
Overburden moved	136 000 ²	6 500	20 000
Raw feed extracted	Nil	113 000	400 000
Product transported off site	Nil	73 765	400 000
Note 1: Specific density of 1.5 applied for topsoil			
Note 2: Specific density of 1.7 applied for overburden			
Source: Hanson Construction Materials Pty Ltd			

2.3 EXTRACTION OPERATIONS

2.3.1 Current Reporting Period

Overburden stripped in preparation for blasting was used to construct the amenity bunds to the north and south of the Infrastructure Area and for partial construction of the amenity bund to the south of the Extraction Area.

Three blasts were initiated during the Reporting Period. **Table 4** presents relevant information in relation to each blast. All three blasts were production blasts and occurred within the approved extraction area (see **Plate 9** and **Figure 3**).

Table 4
Blasting Operations during the Reporting Period

Blast identifier	Date initiated	Volume of Blast (bcm)	MIC ¹ (kg)
Blast 5	16 April 2014	12 569	112
Blast 6	23 July 2014	15 314	119
Blast 7	23 October 2014	14 436	125
Note 1: MIC = Maximum Instantaneous Charge			
Source: Hanson Construction Materials Pty Ltd			

The Company has continued to refine blasting and blast monitoring procedures throughout the Reporting Period through the following measures.

- Review of each of the four blast monitors and results by Hanson and Maxam (blast contractor) technical staff following each blast event.
- Applying any proposed modifications to blast design in single steps to evaluate the impact of each modification independently.
- Modification of the blasting pattern following review of previous blast results to reduce powder factors.

2.3.2 Next Reporting Period

Blasting for extraction operations are expected to continue during the next Reporting Period, with further blasts undertaken on an estimated monthly cycle subject to market and internal demand from the Company's other operations. The Company anticipates that there will be a gradual increase in production during the next Reporting Period, with operations approaching the approved production rate by the end of 2015 (see **Table 3**).

2.4 PROCESSING OPERATIONS

2.4.1 Current Reporting Period

A mobile crushing unit and screening plant was in place to the south of the fixed processing plant between 6 March 2014 and 17 June 2014. Following the initial trial of crushing and screening settings and adjustments based on the material being processed, the processing infrastructure was constructed and commenced operating from 15 September 2014 (see **Figure 3**).

2.4.2 Next Reporting Period

Processing activities using the Fixed Processing Plant and Pre-coat Plant are proposed to continue during the next Reporting Period, with the amount of material to be processed dependant on the demand for the Quarry's products from internal and external customers.

2.5 WATER MANAGEMENT

Trial of appropriate flocculation methodologies for management of sediment laden water in the Sediment Dam was limited during the reporting period as the lack of rain and continued construction activities limited use of Sediment Dam. A preliminary trial of a Gypsum-based product in powder form produced beneficial results with suspended sediment observed to be dropping out of water within the dam.

Trials involving alternative materials for this purpose are proposed during the next reporting period.

2.6 PRODUCT TRANSPORTATION

Product transported off site during the Reporting Period was limited to was limited to 73 765 tonnes of material which is below the approved annual transportation volume of 400 000 tonnes. Product transport during the next Reporting Period would not exceed the approved transport volume (see **Table 3**).

2.7 REHABILITATION

2.7.1 Current Reporting Period

The commencement of extraction operations has resulted in overburden, stripped to prepare the extraction area for blasting, being available for use in rehabilitation activities. The following rehabilitation was completed or commenced during the Reporting Period.

- Construction of amenity bunds to the north and northeast of the Infrastructure Area and along the northern and southern boundary of the Infrastructure Area were completed during the Reporting Period and these bunds were shaped and spread with topsoil (**Figure 3**).
- Prepared areas were spread with the seed of groundcover species and tubestock planted in targeted areas. Approximately 2 000 tubestock were planted within the northern and southern amenity bunds of the Infrastructure Area (**Plate 12**).
- 4 000 tubestock were also planted along existing amenity bunds including the amenity bund adjacent to the Site Access Road and the eastern amenity bund of the Infrastructure Area (**Plate 11**).

2.7.2 Next Reporting Period

During the next Reporting Period rehabilitation activities will focus on the partially completed southern bund and initial construction of the northern bund (see **Figure 4**). Activities will involve final shaping, spreading of topsoil (where required) and revegetation (including replanting areas of unsuccessful revegetation) of these bunds.

The Company plans to continue progressive revegetation of the Quarry Site during the next Reporting Period. It is anticipated that approximately 5 000 tubestock would be planted along the southern and southwestern boundary of the Quarry Site where it is closest to the Mitchell Highway to develop vegetation screening from this vantage point (see **Figure 4**).

Revegetation of disturbed sections of the Site would be undertaken in accordance with the procedures identified in Section 10.3.4 of the *Landscape Management Plan*.

2.8 HOURS OF OPERATION

The approved hours of operation are as follows.

- Monday to Friday (non-daylight savings) – 6:00am to 6:00pm.
- Monday to Friday (daylight savings) – 6:00am to 8:00pm.
- Saturdays – 7:00am to 1:00pm.
- Sundays and public holidays – nil.

Product despatch between 5:00am and 6:00am and from 6:00pm to 10:00pm (non-daylight savings) and 8:00pm to 10:00pm (daylight savings), Monday to Saturday is permitted following negotiation of written agreements with seven surrounding landholders nominated in Condition 3(6). No agreement has been negotiated to date.

All activities during the Reporting Period were undertaken within the approved hours of operation.

2.9 EMPLOYMENT

During the Reporting Period, employment at the Quarry increased to include 13 full-time operational staff, including seven staff involved in extraction and processing activities and six staff involved in transportation activities. The Company anticipates that an additional casual full time employee will be employed during the next Reporting Period.

2.10 CONSULTATION

Four meetings of the East Guyong Quarry Community Consultative Committee were held during the Reporting Period on the following dates.

- 17 February 2014.
- 26 May 2014.
- 15 September 2014.
- 24 November 2014.

Appendix 1 presents the minutes from each of the meetings. A range of issues were raised and questions or requests for additional information provided during the four meetings during the Reporting Period. The quarry staff present at the meeting were able to answer all queries or follow up questions for later response. It was decided at the 24 November 2014 meeting that future meetings would occur bi-annually. Meetings during 2015 are scheduled to occur on 13 May 2015 and 11 November 2015.

2.11 COMPLAINTS AND INCIDENTS

No complaints were received during the Reporting Period and no incidents recorded at the Quarry.

3. ENVIRONMENTAL MONITORING AND MANAGEMENT

3.1 OBJECTIVES AND OUTCOMES

Environmental monitoring is undertaken to determine the degree of impact the construction and production operations are having on the environment. Assessment of these results can establish if environmental management systems are being successfully applied in the short term and if the management systems need to be amended.

Appropriate environmental monitoring, apart from satisfying necessary statutory requirements, demonstrates to the local community and relevant authorities the Company's commitment to the protection of the environment.

The following sub-sections present the results of the various monitoring programs undertaken throughout the Reporting Period. Where appropriate, results of the previous years' monitoring are also presented for comparative purposes.

Figures 5 and 6 provide monitoring locations referred to in this section.

3.2 KEY ENVIRONMENTAL MANAGEMENT MILESTONES

3.2.1 Independent Environmental Audit

In accordance with the requirements of Condition 5(8) of PA06_0193, an independent environmental audit of the Quarry is to be completed every three years following the initial audit completed on 12 and 13 November 2013.

While the 2013 independent environmental audit did not apply to this Reporting Period, a response to the recommendations of the audit was prepared by the Company and submitted to the Department of Planning and Environment on 28 January 2014. The response document addressed recommendations relating to the Asbestos Management Plan included in the audit of asbestos management prepared by C. M. Jewell & Associates Pty Ltd. As no response has been received from the Department it is assumed that the Company's response to the recommendations was satisfactory.

The next independent environmental audit is due to be completed by December 2016.

3.2.2 Aerial Photography

A program of regular aerial photography commenced in late 2013, with further flights planned annually. Aerial photograph captured on 28 November 2014 has been used in the preparation of **Figures 2 to 5**.

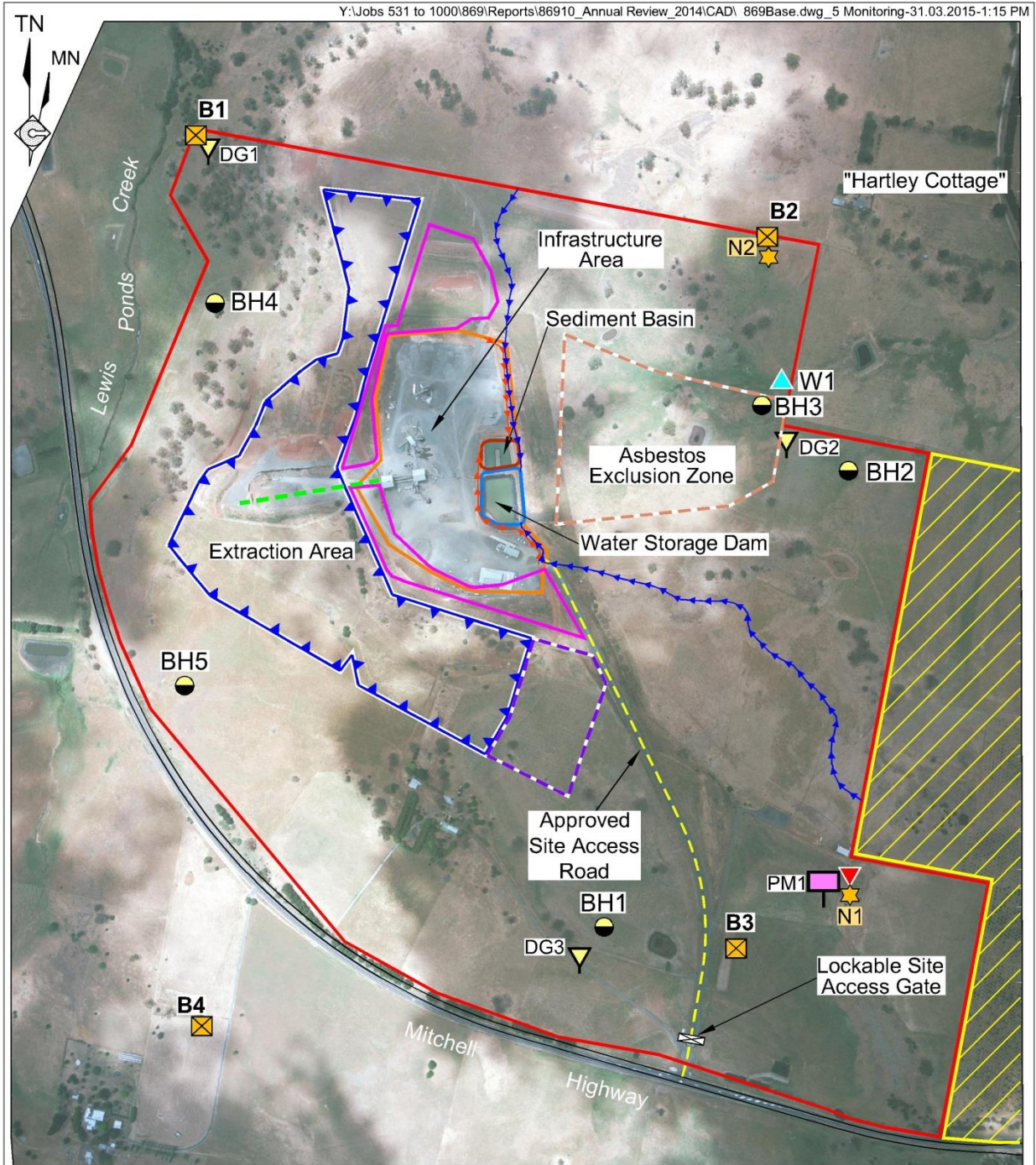
3.3 METEOROLOGICAL MONITORING

Table 5 presents the meteorological monitoring results recorded by the Company's automated meteorological monitoring station (**Figure 5**). In addition, long term-average climate data from

the Bureau of Meteorology-operated Orange Airport AWS (Station No 063303) is provided for comparison.

It is noted that a malfunction with the communications of the Company operated weather station between 18 February 2014 and 14 March 2014 resulting in no records during this period and therefore data for February and March is not included in **Table 5**.

Average temperatures, where available, were similar to those recorded in 2013 and slightly higher than the long term average recorded at the Orange Airport AWS during spring and winter time.



REFERENCE

- Site Boundary
- ▲ Approved Extraction Area Boundary
- Approved Infrastructure Area
- Approved Site Access Road
- - - Haul Road
- - - Fenced Asbestos Exclusion Zone
- Soil Stockpile Area
- Approved Water Storage Dam
- Approved Sediment Basin
- ▲ Clean Water Diversion Embankment
- ▲ Dirty Water Containment Structure
- - - Growth Medium Storage Area
- Sealed Road
- ▲ W1 Surface Water Monitoring Location, Licensed Discharge Point & Identifier
- BH1 Groundwater Piezometer & Identifier
- PM1 PM₁₀ Monitoring Location & Identifier
- ▼ DG1 Deposited Dust Monitoring Location & Identifier
- B1 Blast Monitoring Location and Identifier
- ★ N1 Noise Monitoring Location and Identifier
- ▼ Meteorological Station
- ▨ Land Acquired as Buffer Land

SCALE 1:10 000 (A4)



Base Photo Source: Hanson - Date of Photo 28 November 2014

Figure 5
ENVIRONMENTAL
MONITORING LOCATIONS

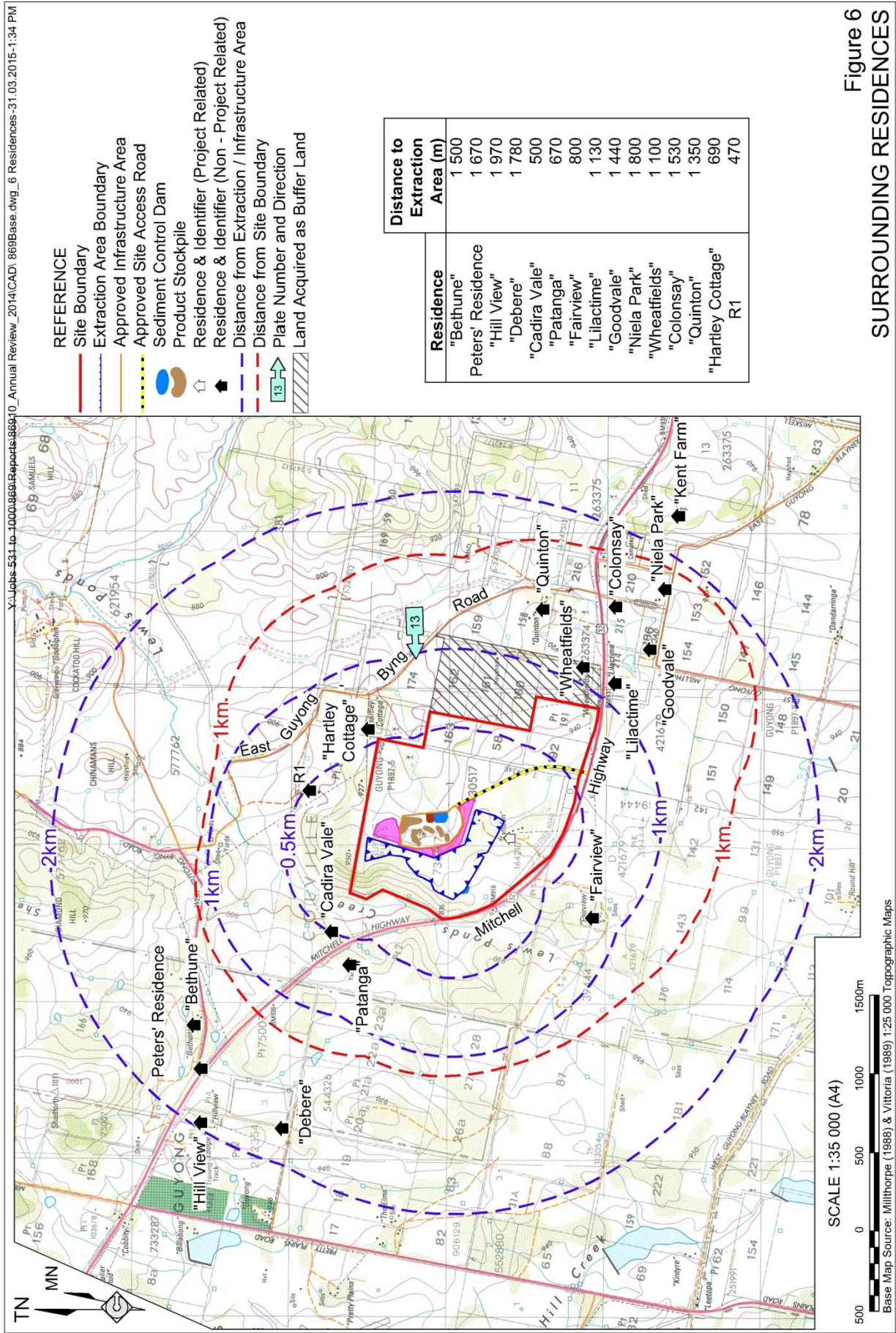


Figure 6
 SURROUNDING RESIDENCES

In the absence of annual records for rainfall, individual months can be compared to 2013 data to give an indication of rainfall variability. In summary, rainfall during 2014 was higher or similar to monthly results for 2013 except in January 2014 when significantly lower rainfall was recorded in 2014. Rainfall remained below the long term average for most months recorded at the Orange Airport AWS. Rainfall during winter of 2014 was above the long term average, but significantly drier than the long term average for spring and into summer, with some monthly rainfall typically less than half the long-term average.

Table 5
Meteorological Monitoring Results

Year		Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
Average Temperature (°C)														
2013	Maximum	26.9	23.1	20.9	17.7	13.2	10.2	10.8	11.4	16.9	18.9	21.9	26.3	18.2
	Minimum	16.9	13.5	12.2	8.7	5.4	4.5	1.8	2.1	5.3	5.2	8.3	11.1	7.9
2014	Maximum	28.8	N/A	N/A	17.7	14.1	10.3	9.1	11.2	14.4	20.2	25.7	25.6	-
	Minimum	13.5	N/A	N/A	8.1	5.0	2.9	1.1	0.9	3.9	6.6	9.8	12.0	-
Long Term Average ¹	Maximum	27.0	25.7	22.6	18.4	14.1	10.8	9.7	11.3	14.9	18.0	21.7	24.5	18.2
	Minimum	12.6	12.6	9.7	5.3	2.3	1.3	0.5	0.8	3.3	5.4	8.4	10.4	6.0
Rainfall (mm)														
2013	Total	73.2	126.6	34.6	18.2	25.4	86.8	38.8	42	37	21	33.2	46	582.8
	No. of Rain Days	6	10	8	9	10	20	19	19	8	6	8	8	131
	Max Daily Rainfall	34.2	23.8	28.6	14.8	14.0	24.0	10.4	11.2	28.4	10.8	9.4	24.6	34.2
2014	Total	17.4	N/A	N/A	50.0	40.6	108.2	56.6	42.0	37.4	58.8	33.8	77.8	-
	No. of Rain Days	6	N/A	N/A	10	18	21	20	13	6	5	6	12	-
	Max Daily Rainfall	15.4	N/A	N/A	17.0	20.8	27.2	18.4	16.6	18.6	38.4	12.2	29.8	-
Long Term Average ¹	Total	60.2	87.4	72.0	35.8	46.7	78.5	74.9	84.4	75.6	75.3	80.9	90.3	861.1
	No. of Rain Days	8.1	8.5	8.1	7.4	12.1	17.9	18.8	15.8/	11.2	9.2	9.6	8.9	135.6
	Max Daily Rainfall	69.0	89.0	109.6	68.0	50.4	57.2	40.8	74.0	46.8	61.0	80.0	94.0	109.6
Note 1:	Long-term average data source - Orange Airport AWS (Station No 063303) – Updated 24 March 2015													
Source:	Hanson Construction Materials Pty Ltd													

3.4 ASBESTOS

3.4.1 Predicted Impacts and Performance Criteria

The *Asbestos Management Plan* prepared by Greencap/NAA Limited (formerly Noel Arnold and Associates Pty Ltd) and dated May 2012 was approved by the Land and Environment Court and appended to Project Approval PA06_0193. That document identifies the control measures to be implemented by the Company, as well as documenting the Asbestos Fibre Air Monitoring Protocol, Notification Protocol and Exceedance Protocol and measures to be implemented in the event of exposure to Naturally Occurring Asbestos.

In summary, Paragraphs 6.2 and 6.6 of the *Asbestos Management Plan* require the following stages of asbestos monitoring.

1. Background monitoring at a range of locations for a minimum of five days prior to commencement of intrusive works.
2. Daily control and personal monitoring during intrusive works.
3. Weekly control and personal monitoring for a three month period following the conclusion of intrusive works.
4. Monthly control and personal monitoring for the period between 4 and 15 months following the conclusion of intrusive works.
5. Bi-monthly control and personal monitoring for the period from 16 months following the conclusion of intrusive works during the life of the Quarry.

Intrusive Works are defined as “any works for site infrastructure that have the potential to disturb soil or rock on the Infrastructure Area.”

Stage 1 was completed during the 2012/2013 Reporting Period. Stage 2 was ongoing during the current Reporting Period. All “intrusive works” ceased with the completion of the Fixed Processing Plant in September 2014. As a result, the Company transitioned from Stage 2 to Stage 3 monitoring during the Reporting Period. The Company will transition from Stage 3 to Stage 4 during the next Reporting Period.

Monitoring of airborne asbestos fibres is undertaken using a small pump that draws a known volume of air through a filter. The filter collects dust particles in the air. The filters are sent to Greencap/NAA Limited (formerly Noel Arnold and Associates Pty Ltd) on the day they are collected for analysis and reporting in accordance with paragraphs 6.7 to 6.9 of the *Asbestos Management Plan*.

In implementing Stage 2 and Stage 3 of the *Asbestos Management Plan*, the Applicant undertakes asbestos sampling on days when:

- ground disturbing activities are being undertaken within the Infrastructure Area; and
- when rain is not falling and potential exists for airborne dust to be generated.

No sampling is undertaken on days when there is no ground disturbing activities being undertaken or when rain is falling.

Fibre concentrations are analysed by Greencap/NAA Limited (formerly Noel Arnold and Associates Pty Ltd), a NATA-accredited laboratory, using phase contrast microscopy in accordance with the procedure identified in Paragraph 6.8 of the *Asbestos Management Plan*.

All fibres are counted initially, with those samples exceeding the Quantification Limit of 0.01 fibres/mL further analysed, to determine whether the fibres are asbestiform or non-asbestiform. In accordance with Paragraph 6.10 of the *Asbestos Management Plan* this assessment would be undertaken by an approved external laboratory using scanning electron microscopy or transmission electron microscopy.

The Asbestos Impact Assessment Criterion (AIAC) is 0.01 asbestos fibres/mL.

Table 6 presents a summary of the asbestos performance criteria and actions to be implemented in the event of an exceedance of the criteria.

Table 6
Asbestos Monitoring Performance Criteria

Criteria	Limit	Action in the Event of Exceedance
Quantification Limit	0.01 fibres/mL	<ul style="list-style-type: none"> • Cease intrusive works and isolate and secure the work area. • Employ dust suppression techniques. • Notify relevant stakeholders. • Send samples for further analysis by an approved laboratory. • If no exceedance of AIAC resume works.
Asbestos Impact Assessment Criterion	0.01 asbestos fibres/mL	<ul style="list-style-type: none"> • Implement a 25m exclusion zone around the monitoring location. • Engage NATA accredited asbestos consultant or licensed asbestos assessor to assist in the investigation and provide appropriate advice. • Notify relevant stakeholders. • Implement recommended measures prior to resuming work.
Source: Asbestos Management Plan – After Section 8		

3.4.2 Measured Performance

In accordance with Condition 5(10)(a) of PA06_0193, all asbestos monitoring certificates are presented on the Quarry's website¹. That data has been summarised and is presented in **Appendix 2**. In summary, samples were taken on the following days.

- 14 January 2014.
- 22 January 2014.
- 21 March 2014.
- 4 July 2014.
- 29 July 2014
- 17 October 2014.
- 5 November 2014.
- 18 November 2014.

The Company analysed a total of 69 samples over these dates at locations within the Infrastructure Area and at strategic locations within the Quarry Site to accurately determine background conditions.

No samples exceeded the Quantification Limit during the Reporting Period and as a result, no samples required further testing to determine whether the Asbestos Impact Assessment Criterion has been exceeded.

¹ Hanson Website URL: <http://www.hanson.com.au/Aboutus/RegulatoryInformation/EastGuyongQuarryProject.aspx>

3.4.3 Discussion and Analysis

No samples exceeded the quantification or screening limit for airborne asbestos fibres. As a result, the Company contends that the management measures implemented to date would appear to have been effective in protecting the health of the Company's employees and contractors, as well as the health of the surrounding community. The Company will continue to implement the identified management measures and monitoring procedures during the next and subsequent Reporting Periods.

3.5 NOISE

3.5.1 Predicted Impacts and Performance Criteria

Table 7 identifies the predicted operating noise levels at four representative residences surrounding the Quarry (**Figure 6**) and **Table 8** identifies the relevant noise-related performance criteria for residences surrounding the Quarry Site identified by Condition 3(5) of PA06_0193.

Section 11.2.2 of the *Noise Management Plan* identifies that noise monitoring would be undertaken at two intermediate locations, namely Locations N1 and N2 (**Figure 5**), within land owned by the Company as a screening mechanism and to ensure that residents of the surrounding properties are not unduly inconvenienced as a result of the attended monitoring program. In 2012, Mr Dick Godson of SLR undertook an assessment of equivalent noise levels at Locations N1 and N2 that would ensure compliance with the noise criteria identified in Condition 3(5) of PA06_0193 (RWC, 2013). **Table 7** presents the results of that assessment.

Table 7
Predicted Operating Noise Levels

Receiver ¹	Stage	Daytime (0700-1800)		Evening (1800-2200)		Night-time (2200-0700) calm	
		Predicted L _{Aeq} (15 minute) noise level	L _{Aeq} (15 minutes) intrusive criterion	Predicted L _{Aeq} (15 minute) noise level	L _{Aeq} (15 minute intrusive criterion)	Predicted L _{Aeq} (15 minute) noise level	L _{Aeq} (15 minute) intrusive criterion
"Cadira Vale"	1	22	35	20	35	20	35
	4	29		21		21	
	7	28		23		23	
"Fairview"	1	25	36	22	35	23	35
	4	36		22		22	
	7	31		25		25	
"Lilactime"	1	23	35	22	35	22	35
	4	20		19		19	
	7	22		20		20	
"Hartley Cottage"	1	29	35	29	35	29	35
	4	32		27		27	
	7	28		27		27	
Note 1: See Figure 6							
Source: Heggies (2007a) – Modified after Table 11							

The Company will initially undertake monitoring quarterly at Locations N1 and N2. In the event that the noise levels identified in **Table 8** are exceeded, there is a substantiated noise-related complaint or a landholder exercises their rights under Condition 4(3) of PA06_0193 to request an independent review of noise-related impacts, attended noise monitoring would be undertaken at surrounding residences.

Table 8
Noise-related Performance Criteria

Location	Day dB(A) ¹	Evening dB(A) ¹	Night dB(A) ¹
Surrounding Residences²			
"Hartley Cottage"	35	35	35
"Cadora Vale"	35	35	35
"Lilac Time"	35	35	35
"Fairview"	36	35	35
All other privately owned land	35	35	35
Intermediate Monitoring Locations³			
Location N1	43	43	43
Location N2	50	50	50
Note 1: Units = LAeq 15 minutes			
Note 2: See Figure 6			
Note 3: See Figure 5			

3.5.2 Measured Performance

Attended noise monitoring programs were undertaken quarterly during the Reporting Period by EMGA Mitchell McLennan Pty Limited (EMM). The resulting reports are presented as **Appendix 3**.

The operational scenarios assessed by EMM varied throughout the Reporting Period due to the changes in activities over the period. The following provides a summary of the operating scenarios and the locations assessed on each occasion with results summarised in **Table 9**, **Table 10**, **Table 11** and **Table 12**.

21 March 2014

A single operating scenario was assessed during this period due to an unexpected breakdown of the mobile crushing plant.

- Scenario 1 – Only noise levels associated with construction activities were measured.
- Locations – N1 and N2 only.

27 June 2014

Two operational scenarios were assessed during this period, although crushing operations were not occurring.

- Scenario 1 – establishment of the extraction area and construction of the permanent processing plant.
- Scenario 2 – establishment of the extraction area, construction of the permanent processing plant and blast hole drilling.
- Locations – N1, N2 and Residence R1 (see **Figure 6**) at the request of quarry staff.

16 September 2014

This assessment was the first to occur following completion of the Fixed Processing Plant and involved assessment of all quarry activities including extraction, processing and transportation of quarry products.

- Scenario 1 – All quarry activities with the exception of the crushing plant.
- Scenario 2 – All quarry activities including the crushing plant (unloaded).
- Scenario 3 – All quarry activities including the crushing plant (loaded).
- Locations – N1, N2 and Residence “Wheatfields” (see **Figure 6**) at the request of quarry staff to validate noise limits nominated for intermediate monitoring location N1.

11 November 2014

A single scenario was assessed during this period as extraction and production operations were occurring following completion of all construction activities.

- Scenario 1 – All quarry activities including:
 - extraction of basalt using standard drill, blast, load and haul techniques;
 - processing of extracted basalt and stockpiling; and
 - transportation of quarry products.
- Locations – N1 and N2.

3.5.3 Discussion and Analysis

It is noted that in accordance with the Industrial Noise Policy (INP), a modification factor of five decibels has been applied in situations where low frequency noise was identified and where there is a difference of 15 decibels or more between ‘C’ weighted and ‘A’ weighted noise levels. In addition, several instances were recorded where wind speeds greater than 3m/s were identified. In these instances the noise limits do not apply (see Condition L4.7 of Environment Protection Licence 20190). As a result and in summary, the attended monitoring program undertaken throughout the Reporting Period confirmed that the Quarry was operating within the relevant criteria.



**Table 9
Noise Monitoring Results – 21 March 2014**

Location	Scenario	Time	Attended Noise Monitoring Results (dB(A))				Criteria dB(A)	Met conditions ¹		Comments
		(hrs)	Total measured			Site Contribution		Wind Speed (m/s)	Wind Direction (degrees)	
			Leq	Lmax	L90	Leq				
N1	1	7:37	44	63	38	Not measurable	43	0.8	63	Site noise just audible briefly in background (not measurable) including hammering sound and truck. Road traffic noise and birds dominant.
	1	10:11	36	54	29	Inaudible	43	3.8	25	Site noise inaudible. Road traffic noise and birds dominant, plane audible.
N2	1	8:02	39	55	32	<35	50	1.8	45	Site noise just audible briefly including hammering sound ~35 dB(A) SPL. Road traffic noise and birds dominant, plane and livestock audible.
	1	10:43	31	47	28	<30	50	4.6	24	Site noise just audible occasionally including excavator ~30 dB(A) SPL. Road traffic noise and birds dominant.
Notes: 1 Meteorological data was recorded by the East Guyong Quarry site's weather station located near location N1 Source: EMM (2014a) - Table 3										

**Table 10
Noise Monitoring Results – 27 June 2014**

Location	Scenario	Time (hrs)	Attended Noise Monitoring Results (dB(A))				Criteria dB(A)	Met conditions ¹		Comments
			Total measured			Site Contribution		Wind Speed	Wind Direction	
			Leq	Lmax	L90	Leq		(m/s)	(degrees)	
N1	1	7:07	44	56	38	Inaudible	43	1.3	138	Site noise inaudible. Constant traffic from Mitchell Highway. Birds and livestock occasionally audible.
	2	8:45	44	58	39	<40	43	1.7	28	Site noise audible including intermittent drill ≤40 dB(A) SPL. Constant traffic from Mitchell Highway. Birds audible frequently.
N2	1	7:30	45	58	38	Inaudible	50	1.3	241	Site noise inaudible. Constant traffic from Mitchell Highway. Birds frequently audible.
	2	8:19	45	58	40	<45	50	0.7	344	Site noise audible occasionally including drill ~45-47 dB(A) SPL and hammering ~40-43 dB(A) SPL. Constant traffic from Mitchell Highway. Birds audible frequently. Plane audible on two occasions.
R1	2	9:12	45	71	34	Inaudible	35	3.7	22	Site noise inaudible. Traffic from Mitchell Highway constant. Birds frequently audible.
Notes: 1 Meteorological data was recorded by the East Guyong Quarry site's weather station located near location N1 Source: EMM (2014b) - Table 3										





**Table 11
Noise Monitoring Results – 16 September 2014**

Location	Scenario	Time (hrs)	Attended Noise Monitoring Results (dB(A))				Criteria dB(A)	Met conditions ¹		Comments	
			Total measured			Site Contribution		Wind Speed	Wind Direction		
			Leq	Lmax	L90	C-A		Leq	(m/s)		(degrees)
N1	3	8:17	45	72	41	19.1	45 ²	43	5.2 ³	272	Site noise audible including crushing circuit constant ~38-43 dB(A) SPL and up to 45 dB(A) SPL, FEL reversing occasionally audible. Traffic on Mitchell Highway and birds constant.
	3	8:35	44	63	41	19.4	44 ²	43	5.7 ³	262	Site noise audible including crushing circuit constant ~40-45 dB(A) SPL and up to 48 dB(A) SPL, FEL reversing occasionally audible. Traffic on Mitchell Highway and birds constant.
N2	1	6:46	39	52	35	N/A	Inaudible	50	3.0	327	Site noise inaudible. Traffic on Mitchell Highway constant. Birds and livestock also constant. Plane audible.
	2	7:28	41	62	37	N/A	<35	50	4.9 ³	308	Site noise just audible including crushing circuit when ambient low ~35 dB(A) SPL, FEL reversing occasionally and truck on access road briefly. Traffic on Mitchell Highway and birds constant.
	3	7:50	43	52	40	16.6	46 ²	50	4.6 ³	298	Site noise audible including crushing circuit constant ~38-45 dB(A) SPL and up to 48 dB(A) SPL, FEL reversing occasionally audible. Traffic on Mitchell Highway and birds constant.
R1	3	9:55	48	59	42	N/A	<35	N/A	4.6 ³	248	Site noise just audible briefly including crushing circuit when ambient low ~42 dB(A) SPL, FEL reversing occasionally. Traffic on Mitchell Highway and birds constant. Wind in trees occasionally.
Note: 1		Meteorological data was recorded by the East Guyong Quarry site's weather station located near location N1									
Note: 2		A penalty factor of 5dB has been applied to these results to account for the low frequency component. This is applied when 'C' weighted noise minus 'A' weighted noise is greater than 15dB in accordance with the Industrial Noise Policy									
Note: 3		Noise limits not applicable as wind speed measured to be above 3m/s									
Source:		EMM (2014c) - Table 3									

**Table 12
Noise Monitoring Results – 11 November 2014**

Location	Scenario	Time (hrs)	Attended Noise Monitoring Results (dB(A))				Criteria dB(A)	Met conditions ¹		Comments	
			Total measured					Site Contribution	Wind Speed		Wind Direction
			Leq	Lmax	L90	C-A		Leq	(m/s)		(degrees)
N1	1	8:41	37	63	32	18.2	30	43	3.9 ³	73	Site noise just audible including crushing circuit, FEL and haul truck when ambient levels are low at 33 dB(A). Traffic on Mitchell Highway and birds constant.
	1	9:55	38	53	34	20.2	Inaudible	43	3.0	79	Site noise inaudible. Traffic on Mitchell Highway constant. Birds and insects also constant. Nearby workers not associated with quarry.
N2	1	9:13	37	57	32	20.9	35 ²	50	3.7 ³	60	Site noise just audible when ambient low including crushing circuit 30 dB(A) SPL and up to 34 dB(A). Traffic on Mitchell Highway and birds constant.
	1	9:32	34	48	31	21.5	<35 ²	50	3.2 ³	84	Site noise audible when ambient low including crushing circuit constant <30 dB(A) and up to 32 dB(A). Traffic on Mitchell Highway and birds constant.
<p>Notes: 1 Meteorological data was recorded by the East Guyong Quarry site's weather station located near location N1</p> <p>Note: 2 A penalty factor of 5dB has been applied to these results to account for the low frequency component. This is applied when 'C' weighted noise minus 'A' weighted noise is greater than 15dB in accordance with the Industrial Noise Policy</p> <p>Note: 3 Noise limits not applicable as wind speed measured to be above 3m/s</p> <p>Source: EMM (2014d) - Table 3</p>											



3.6 BLASTING

3.6.1 Public Notices, Property Inspections and Property Investigations

Condition 3(15) of PA06_0193 requires the Company to:

- operate a blasting hotline and advertise the hotline number in a local newspaper at least twice a year, or operate an alternate system agreed to by the Director-General, to enable the public to get up-to-date information on the blasting schedule;
- publish an up-to-date blasting schedule on its website; and
- notify the landowner/occupier of any residence within 2 kilometres of the site about the blasting schedule, blasting hotline and its website,

The blasting hotline (02 6368 7130) was advertised in the public notice section of the *Bathurst Advocate* and *Central Western Daily* (Orange) on 12 February 2014 and 16 October 2014. In addition, blasting schedules for the coming month are published on the quarry website each month. Finally, the Company provides written notification of planned blasts to all residents within 2km of the Site prior to each blast.

3.6.2 Predicted Impacts and Performance Criteria

Table 13 identifies predicted blasting-related impacts at surrounding residences (**Figure 6**). **Table 14** presents the airblast overpressure and ground vibration performance criteria identified in Conditions 3(8) and 3(9) of PA06_0193.

In order to minimise inconvenience for surrounding residents, the *Blast Management Plan* identifies three blast monitoring locations within land owned by the Company, with a fourth located adjacent to the access road for the “Fairview” residence (**Figure 5**).

Table 13
Predicted Levels of Blast Emissions

Residence	Distance from Closest Blasting	Ground Vibration (mm/s)	Airblast Overpressure (dB Linear)
“Cadora Vale”	750m – 340m	1.1 – 4.0 mm/s	111 – 119 dB Linear
“Hartley Cottage”	1 250m – 810m	0.5 – 1.0 mm/s	106 – 110 dB Linear
“Fairview”	1 480m – 920m	0.4 – 0.8 mm/s	104 – 109 dB Linear
“Lilactime”	2 025m – 1 720m	0.2 – 0.3 mm/s	101 - 103 dB Linear

Source: Heggies (2007a) Modified Table 18

Table 14
Blasting-related Performance Criteria

Allowable exceedance	Airblast overpressure level (dB(Lin Peak))	Peak particle velocity (mm/s)
5% of the total number of blasts in a 12 month period	115	5
0% of the total number of blasts in a 12 month period	120	10

In addition to the above criteria, Conditions 3(10) and 3(11) of PA06_0193 permit blasting between 9:00am and 3:00pm, Monday to Friday. No blasting is permitted on Saturdays, Sundays or Public Holidays. In addition, the Company may initiate up to:

- two blasts per day; and
- five blasts per week, averaged over a calendar year.

3.6.3 Measured Performance

Three blasts were initiated during the Reporting Period, on 16 April, 23 July and 23 October 2014 as described in Section 2.3.1. **Table 15** presents the results of blast monitoring during the Reporting Period.

Table 15
Blast Monitoring Results

Date	Time	MIC (kg)	B1		B2		B3		B4	
			Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)
Criterion	95%/yr		5	115	5	115	5	115	5	115
	100%		10	120	10	120	10	120	10	120
16/04/2014	12:40pm	112	2.08	105.6	1.21	116.1	0.72	106.3	0.71	104.2
23/07/2014	1:15pm	119	3.46	89.6	1.28	107.9	0.73	108.1	0.95	86.3
23/10/2014	12:14pm	125	3.15	99.5	4.95	109.0	2.69	107.0	1.38	110.0
Source: Hanson Construction Materials Pty Ltd										

3.6.4 Discussion and Analysis

It is noted that air blast overpressure recorded at location B1 following the blast on 16 April 2014 exceeded the allowable exceedance of 115dB by 1dB. The criteria displayed in **Table 14** requires that airblast overpressure of 115dB is not exceeded for 5% of the total number of blasts in a 12 month period.

EMGA Mitchell McLennan Pty Limited (EMM) reviewed the blast monitoring results from this date in their report dated 18 July 2014 (**Appendix 3**). EMM noted that monitoring location B2 is located within the Quarry Site. As a result EMM applied desktop calculations, taking into account the additional distance between monitoring location B2 and the Hartley Cottage, and identified that the airblast overpressure level at the residence would have been 114.4 dB (Linear

Peak). EMM concluded that this blast would satisfy the criteria at this residence. It is noted that the modified blast record remains above the predicted airblast overpressure provided in Table 13. Blast monitoring results, throughout the remainder of the Reporting Period, were within both the criteria level and predicted levels at this location.

To ensure compliance was achieved for future blast events, the Company tested the blast monitoring equipment by placing a second monitor next to the monitor at this monitoring location for the next blasting event (23 July 2014). Both monitors were placed correctly and readings were within the criteria levels. The Company has since provided additional on-site training for staff involved in placement and recording of blast monitoring to ensure future compliance.

It is therefore concluded that blasting performance criteria were achieved for all three blasts during the Reporting Period at locations B1, B2, B3 and B4.

3.7 AIR QUALITY

3.7.1 Predicted Impacts and Performance Criteria

Table 16 presents the predicted cumulative air quality impacts at the closest potentially affected residences to the Quarry (**Figure 6**). **Tables 17** and **18** present the air quality performance criteria presented in Condition 3(18) of PA06_0193.

3.7.2 Measured Performance

3.7.2.1 Total Suspended Particulate Matter

Section 11 of the approved Air Quality Monitoring Program (AQMP) dated February 2013 establishes the procedures to be implemented at the Quarry to satisfy Condition 3(20) of PA06_0193 regarding air quality monitoring. Section 11.3 of the AQMP states:

*There are established relationships between PM_{10} and TSP for extractive industries whereby if the PM_{10} long-term impact assessment criterion is satisfied the TSP criterion can also be expected to be satisfied. In view of this, PM_{10} monitoring is proposed as a surrogate for demonstration of compliance with the TSP criterion in **Table 8**, and thus no TSP monitoring is to be undertaken.*

The AQMP was prepared and submitted to DPE in February 2013. In accordance with this program, no monitoring of TSP is undertaken at the Quarry with compliance demonstrated through established compliance with the long-term criteria for PM_{10} (see Section 3.7.2.3 below).

Table 16
Predicted Cumulative Air Quality Impacts – Stages 1, 3 and 7

Receptor ¹	Stage	Cumulative Depositional Dust annual average (g/m ² /month) ²	Cumulative PM ₁₀ 24-hour average (µg/m ³) ³	Cumulative PM ₁₀ annual average (µg/m ³) ⁴
Performance Criteria		4.0	50	30
"R1"	1	1.7	39	15
	3	1.8	40	15
	7	1.8	39	15
"Hartley Cottage"	1	1.9	43	15
	3	2.1	44	16
	7	2.0	44	16
"Quinton"	1	1.7	39	15
	3	1.7	39	15
	7	1.7	39	15
"Lilactime"	1	1.7	40	15
	3	1.7	42	15
	7	1.7	40	15
"Fairview"	1	1.7	39	15
	3	1.8	39	15
	7	1.8	42	16
"Cadira Vale"	1	1.7	39	15
	3	1.7	39	15
	7	1.7	39	15
Note: 1 See Figure 6 for location				
Note: 2 Total includes ambient air quality level of 1.6g/m ² /month plus predicted contribution by the Quarry				
Note: 3 Total includes varied ambient air quality levels plus predicted contribution by the Quarry				
Note: 4 Total includes ambient air quality level of 13µg/m ³				
Sources: Heggies (2007b) - Modified from Tables 8, 9, 10				

Table 17
Air Quality-related Performance Criteria – Suspended Particulates

Pollutant	Averaging period	Criterion	Basis
Total suspended particulate (TSP) matter	Annual	90µg/m ³	Total
Particulate matter < 10 µm (PM ₁₀)	Annual	30µg/m ³	Total
Particulate matter < 10 µm (PM ₁₀)	24 hour	50µg/m ³	Total

Table 18
Air Quality-related Performance Criteria – Deposited Dust

Pollutant	Averaging period	Maximum increase ² in deposited dust level	Maximum total ¹ deposited dust level
Deposited dust	Annual	2g/m ² /month	4g/m ² /month

3.7.2.2 Deposited Dust

Deposited dust monitoring commenced at monitoring locations DG1, DG2 and DG3 on 27 February 2013 and continued on a monthly basis during the Reporting Period. The locations of the deposited dust monitoring locations are shown on **Figure 5**. **Table 19** presents the results of the deposited dust monitoring program since the commencement of monitoring operations.

Table 19
Measured Performance – Deposited Dust¹

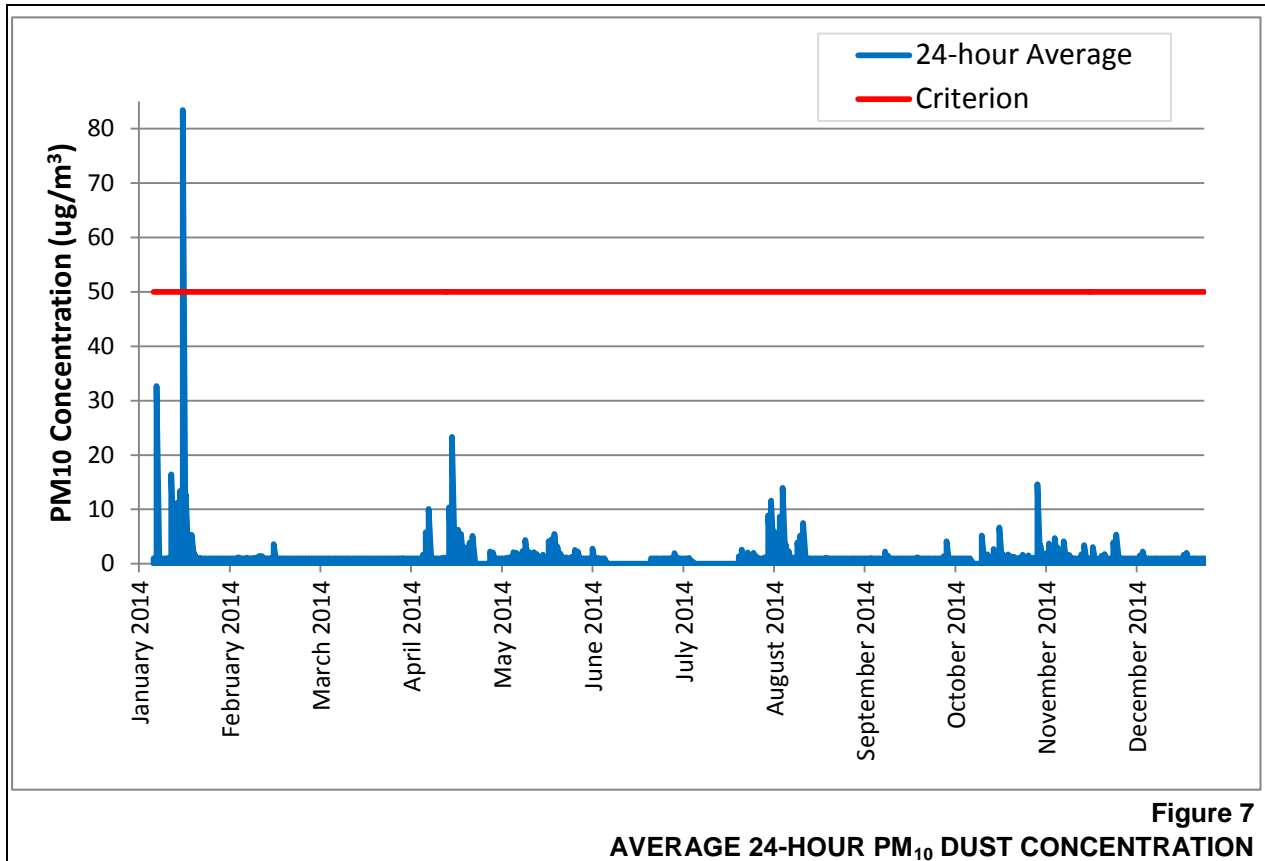
Start Date	End Date	DG1	DG2	DG3	Criterion ²
20/12/2013	21/01/2014	0.2	2.8	2.1	4.0
21/01/2014	24/02/2014	1.0	1.1	2.3	4.0
24/02/2014	26/03/2014	0.7	0.9	2.1	4.0
26/03/2014	23/04/2014	0.8	0.2	1.3	4.0
23/04/2014	25/05/2014	0.2	5.8	3.8	4.0
25/05/2014	25/06/2014	0.1	0.1	0.5	4.0
25/06/2014	25/07/2014	0.3	0.5	0.4	4.0
25/07/2014	25/08/2014	0.5	4.9	16.4	4.0
25/08/2014	25/09/2014	0.6	0.2	6.7	4.0
25/09/2014	27/10/2014	1.2	0.6	1.9	4.0
27/10/2014	27/11/2014	0.7	4.3	2.0	4.0
27/11/2014	26/12/2014	0.7	1.2	0.7	4.0
Annual Average		0.6	1.9	3.4	4.0
Note 1:	Units – g/m ² /month				
Note 2:	Averaged over a 12 month period				
Source:	Hanson Construction Materials Pty Ltd				

Deposited dust monitoring results indicate that average annual rates of dust deposition in the vicinity of the Site remain below the criterion levels at each location. The majority of recorded samples varied between 0.1g/m²/month and 2.8g/m²/month with five instances where the monthly result was higher than the criterion level. In addition, one of these samples, DG3 sampled in August 2014, was significantly elevated.

The Company is not aware of any on-site activity that may have caused this increase. It is noted that no complaints were received during the Reporting Period regarding dust emissions and the remaining records for October, November and December at monitoring location DG3 were all much lower than those recorded during August and September (see **Table 19**). Due to the significantly lower results at all locations during the remainder of the year, the Company considers that these results were the result of external factors and possible contamination and not caused by on-site activities. The Company proposes to include field sampling conditions in notes taken for all deposited dust monitoring in the future to ensure that all possible sources of contamination and relevant environmental conditions are noted with sampling records.

3.7.2.3 PM₁₀ Concentration

The concentration of PM₁₀, namely that component of suspended particulates with an aerodynamic diameter of 10µm or less, commenced at monitoring location PM1 on 24 January 2012 using a DustTrac PM₁₀ monitor (**Figure 5**). **Figure 7** presents the results of the PM₁₀ dust monitoring during the Reporting Period.



Adverse weather conditions at the end of December 2013 and early 2014 resulted in problems with the DustTrac PM₁₀ monitor and meant that PM₁₀ monitoring results are not available for the period from 28 December 2013 to 6 January 2014. This period coincided with the Christmas closure of the Quarry and no staff were available to check the status of the monitor. As a result, the excluded period commences during the holiday and was not rectified until staff returned on 6 January 2014.

The average 24-hour PM₁₀ concentrations in the vicinity of the Site during the Reporting Period were typically less than the criterion of 50µg/m³, with the exception of one instance on 16 January 2014 where the monitor registered 83µg/m³ of particulate matter. Quarry staff recorded that this day was the first day of return work after the Christmas holiday period and that no significant construction, blasting or crushing activities took place. It is noted that during that period smoke from a bush fire in the vicinity of Girribung Creek within Wollemi National Park had spread smoke in the vicinity of the Quarry Site. Other peaks in particulate matter during the Reporting Period coincided with bushfire events in the vicinity, although particulate matter levels did not approach the criteria levels in these instances.

3.8 SURFACE WATER

3.8.1 Predicted Impacts and Performance Criteria

The Infrastructure Area and Site Access Road are located in a section of the Quarry Site that drains to the north and east, with surface water from disturbed sections of the Site reporting to the existing Dam D2 (see **Figure 2**) within the Asbestos Exclusion Zone, before flowing off Site via the licenced discharge point W1 (**Figure 5**).

Condition L2.5 of the Quarry's Environment Protection Licence 20190 requires that water discharged from licenced discharge point W1 complies with the following water quality performance criteria.

- Total Suspended Solids – 50mg/L.
- Oil and Grease – 10mg/L.
- pH – between 6.5 and 8.5.

The *Soil and Water Management Plan* indicates that monitoring would be undertaken monthly during discharge.

In addition, Section 8.10 of the *Soil and Water Management Plan* identifies that the following data will be recorded in this *Annual Review*.

- Volume of water used for dust suppression purposes.
- Volume of water imported to Site.
- Specific measures implemented as part of the water use reduction program, and their effectiveness.

3.8.2 Measured Performance

The Company notes that Dam D2 did not discharge during the Reporting Period and, as a result, water from disturbed sections of the Site has not discharged from Site via licenced discharge point W1.

Table 20 presents the volumes of water used for dust suppression within the Site, as well as volume of water imported to Site during the Reporting Period.

Table 20
Volumes of Water Used during the Reporting Period

Description	Estimated Volume
Water Consumption for Dust Suppression	
Water Cart	5.4ML
Processing Operations	3.8ML
Water Imported to Site	
Water Imported	-

3.8.3 Discussion and Analysis

No specific water consumption reduction measures were implemented during the Reporting Period as total water use for both dust suppression and processing operations was well within the licenced allocation of 40ML per annum.

3.9 GROUND WATER

3.9.1 Predicted Impacts and Performance Criteria

Potential groundwater-related impacts associated with the approved Quarry include drawdown of the regional aquifer of approximately 0.6m as the Extraction Area is extended to its final depth. No significant impacts are anticipated to groundwater quality and flow or surrounding groundwater users or Groundwater Dependent Ecosystems.

Section 11.3 of the *Soil and Water Management Plan* identifies the following groundwater level performance criteria for surrounding, non-Quarry related bores.

- standing water level below 10th percentile measured level; or
- standing water level below intake during normal operation of the bore.

Section 11.4 of the *Soil and Water Management Plan* identifies the locations and frequency of groundwater quality monitoring to occur following commencement of extraction operations. Groundwater quality performance criteria are presented in **Table 21**.

Table 21
Groundwater Quality Performance Criteria

Parameter	Unit	Long-term Assessment Criteria	Initial Assessment Criteria ¹
pH value	pH	6.5-8.5	6.5-8.5
Electrical Conductivity	µS/cm	Greater than 90 th percentile groundwater quality as determined by ongoing groundwater quality monitoring	
Bicarbonate Alkalinity as CaCO ₃	mg/L		
Carbonate Alkalinity as CaCO ₃	mg/L		
Hydroxide Alkalinity as CaCO ₃	mg/L		
Total Alkalinity as CaCO ₃	mg/L		
Chloride	mg/L		
Sulphate	mg/L		
Calcium	mg/L		
Magnesium	mg/L		
Sodium	mg/L		
Potassium	mg/L		
Nitrate as N	mg/L		
Nitrite as N	mg/L		
Total Oxidized Nit. As N	mg/L		
Total Phosphorus as P	mg/L		
Arsenic	mg/L		
Manganese	mg/L		
Iron	mg/L		
Note 1: Applies until revised assessment criteria have been determined in consultation with relevant government agencies following receipt of initial 12 months of groundwater quality data			

3.9.2 Measured Performance

Figure 8 presents the results of monitoring of standing water levels within bore holes BH1 to BH5 (bore locations are provided on **Figure 5**). Monitoring was undertaken using automated data loggers which record standing water levels every six hours.

Groundwater quality monitoring commenced in March 2014 as development of the extraction area continued (see **Figure 3**). The Company undertook field-based groundwater quality samples quarterly during the Reporting Period. The results of the field groundwater quality monitoring are presented in **Table 22**. Laboratory analysis of the groundwater samples to measure the suite of analytes displayed in **Table 21** was completed in March 2014. The results of this analysis are provided in **Table 23**.

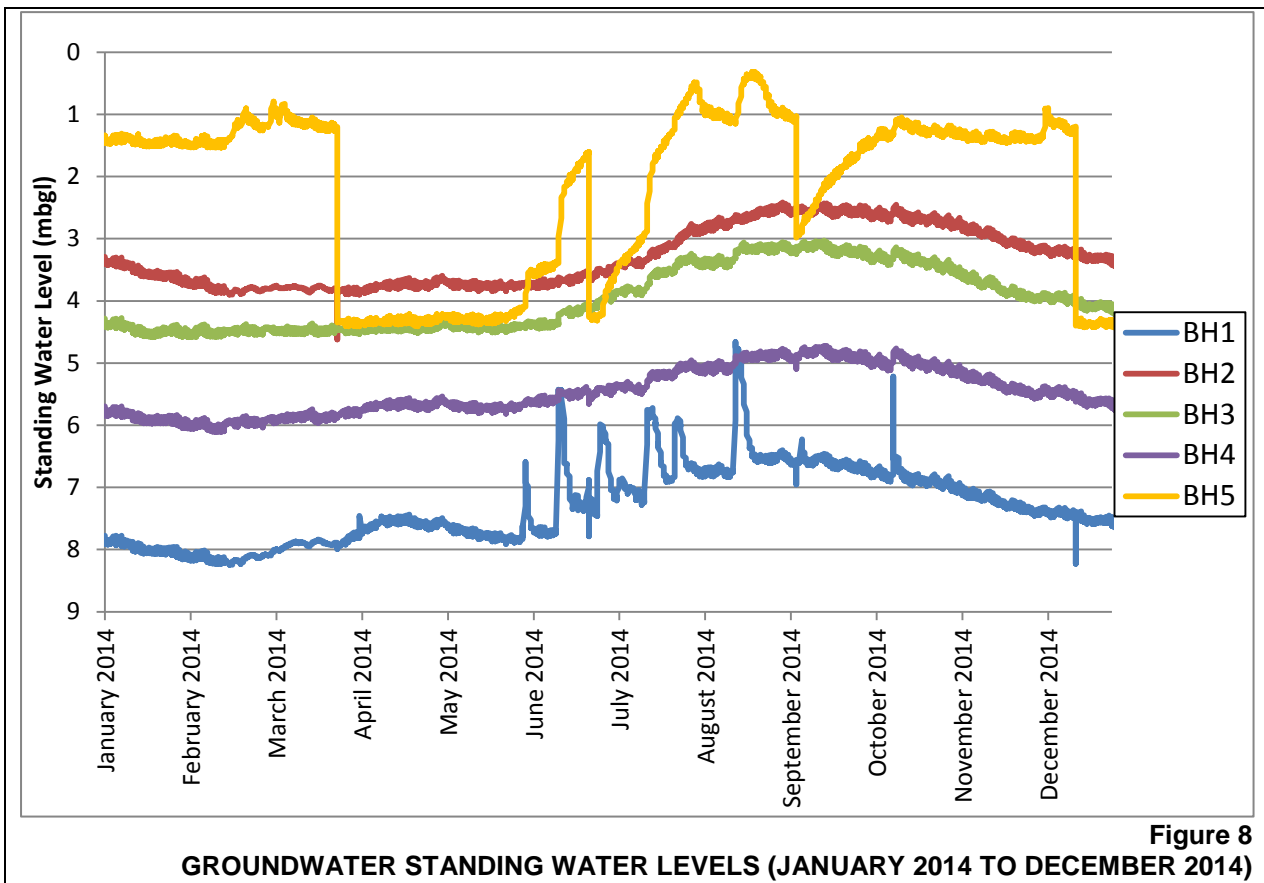


Table 22
Groundwater Quality Field Monitoring Results 2014

Bore/Analyte	Units	Criteria	March 2014	June 2014	September 2014	December 2014
BH1						
Temperature	°C	-	13.3	13.3	15.3	15.7
pH	-	6.5-8.5	7.86	7.64	6.88	7.47
Electrical Conductivity	µS/cm	-	774	273	308	389
BH2						
Temperature	°C	-	13.8	13.9	14.7	15.1
pH	-	6.5-8.5	7.76	7.40	7.68	6.69
Electrical Conductivity	µS/cm	-	922	810	668	757
BH3						
Temperature	°C	-	13.0	13.8	15.1	15.2
pH	-	6.5-8.5	8.00	6.80	7.45	7.26
Electrical Conductivity	µS/cm	-	922	840	852	852
BH4						
Temperature	°C	-	13.7	14.0	15.0	15.4
pH	-	6.5-8.5	7.42	7.57	7.74	7.28
Electrical Conductivity	µS/cm	-	531	459	439	464
BH5						
Temperature	°C	-	14.6	13.7	13.0	15.9
pH	-	6.5-8.5	8.49	7.59	7.66	7.58
Electrical Conductivity	µS/cm	-	745	548	414	455
Source: Hanson Construction Materials Pty Ltd						

Table 23
Groundwater Quality Laboratory Assessed Results March 2014

Analyte	Units	Monitoring Bore				
		BH1	BH2	BH3	BH4	BH5
pH	pH units	7.55	7.84	7.86	7.34	7.94
Electrical Conductivity	µS/cm	581	646	707	385	546
Hydroxide Alkalinity	mgCaCO ₃ /L	<1	<1	<1	<1	<1
Carbonate Alkalinity	mgCaCO ₃ /L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity	mgCaCO ₃ /L	220	295	315	178	247
Total Alkalinity	mgCaCO ₃ /L	220	295	315	178	247
Sulfate	mg/L	2	3	3	1	4
Chloride	mg/L	39	9	12	7	7
Calcium	mg/L	34	33	38	23	21
Magnesium	mg/L	31	60	51	26	15
Sodium	mg/L	47	19	28	18	77
Potassium	mg/L	4	5	25	2	8
Arsenic	mg/L	<0.001	0.066	0.003	<0.001	0.002
Manganese	mg/L	0.406	0.006	0.006	0.151	0.140
Iron	mg/L	0.29	<0.05	<0.05	<0.05	<0.05
Ammonia (as N)	mgN/L	0.30	0.02	0.02	0.04	0.04
Nitrite (as N)	mgN/L	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate (as N)	mgN/L	0.02	4.53	4.89	0.10	0.09
Nitrite + Nitrate (as N)	mgN/L	0.02	4.53	4.89	0.10	0.09
Total Kjeldahl Nitrogen (as N)	mgN/L	2.3	0.5	0.5	0.3	0.6
Total Nitrogen (as N)	mgN/L	2.3	5.0	5.4	0.4	0.7
Total Phosphorus (as P)	mgP/L	0.85	0.13	0.50	0.30	0.41
Total Anions	meq/L	6.22	7.35	7.68	4.23	5.69
Total Cations	meq/L	6.39	7.54	7.95	4.12	5.84
Ionic Balance	%	1.40	1.29	1.76	1.29	1.24

3.9.3 Discussion and Analysis

Standing Water Levels

The monitoring data presented on **Figure 8** indicate that, with the exception of bore BH5, standing water levels within each of the monitored bores fluctuated over the Reporting Period by approximately 1m to 2m. The rate and timing of fluctuation was similar for all bores, and was consistent with recorded rainfall, particularly considering the significant levels of rainfall experienced in June 2014 (see Section 3.3).

Short term fluctuations in the standing water levels within BH1 were recorded between June and October 2014. Upon closer inspection of daily rainfall during this period these 'spikes' in standing water levels occurred on days of heavy rainfall and are consistent with surface water flow into the bore hole. The Company is investigating the cause of this inflow of surface water and will undertake any remedial action necessary to ensure this does not continue.

Standing water levels in bore hole BH5 varied significantly with records in some cases fluctuating by up to 3m over a short period of time. Upon closer investigation of the results it was determined that the decrease in standing water level occurred on days when ground water monitoring was undertaken. Groundwater monitoring involved the sampling of water pumped from the bore. Hydraulic testing of this bore for the original *Environmental Assessment* (Hanson, 2009) indicated a permeability of less than 0.0001 m/day. The yield of bore BH5 was assessed to be significantly lower than the remaining four monitoring bores as a result of weathering in the vicinity of these bores and the nature of the basalt surrounding bore BH5. Therefore the Company considers that the fluctuations in groundwater levels at this bore are the result of water within the bore being removed for sampling and very slowly returning to an equilibrium level.

The Company notes that all ground-disturbing activities were well above the regional water table during the Reporting Period. As a result, the Company contends that the fluctuations in groundwater levels are wholly attributable to natural causes.

Groundwater Quality

The results of both field testing and laboratory analysis of groundwater samples indicates that records of pH within the monitoring bores was within the nominated range of 6.5 to 8.5 for all records. As this is the first year of monitoring of groundwater quality it is too soon to establish a 90th percentile level as the relevant performance criteria.

It is anticipated that the long term groundwater quality criteria would be established in consultation with the Department of Planning and Environment and NSW Office of Water during the next Reporting Period now that the first 12 months of sampling has been completed.

3.10 HERITAGE

The Aboriginal heritage assessment for the Quarry identified no objects of Aboriginal or non-Aboriginal heritage significance within the Site. Notwithstanding this, Section 8.3 of the *Aboriginal Cultural Heritage Management Plan* identifies that on the first day of ground disturbance within the Infrastructure or Extraction Areas, a sites officer (as agreed by the Aboriginal community) will be commissioned to inspect the ground disturbance. The Company

invited the Orange Local Aboriginal Land Council to inspect the Infrastructure Area in writing on 28 May 2013. A copy that letter was presented with the *2012/2013 Annual Review*. No response to either the letter or phone call was received.

The measures identified in Section 8 of the *Aboriginal Cultural Heritage Management Plan* were implemented during the Reporting Period and no items of suspected Aboriginal heritage significance were identified.

3.11 TRAFFIC AND TRANSPORT

Construction of the intersection of the Site Access Road and Mitchell Highway was completed on 26 April 2013 with final sealing of the Site Access Road completed in early 2014.

Transportation activities during the Reporting Period occurred during the approved hours of operation (Section 2.6). It is also noted that an extension to the approved hours for product despatch is approved subject to a negotiated agreement being reached with surrounding landowners. No agreement has been made to date and product despatch remains within the approved operational hours.

3.12 VISUAL

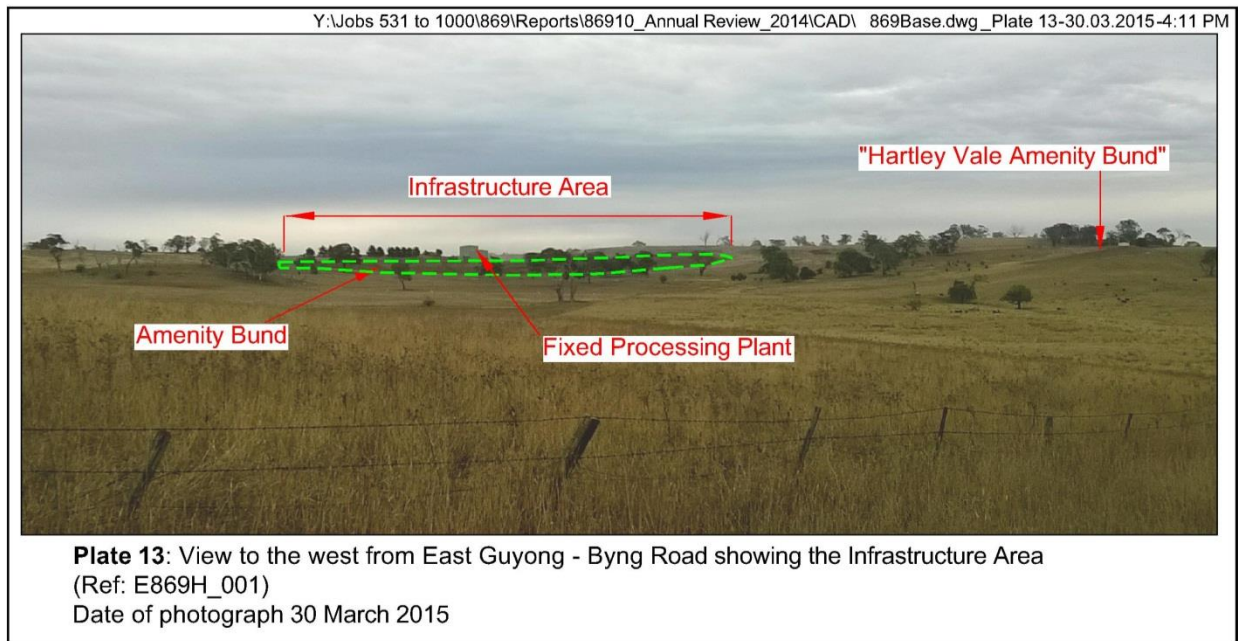
Operations with the potential to adversely impact visual amenity during the Reporting Period included earthmoving and construction activities within the Infrastructure Area and along the Site Access Road and drill and blasting operations within the Extraction Area. The most significant change was the final construction of the Fixed Processing Plant that will remain the most visible feature of the Quarry.

The Company implemented the following management measures during the Reporting Period to minimise visual amenity impacts associated with its operations (**Figure 3**).

- Completion of construction of the amenity bunds to the north and south of the Infrastructure Area to complement the existing amenity bund on to the east of the Infrastructure Area.
- Completion of construction of a temporary amenity bund to the south of the extraction area.
- Completion of construction of the amenity bunds to the north and north east of the Quarry Site.
- Partial construction of an amenity bund to the south of the Extraction Area.
- Revegetation of the outer faces of some of the amenity bunds. It is noted that this program met with mixed success and some areas will be repeated during the next Reporting Period, should weather conditions allow this.

Plate 13 presents a view from the East Guyong – Byng Road showing the completed visual amenity bund east of the Infrastructure Area. The Company notes that the bund, once revegetated will screen the majority of the Infrastructure Area from views to the east.

Vegetation to be established on the upper sections of the batter in the northwest section of the Infrastructure Area will soften the visual impact of that section of the Site.



3.13 WASTE MANAGEMENT

Waste generation during the Reporting Period was negligible, with general waste placed within skip bins that are serviced monthly by a licenced waste contractor. Liquid wastes, principally waste hydrocarbons generated during equipment servicing, were removed from the Quarry Site on the day they were generated. Finally, construction of the approved office and weighbridge was completed during the Reporting Period including ablutions facilities and a septic system.

3.14 EMERGENCY AND HAZARDS

Diesel delivered to the Site was delivered in bulk by a diesel supplier and stored in a self-bunded diesel tank. Refuelling was undertaken within the Infrastructure Area. Spill kits were available in the site offices and no significant hydrocarbon spills were reported during the Reporting Period.

Explosives used during the Reporting Period were transported to Site by the blasting contractor on the day of the blast.

No significant safety hazards occurred during the Reporting Period.

3.15 BUSHFIRE

Management of bushfire hazards is provided through the *Bushfire Management Plan* which was previously prepared as a sub-section of a *Crisis Management Plan*. That plan outlines procedures to be implemented in the event of a bushfire within or surrounding the Site. The

Bushfire Management Plan and *Crisis Management Plan* will be reviewed and updated as necessary.

During the Reporting Period, the Company maintained fire extinguishers within all offices and on all mobile plant. In addition, the Company and construction contractors each maintain separate water carts with fire-fighting capability within the Quarry.

No fires occurred within the Site during the Reporting Period.

4. ENVIRONMENTAL MANAGEMENT DURING THE NEXT REPORT PERIOD

In addition to the environmental management measures identified in the various environmental management plans, the Company proposes to implement the following environmental management measures during the next Reporting Period (**Figure 4**).

- Complete partially constructed amenity bunds and continue constructing additional bunds as indicated on **Figure 4**.
- Re-establish vegetation where previous revegetation programs have failed. The revegetation programs are likely to be implemented in late winter to early spring.
- Monitor and maintain the surface water controls within the Site.
- Complete installation of fences within the Site.
- Decommission farm dams D1, D3, D4 and D5 (**Figure 4**) as necessary.
- Continue to utilise temporary amenity bunds within the Extraction Area until extraction operations have progressed sufficiently that the operations are not visible from surrounding residences or publicly accessible vantage points.
- Continue to refine blasting and blast monitoring procedures.
- Implement a trial to determine the most effective flocculation methodology to ensure that sediment-laden water may be treated effectively prior to discharge.
- Establish long term assessment criteria for groundwater quality in consultation with the Department of Planning and Environment and the NSW Office of Water.

5. REFERENCES

EMM (2014a). *East Guyong Quarry Noise Monitoring Report.* March 2014.

EMM (2014b). *East Guyong Quarry Noise Monitoring Report.* June 2014.

EMM (2014c). *East Guyong Quarry Noise Monitoring Report.* September 2014.

EMM (2014d). *East Guyong Quarry Noise Monitoring Report.* November 2014.

Hanson (2009). *Environmental Assessment Report, East Guyong Quarry NSW.* September 2009.

Heggies (2007a). *Operational and Transportation Noise and Blasting Impact Assessment,* prepared to accompany the application for Project Approval.

Heggies (2007b). *Air Quality Impact Assessment,* prepared to accompany the application for Project Approval.

RW Corkery & Co Pty Limited (RWC) (2013). *Noise Management Plan (incorporating a Traffic Noise Management Plan) for the East Guyong Quarry – February 2013.*