3. ISSUE IDENTIFICATION AND PRIORITISATION

3.1 INTRODUCTION

In order to undertake a comprehensive *Environmental Assessment* of the Proposal, appropriate emphasis needs to be placed on those issues likely to be of greatest significance to the local environment, neighbouring landowners and the wider community.

Issue identification was completed through a combination of the following methods.

- Targeted community and government consultation in order to identify environmental issues of concern or relevance.
- A review of environmental planning documentation in order to identify relevant environmental constraints and/or issues.
- A review of the environmental performance at the Mine in order to identify those aspects of the environment that are, have been or are likely to be affected by mining operations.
- The experience of Mine personnel and the authors of this *Environmental Assessment* in relation to the likely impacts.

Section 3.2 provides the results of the issue identification.

On identification of those environmental issues that could be affected by the Proposal, an analysis of the potential for impact on each of these has been undertaken in order to identify the priority and scale of assessment required (see Section 3.3).

3.2 ISSUE IDENTIFICATION

3.2.1 Consultation

3.2.1.1 Community Consultation

The 2010 *Environmental Assessment* for the Werris Creek Coal Mine LOM Project (RWC, 2010) documents the comprehensive community consultation program undertaken prior to the continuation of operations at the Mine to identify the issues of greatest concern to the local community. Issues associated with noise, blasting, air quality, visual amenity (including lighting) and affects on transport infrastructure (road and rail) were common issues raised and identified as part of that consultation. It is notable that a number of respondents to consultation either noted no issues with the Mine or referred to the positive benefits of the operations.

Werris Creek Community Consultative Committee

The Proponent maintains an ongoing dialogue with the local community. A Community Consultative Committee (CCC) has been established and meets quarterly. The function of the CCC is to provide a forum for the Proponent to inform the local community of ongoing or notable operations and provide the local community an opportunity to raise issues of concern or relevance. The most notable issues raised are generally in relation to Mine noise, blasting, groundwater and dust emissions.

The Proposal was raised at the September 2014 CCC Meeting, however, no specific issues were raised. It is noted that at the September 2014 CCC Meeting, the potential for water currently evaporated at the Mine to be returned to Quipolly Creek.

At the most recent CCC Meeting (26 February 2015), a motion was carried by the CCC to support the Proponent's application to use void water for beneficial agricultural purposes.

Werris Creek Community Meetings

The Proponent also hosts 6 monthly meetings with the community, with attendance open to any interested parties. Issues related to noise, blasting and dust emissions are regularly raised.

The most recent community meeting was held on 17 September 2014 where the Proposal was identified. No specific issues were raised, however, the Proponent is aware of the communities general concerns over noise, blasting and dust emissions.

Werris Creek Coal Mine Open Inspection

The Proponent is conscious of maintaining transparency over operations with the local community. With this in mind, an inspection of the Mine, in the form of a bus tour, was held on 11 October 2014. A general overview of the operations was provided and an opportunity given to those attending to ask questions about operations and performance. The Proposal was identified during the inspection, however, again no specific issues were raised.

Other Community Consultation

The Proponent regularly corresponds with, either by email, phone or face to face, local land owners and others in the Werris Creek community. As noted in Section 2.9, a large proportion of the Mine workforce reside locally and socialise within the Werris Creek area. As would be expected, a variety of views and opinions of the Mine and its impact and performance are held and expressed to those who work at the Mine (formally and informally). As is the case with the more formal consultation channels, the primary issues of concern relate to noise, blasting and dust, however, equally the overall benefits of the Mine to the local economy, services and facilities is recognised and noted.

3.2.1.2 Government Agency Consultation

Following discussions with NSW Department of Planning and Environment, it was determined that a formal request for *Secretary Environmental Assessment Requirements* (SEAR's) was not required for the Proposal.

On the basis of the modifications proposed, the government agencies and public authorities identified as having a role in the assessment of the Proposal are as follows.

- Liverpool Plains Shire Council.
- Environment Protection Authority.
- Department of Primary Industries (NSW Office of Water).
- Division of Resources and Energy (within the Department of Trade & Investment, Regional Infrastructure & Services).

Given the longevity of operations at the Mine and regular correspondence with these government agencies, it was not deemed necessary to request formal assessment requirements from each. Rather, following the completion of preliminary assessments relevant to the regulatory role of each agency the Applicant contacted each to confirm the area and scale of assessment was satisfactory. Responses received from the agencies or authorities consulted are summarised as follows.

Liverpool Plains Shire Council

When contacted, the Council queried whether an additional road traffic assessment was warranted. As discussed in Section 4.2.5, reliance has been placed on the road noise traffic assessment completed in 2010 (Spectrum, 2010) given the number of truck movements would not increase and remain within the day time period for road noise assessment (7:00am to 10:00pm).

Environment Protection Authority

The EPA has requested consideration be given to the salt balance for the proposed irrigation. The modelling included in the Void Water Irrigation Assessment (refer to **Appendix 5**) and summarised in Section 4.6 uses an EPA endorsed model and provides sufficient information to satisfy this request. It is further noted that the EPA is responsible for the regulation of pollution under the Protection of the Environment Operations Act 1995 and accordingly, this Environmental Assessment considers noise emissions, emissions to air and discharge of water to land.

NSW Office of Water

NOW indicated a four to five week timeframe to respond. Given there is no additional impact proposed on groundwater resources and very minimal changes to the management of surface water, the involvement of NOW is considered likely to be minor.

Division of Resources and Energy

The DRE noted the standard of rehabilitation at the Mine was generally good and would be unlikely to require detailed review. A review of the current overburden emplacement design of was requested to address the large upper 'plateau' feature and this is addressed in Section 2.11.2. Any changes to proposed rehabilitation would be considered primarily as part of a new Mining Operations Plan to be submitted to account for the minor modifications proposed.

3.2.2 Review of Planning Issues

3.2.2.1 Introduction

A number of State and regional planning instruments apply to the Proposal. These planning instruments were reviewed to identify environmental aspects requiring consideration in this document. This subsection provides a brief summary of each relevant planning instrument.

3.2.2.2 State Planning Issues

Application of Part 3A of the Environmental Planning and Assessment Act 1979

In accordance with transitional arrangements of Schedule 6A of the EP&A Act, Part 3A of the EP&A Act continues to apply to development approved under this part of the Act (NSW Department of Planning & Infrastructure, 2011).

Modification to a 'Part 3A Approval' is therefore made under Section 75W of the EP&A Act which is as follows.

> ***75W Modification of Minister's approval***
>
> *(1) In this section:*
>
> *Minister's approval means an approval to carry out a project under this Part, and includes an approval of a concept plan.*
>
> *Modification of approval means changing the terms of a Minister's approval, including:*
> *(a) revoking or varying a condition of the approval or imposing an additional condition of the approval, and*
>
> *(b) changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*
>
> *(2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
>
> *(3) The request for the Minister's approval is to be lodged with the Director- General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
>
> *(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.*

Mining SEPP

This SEPP was gazetted on 17 February 2007 in recognition of the importance to NSW of mining, petroleum production and extractive industries. The SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development as defined in NSW legislation.

Table 3.1 presents a summary of the matters that the Minister or his/her delegate may consider when assessing a modified Proposal (Part 3 – Clauses 12 to 17 of the SEPP) and a reference to the section(s) in this or the 2010 *Environmental Assessment* where each relevant element of the SEPP is or has been addressed.

Table 3.1
Application of the Mining SEPP

Relevant SEPP Clause	Description	Section	
		RWC (2010a)	This document
12: Compatibility with other land uses	Consideration is given to:		
	• the existing uses and approved uses of land in the vicinity of the development;	1.5.5	N/A
	• the potential impact on the preferred land uses (as considered by the consent authority) in the vicinity of the development; and	N/A	N/A
	• any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.	N/A	N/A
	The respective public benefits of the development and the existing, approved or preferred land uses are evaluated and compared.	4.11 & 5.2.3	5.3
	Measures proposed to avoid or minimise any incompatibility are considered.	NA	N/A
12AA: Significance of resource	Consideration is given to the significance of the resource that is the subject of the application, having regard to: • the economic benefits, both to the State and the region; and • the advice provided by the DG of DTIRIS as to the relative significance of the resource in comparison with other mineral resources across the State.	The application represents a modification to an approved State Significant Development. Significance of the resource has therefore already been confirmed.	
12AB: Non-discretionary development standards for mining	Consideration is given to development standards that, if complied with, prevents the consent authority from requiring more onerous standards for those matters	Noted	
13: Compatibility with mining, petroleum production or extractive industry	Consideration is given to whether the development is likely to have a significant impact on current or future mining, petroleum production or extractive industry and ways in which the development may be incompatible.	N/A	N/A
	Measures taken by the Proponent to avoid or minimise any incompatibility are considered.	N/A	N/A
	The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.	N/A	N/A
14: Natural resource and environmental management	Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure:		
	• impacts on significant water resources, including surface and groundwater resources, are avoided or minimised;	4.2, 4.7	4.5.3
	• impacts on threatened species and biodiversity are avoided or minimised; and	4.3	N/A
	• greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.	N/A	N/A

Table 3.1 (Cont'd)
Application of the Mining SEPP

Relevant SEPP Clause	Description	Section	
		RWC (2010a)	This document
15: Resource recovery	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	2.3.2 & 2.3.3	N/A
16: Transportation	The following transport related issued are considered.		
	• The transport of some or all of the materials from the site by means other than public road.	2.6	N/A
	• Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools.	2.6	N/A
	• The preparation of a code of conduct for the transport of materials on public roads.	N/A	N/A
17: Rehabilitation	The rehabilitation of the land affected by the development is considered including:		
	• the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;	N/A	**Figure 2.6**
	• the appropriate management of development generated waste;	N/A	N/A
	• remediation of any soil contaminated by the development; and	N/A	N/A
	• the steps to be taken to ensure that the state of the land does not jeopardize public safety, while being rehabilitated or at the completion of rehabilitation.	2.10	N/A

Note 1: This is a matter for the Department of Planning to determine N/A = Not Applicable

Infrastructure SEPP

The *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) identifies, amongst other things, the matters to be considered in the assessment of development adjacent to particular types of infrastructure.

The Proposal does not seek to amend any activities in the vicinity of the classes of infrastructure identified by the Infrastructure SEPP. As a result, the Infrastructure SEPP does not apply to this modification.

SEPP 33 – Hazardous and Offensive Development

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) identifies that hazardous and offensive industries, and potentially hazardous and offensive industries, relate to industries that, without the implementation of appropriate impact minimisation measures would, or potentially would, pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment.

The Proposal would not result in any modifications to the types, volumes, storage or use of hazardous or dangerous goods within the Mine Site. As a result, SEPP 33 is not relevant to this application.

SEPP 44 – Koala Habitat Protection

The former Parry and Quirindi Local Government Area's, which form the Liverpool Plains Shire Council local government area includes the Mine Site and is identified in Schedule 1 of *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44) as an area that could provide habitat for Koalas. As a result, the Minister is required to consider whether potential or core Koala habitat would be disturbed by the Proposal.

The Proposal would not result in disturbance of any additional areas of habitat suitable for Koala. As a result, the Applicant contends that no further assessment is required.

3.2.2.3 Regional and Local Planning Issues

Orana Regional Environmental Plan No 1 – Siding Spring

The Mine was originally included in the draft Orana Regional Environmental Plan (REP) No 1 – Siding Spring. The current boundary of the REP is defined as "*all land within the Shires of Coonabarabran, Coonamble and Gilgandra and the City of Dubbo, being part of the area declared on 14 April 1986*". The Mine Site is not situated within these areas and therefore the Orana Regional Environmental Plan No1 – Siding Spring is not relevant to this Project.

Liverpool Plains Local Environment Plan 2011

The Mine is located within the Liverpool Plains Local Government Area to which the *Liverpool Plains Local Environmental Plan (LEP) 2011* is relevant. The Mine Site is situated within the area defined as 'RU1 – Primary Production', to which 'open cut mining' is permissible with consent.

3.2.2.4 Environmental Performance

The Proponent maintains comprehensive records of the monitoring and management of emissions and discharges generated by the Mine. Furthermore, the Proponent records all complaints registered with the Mine's Environmental Officer or Manager and presents these in a report to the CCC each quarter. A complaints register is published monthly on the Whitehaven Coal Limited website, with a summary presented in the Mine's AEMR and Annual Return to the DRE and EPA respectively.

Over the life of the Mine, non-compliances against the noise criteria of EPL 12290 have been recorded and reported. Whilst noise non-compliances still occur on occasion, management of noise has improved over the life of the Mine, with noise attenuation of the mobile fleet especially significant in reducing noise non-compliances. Complaints have historically focussed on the following issues, in deceasing order of frequency.

- Blasting.
- Noise emissions.
- Dust emissions.

- Impacts on visual amenity (including lighting).
- Impacts on water resources.
- Other environmental impacts.

Each of these issues requires particular attention in this Environmental Assessment.

3.2.3 Summary

On the basis of the consultation undertaken, review of planning instruments and assessment of environmental performance, the environmental issues identified as requiring assessment are as follows.

- Noise.
- Air Quality (including greenhouse gases).
- Blasting.
- Visual Amenity.
- Water Resources (including erosion and sedimentation).
- Rehabilitation.
- Biodiversity.
- Transportation.
- Land Use.

The relative priority of each of these issues is considered in Section 3.3, with relevant assessment described and discussed in Section 4.

3.3 ISSUE PRIORITISATION AND COVERAGE

3.3.1 Introduction

For each of the environmental issues identified (refer to Section 3.2), an analysis of the possible impacts was undertaken to determine the specific assessment requirements and level of priority associated with each. This analysis was undertaken in conjunction with a review of the original *Environmental Assessment* for the LOM Project (RWC, 2010), to determine whether the Proposal would result in any material change to the impacts assessed originally (and therefore warrant further assessment).

3.3.2 Noise

It is noted that the Proposal would result in the introduction of a new source of noise emissions (Dry Separation Plant) and a change to the location of noises sources relative to surrounding receivers (Northern Extension of the 400m to 445m AHD section of the overburden emplacement). Considering the proximity of surrounding receivers to the Mine (see **Figure 3.1**), it is possible that the Proposal would result in a change to the noise level received at some or all of these receivers.

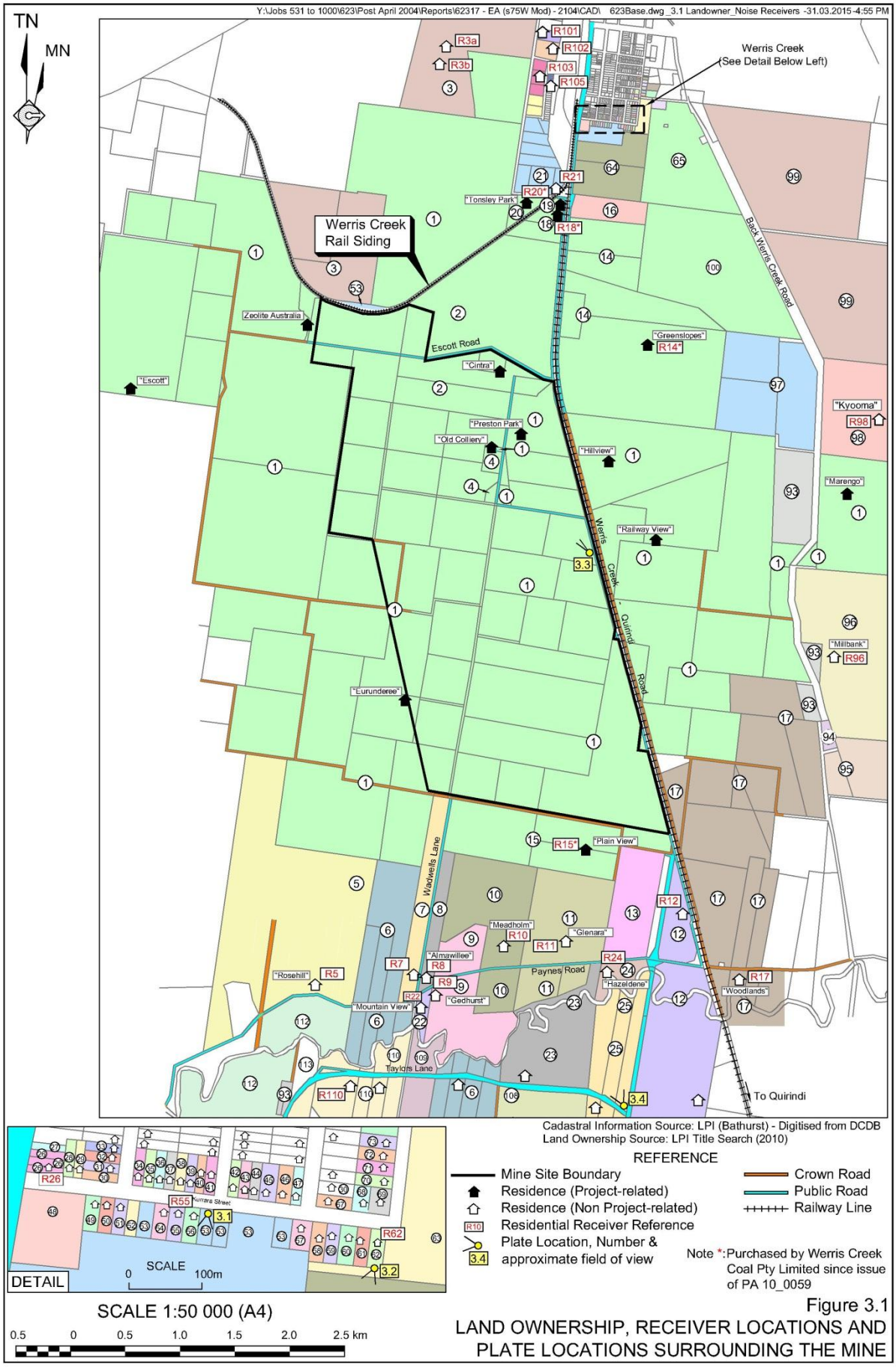

Figure 3.1
LAND OWNERSHIP, RECEIVER LOCATIONS AND PLATE LOCATIONS SURROUNDING THE MINE

An extension to the hours of operation of road transport is proposed which would result in some truck movements between the Mine Site and Gunnedah CHPP between 6:00pm and 10:00pm. While this remains within the nominated daytime period for road traffic noise, it could affect owners of land adjoining the principal transport route as a result of additional truck pass-by noise of an evening.

*On the basis of the completed issue identification and prioritisation, noise is considered to be a **high priority** issue with further assessment to include.*

- *the potential noise impacts associated with the new and relocated noise sources;*
- *the likely effectiveness of any additional mitigation measures or controls; and*
- *the effect of evening truck movements on road traffic noise.*

3.3.3 Air Quality

Similar to the assessment of possible noise impacts, the Proposal would introduce a new source of dust emissions (Dry Separation Plant) and change to the location of dust emitting activities relative to surrounding receivers (Northern Extension of the 400m to 445m AHD section of the overburden emplacement). Considering the proximity of surrounding receivers to the Mine (see **Figure 3.1**), it is possible that the Proposal would result in a change to the concentration of particulate matter (dust) received at some or all of these receivers.

*On the basis of the completed issue identification and prioritisation, air quality is considered to be a **high priority** issue with further assessment to include.*

- *the potential impacts associated with the new and relocated dust emitting activities; and*
- *the likely effectiveness of any additional mitigation measures or operational controls.*

3.3.4 Blasting

The Proposal would not result in any change to blasting operations at the Mine.

No further assessment is warranted.

3.3.5 Visual Amenity

The established or advancing overburden emplacement is currently visible from properties at the southern edge of Werris Creek (Kurrara Street), from Werris Creek Road and the rural properties to the east of the Mine, and properties to the south of the Mine (off Paynes Road and Taylors Lane) in the Quipolly locality. **Plates 3.1** to **3.4** provide the current views of the Mine from Werris Creek to the north, Werris Creak Road to the east and Quipolly to the south.

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Plate 3.1: View from Kurrara Street (Southern Werris Creek) adjoining Property 56 towards the Mine (Ref: 623H161214_443)

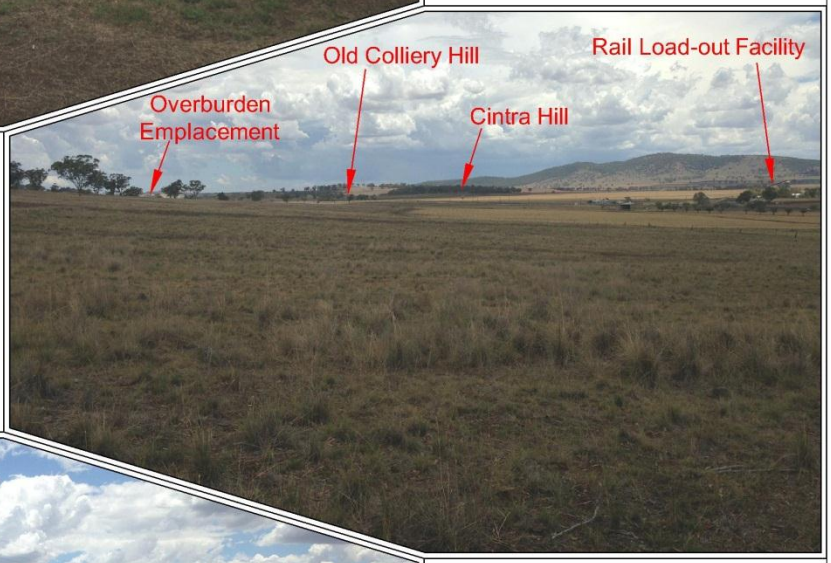


Plate 3.2: View from Kurrara Street (Southern Werris Creek) adjoining Property 62 towards the Mine (Ref: 623H161214_445)

Plate 3.3: View from Werris Creek Road (northbound) with the Mine to the West (Ref: 623H161214_442)

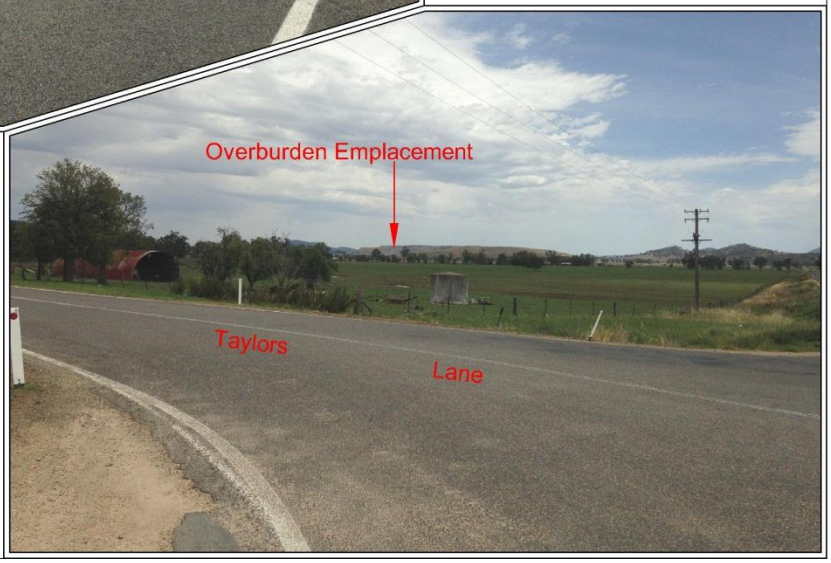


Plate 3.4: View from Quipolly Locality (corner Werris Creek Road and Taylors Lane) (Ref: 623H161214_554)

The plates, which identify key features of the Mine and surrounding topography, illustrate that the overburden emplacement is the most visible feature of the Mine. With respect to the effect of this feature on local visual amenity, the following is noted.

- The overburden emplacement has almost been completed to its full extent when viewed from the south. Progressive rehabilitation of the southern slopes of the overburden emplacement has reduced the visual intrusion of this feature from receivers to the south (see **Plate 3.4**). It is expected that by the end of 2016, the western portion of the overburden dump will be completed to its full extent with rehabilitation to grassy woodland close to completion (see **Figure 2.2**)
- The effectiveness of progressive rehabilitation on views of the Mine from Werris Creek Road is clearly evident. Not only does the overburden emplacement and Acoustic and Visual Amenity Bund screen mining and processing operations to the west, the established grass cover and developing overstorey (tree) component is itself a relatively unobtrusive landform.
- Views of the overburden emplacement when viewed from the southern edge of Werris Creek remains relatively distant. The completion of the Visual Amenity and Noise Bund in advance of overburden emplacement development will provide a visual screen of open cut mining operations as Old Colliery Hill is removed, however, it is acknowledged that the overburden emplacement will become more visible towards the end of mine life.

No other modifications to the Mine are proposed which would result in a change to the visual impact of the operation. It is noted, however, that the proposed and approved extension of the Product Coal Stockpile Area to the east of the Rail Load-out Facility, is now unlikely to proceed and as a result the view of this component of the Mine will remain unchanged.

*On the basis of the above, Visual Amenity is considered to be of **moderate priority** with further assessment to include interpretation of the likely change in the visual amenity, review of acceptability and consideration of further mitigation.*

3.3.6 Water Resources

3.3.6.1 Surface Water

The Mine currently operates in accordance with the Site Water Management Plan (SWMP). As the Proposal would result in changes to the area of disturbance on the Mine Site, this would likely result in a slight modification to the catchments considered in the design, construction and management of the various features of the SWMP, e.g. diversion drains, sediment basins.

Also relevant to surface water management of the Mine is the water balance assessment completed for the approved mining operations (refer to Section 2.5.3). This assessment concludes that under average to high rainfall conditions the quantity of void water will exceed the capacity of the existing void water dams requiring the water to be stored within the open cut. As a result, there is the potential that the additional storage of water within the open cut could compromise access to coal resources in the lower sections of the open cut.

*On the basis of the potential for current storage capacity within the void water management system to be exceeded, the management of surface water is considered to be of **moderate to high priority**. Identification of modified or additional surface water management controls is required (for incorporation into an updated SWMP for the Mine). An assessment of the proposed off-site irrigation to provide the void water storage requirements, and residual impacts on the land to which irrigation is proposed, is required.*

3.3.6.2 Groundwater

The Proposal would not result in any further impact on groundwater than previously assessed and approved. The management of groundwater seepage as a component of void water has been identified as an issue for surface water management and discussed in Section 3.3.6.1.

On the basis that the Proposal would not result in any changes to the mining operations likely to impact on groundwater, no further assessment is warranted.

3.3.7 Rehabilitation

As a result of the changes to the overburden emplacement and MIA Bund, the final landform would be slightly modified from that presented in the 2010 *Environmental Assessment* (RWC, 2011) and *Mining Operations Plan* (WCC, 2011). As discussed in Section 2.10, however, no changes to the proposed rehabilitation objectives and methods or anticipated final land use would result.

*On the basis of the above, rehabilitation is considered to be of **low to moderate priority**, with consideration and assessment completed in Section 2.10.*

3.3.8 Biodiversity

Figure 3.2 illustrates the extent of the proposed modified operations in relation to native vegetation mapped on the Mine Site and surrounds. No additional impacts on biodiversity are considered likely as a result of the Proposal[10] and no change to the Biodiversity Offset Strategy for the Mine required.

No further assessment is warranted.

3.3.9 Transportation

No change to the overall number of truck movements from the Mine is proposed, however, it is proposed to allow for the movement of trucks between 6:00pm and 10:00pm. The effect of this modification on road traffic noise is to be considered as part of the noise assessment, however, some consideration of the impact of evening traffic on the roads and road users is potentially warranted.

*On the basis of the above, transportation is considered to be of **low priority**, with consideration to be given to the potential for adverse affects on the local traffic environment as a result of evening truck movements.*

[10] The western extension of the out-of-pit overburden emplacement occurs over an area currently used for soil stockpiling.

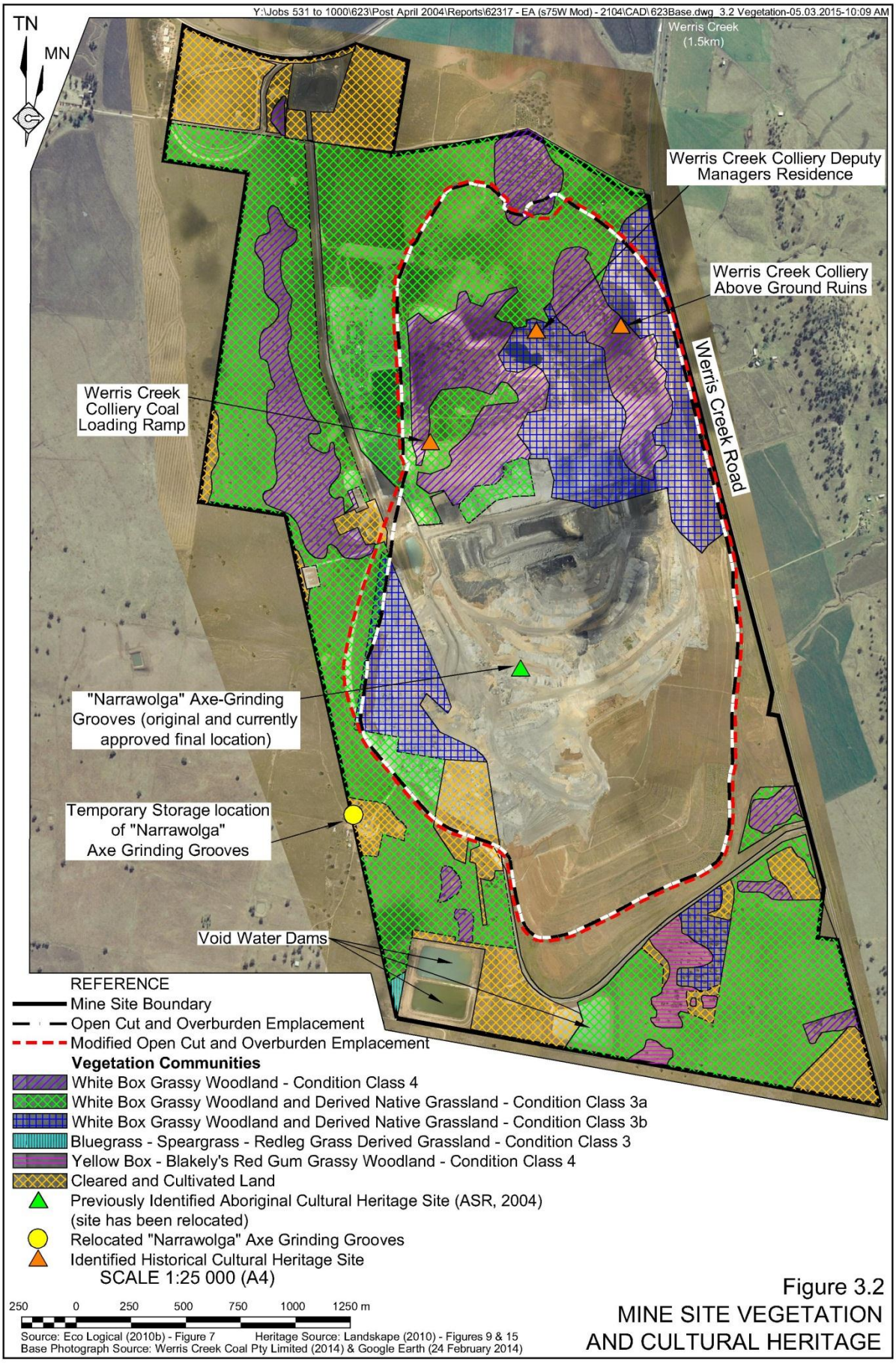


Figure 3.2
MINE SITE VEGETATION AND CULTURAL HERITAGE

3.3.10 Soils, Land Capability and Land Use

Soil resources would be managed in accordance with an approved *Mining Operations Plan* (MOP)[11] (WCC, 2011). On the basis that the operational controls and management measures nominated in the *MOP* are adhered to, the Proposal would not result in any additional impacts on the soils of the Mine Site.

The minor modifications to the final landform of the Mine could influence the final land capability of the rehabilitated final landform. However, on the basis of the proposed rehabilitation methods, monitoring and management, it is considered unlikely that the Proposal would result in any significant change to the land capabilities of the final landform.

The most likely cause of impacts on soils and land capability, and subsequently land use, as a consequence of the Proposal would be as a result of the proposed irrigation of void water to lands adjacent to the Mine. The void water is marginally brackish with elevated concentrations of Nitrogen, in particular nitrate, and some samples had electrical conductivity and sodium concentration which exceeded (marginally) the Short-term Exposure Limit criteria of ANZECC (2000) for irrigation (see **Table 2.2**). While the void water would appear to be similar in quality to that used in the locality for irrigation, it is possible that detrimental impacts on the soils to which the water is applied to, or waterways to which runoff flows, could occur if not managed appropriately.

On the basis of the potential impacts on the land to which void water is applied, Soils, Land Capability and Land Use is considered an issue of ***moderate to high priority****. Further assessment is to include:*

- *An assessment as to the impact on irrigation on local soil resources; and*
- *Calculation of maximum application rates to the targeted areas of adjoining properties.*

3.3.11 Cultural Heritage

Figure 3.2 illustrates the extent of the proposed modified operations in relation to the only identified site of Aboriginal heritage, namely the relocated Narrawolga Axe Grinding Grooves (Landskape, 2010). The Proposal would not result in disturbance to the relocated site. Furthermore, the Proponent is cognisant of its responsibilities to protect Aboriginal heritage under the *National Parks and Wildlife Act 1974* and instructs its workforce accordingly. Several surface sites associated with the former Werris Creek Colliery previously occurred within the approved disturbance footprint of the Mine (see **Figure 3.2**). The Proposal would not require any change in the proposed management of these sites as described in the Heritage Management Plan.

The Proponent notes that a change in the final location of the Narrawolga Axe Grinding Grooves, from the rehabilitated landform of the overburden emplacement to the Willow Tree Visitor Information Centre (at Willow Tree), has been agreed to by the local Aboriginal stakeholders and Liverpool Plains Shire Council. This has been nominated in the Mine

[11] An updated MOP to replace that approved for the period July 2011 to December 2018 (WCC (2011) is in preparation.

Heritage Management Plan and approved by DPE. OEH has approved a care agreement transferring the responsibility from Werris Creek Coal to Nungaroo LALC for the management of the Narrawolga Axe Grinding Groove rocks.

On the basis that no additional surface disturbance is require on the Mine Site, no further assessment is warranted. It is noted, however, that modification to the Statement of Commitments currently appended to PA 10_0059 is required to ensure that the agreed relocation does not result in the Proponent becoming non-compliant with the project approval.

3.3.12 Bushfire

RWC (2010) concluded that while mining and ancillary activities associated with the Mine would increase the number and type of ignition sources in the local area, the proposed controls and safeguards and general clearing activities outlined in the BOMP would ensure that the potential for fire initiation and spread on the Mine Site and adjacent BOA is minimised. The Proposal would not introduce any new ignition sources nor impact on the controls in place and therefore would not have any affect on the bushfire hazard of the Mine.

No further assessment is warranted.

3.3.13 Socio-Economic Setting

The Proposal has the potential for minor impacts upon the socio-economic setting of the surrounding environment, primarily as a result of impacts associated with visual amenity, noise and dust emissions.

In the event that impacts associated with visual amenity, noise and dust emissions can be managed to comply with environmental criteria and reasonable community expectations, the impact on the socio-economic setting would be minimal as a result of the Proposal. Impacts associated with socio-economic setting are considered to be of ***low priority*** *with further assessment to review the residual impacts of the Proposal on the biophysical environment against the positive impacts of the Mine on the local community and region.*

4. ASSESSMENT OF KEY ENVIRONMENTAL ISSUES

4.1 INTRODUCTION

This section provides an assessment of the impacts associated with those features of the local environment which could potentially be affected by the Proposal. The proposed design and/or operational safeguards and an assessment of the level of impact the Proposal may have after implementation of these safeguards is also described.

4.2 NOISE

4.2.1 Introduction

As noted in Section 3.3.2, the proposed modifications to the Mine would introduce a new source of noise (Dry Separation Plant) and place noise sources on the upper lifts of the overburden emplacement approximately 250m closer to receivers to the north, e.g. the town of Werris Creek. In order to confirm that the introduction of a new noise source and modification to the operating locations could be undertaken without exceeding current noise criteria, the Applicant commissioned Spectrum Acoustics Pty Limited (Spectrum) to complete a noise assessment. Notably, Spectrum has undertaken the noise modelling, assessment and monitoring at the Mine since the original development application was lodged in December 2004 and has an excellent understanding of local conditions. The following sub-sections summarise the *Noise Assessment* of Spectrum (2015), a complete copy of which is provided as **Appendix 3**.

4.2.2 Existing Setting, Noise Criteria and Environmental Performance

4.2.2.1 Mine Site Noise

The Mine has operated in close proximity to rural land owners and the town of Werris Creek since 2005. In that time, concerns over noise have been raised, however, notably since progression to operations under PA 10_0059 the number of non-compliances with noise criteria and noise complaints has reduced.

This reduction in non-compliances reflects the Applicant's more detailed understanding of local meteorological conditions. Through analyses of data collected from the Mine Site weather station and targeted studies of temperature inversion conditions as part of the *Environmental Assessment* for the LOM Project (RWC, 2010), the accuracy of the model used to predict noise levels received surrounding the Mine was increased. As a result, the scale of required noise attenuation was better understood and more accurate predictions of noise levels following the application of all reasonable and feasible mitigation measures able to be predicted. The noise criteria established at receivers surrounding the Mine (see **Box 1**) are therefore more appropriate than might otherwise have been established. The Applicant does also acknowledge that reduction in non-compliances and noise complaints has been positively influenced by ongoing purchases of properties surrounding the Mine Site (subject to the highest noise levels) as well as noise attenuation of the truck fleets reducing overall Mine noise emissions.

Figure 4.1 identifies the locations of the residential receivers identified in Box 1, including those referenced as 'All other privately-owned land'.

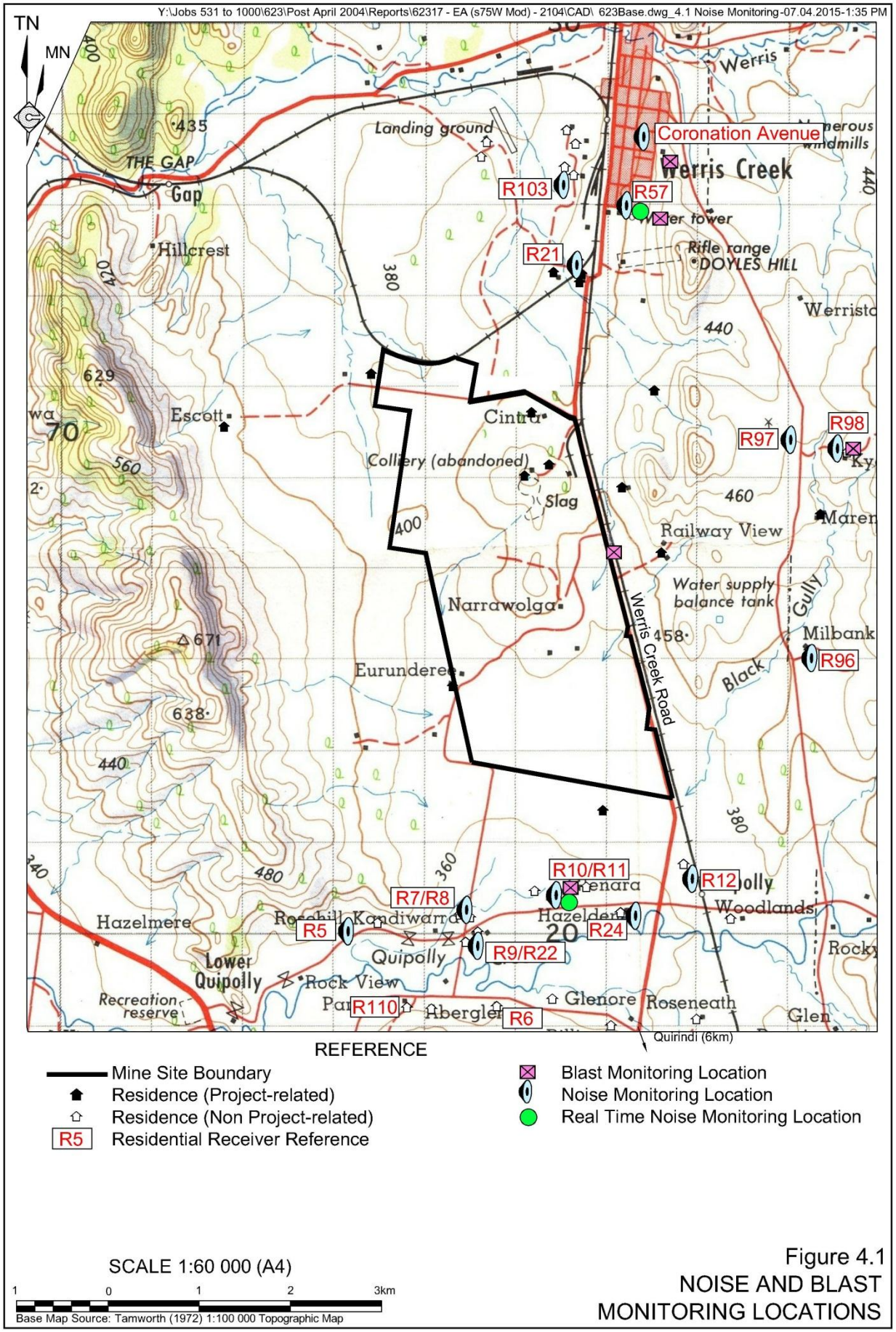


Figure 4.1
NOISE AND BLAST MONITORING LOCATIONS

Noise Criteria

1. The Proponent shall ensure that the noise generated by the project (including noise generated on the Werris Creek Rail Spur) does not exceed the criteria in Table 1 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 1: Noise criteria

Location	Day dB(A) $L_{Aeq(15\ min)}$	Evening & Night dB(A) $L_{Aeq(15\ min)}$	Night dB(A) $L_{A1\ (1\ min)}$
R18	40	37	45
R10, R11, R14	39	39	45
R20, R21	39	37	45
R12	38	38	45
R96	38	37	45
R7, R8, R9, R24	37	37	45
R22, R98	36	36	45
All other privately-owned land	35	35	45

Notes:
- *To interpret the locations referred to in Table 1, see the applicable figure in Appendix 3; and*
- *Noise generated by the project is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

However, these criteria do not apply if the Proponent has an agreement with the relevant owner/s of these residences/land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Note: Locations R14, R18 & R20 have since been purchased by Werris Creek Coal Pty Limited and noise criteria no longer apply

Source: PA 10_0059

Box 1
PA 10_0059: SCHEDULE 3, CONDITION 1 – NOISE CRITERIA

Since the issue of the noise criteria identified in **Box 1**, compliance has generally been confirmed through monthly attended noise monitoring. Since 2011 there have been five minor noise exceedances at residential receivers.

- 1db(A) exceedance of night time noise criterion (35dB(A)) at R5 in July 2013.
- 3db(A) exceedance of night time noise criterion (36dB(A)) at R22 in July 2013.
- 2db(A) exceedance of night time noise criterion (37dB(A)) at R9 in July 2013.
- 1db(A) exceedance of night time noise criterion (37dB(A)) at R96 in September 2014.

This represents less than 1% of the over 500 individual monitoring events undertaken at each noise monitoring location since PA 10_0059 was approved.

It is noted that noise monitoring is also undertaken, at the request of the landowner, at the boundary of property 97. In September 2014 a noise level of 39dB(A) was recorded and in October 2014 a noise level of 38dB(A) was recorded, 3 and 4dB(A) higher than the default noise criteria for privately owned land. Given this location is closer to the Mine Site than R98, which is assigned an elevated noise criterion, it is considered appropriate that this location is assigned a noise criterion reflecting the achievable noise level under noise enhancing conditions when all reasonable and feasible mitigation measures are applied.

Compliance with noise criteria is also attributable to the effective implementation of noise mitigation, attenuation and management measures at the Mine. These measures are documented in the Werris Creek Coal Mine Noise Management Plan (WCC, 2014), and would continue to be implemented, are described in Section 4.2.3.

4.2.2.2 Road Traffic Noise

Taylors Lane already carries heavy vehicle traffic as it is the heavy vehicle by-pass for Quirindi township. In 2010, ambient noise levels were measured at R110 (see **Figure 4.1**) to identify ambient (L_{eq}) and background (L_{90}) nose levels). **Table 4.1** presents the results of this monitoring.

Table 4.1
Summary of Ambient Noise Levels (R110) – 2010

Date	L_{eq} (day)	L_{eq} (evening)	L_{eq} (night)	L_{90} (day)	L_{90} (evening)	L_{90} (night)
31-May-10	45.3	41.8	41.7	29.4	29.5	26.0
1-Jun-10	46.6	44.6	39.5	29.7	26.5	26.0
2-Jun-10	48.5	47.1	43.2	29.0	30.0	25.5
3-Jun-10	46.9	43.9	38.9	31.0	25.9	24.1
4-Jun-10	47.6	46.6	43.4	27.5	27.3	23.8
5-Jun-10	46.2			28.8	25.2	
L_{Aeq}	**47**	**45**	**42**	**--**	**--**	**--**
L90	**--**	**--**	**--**	**29**	**27**	**26**
Note: Day = 7:00am – 6:00pm, Evening = 6:00pm – 10:00pm, Night = 10:00pm – 6:00am						
Source: Modified after Spectrum (2010) – Table 4						

Noise criteria for off-site traffic noise criteria have been established for PA 10_0059, based on the *NSW Environmental Criteria for Road Traffic Noise* (ECRTN). The *NSW Road Noise Policy* (DECCW, 2011) supersedes the ECRTN although the development type and noise criteria are identical (see **Table 4.2**)

Table 4.2
Road Traffic Noise Criteria

Type of Development	Recommended Criteria – dB(A)	
	Day (7:00am to 10:00pm)	Night (10:00pm to 7:00am)
11. Land use developments with potential to create additional traffic on existing local roads.	$L_{Aeq(1hr)}$55	$L_{Aeq(1hr)}$50

4.2.3 Design Features, Operational Controls and Management Measures

The following provides a summary of the key design features, operational controls and management measures implemented at the Mine.

- MIA Bund. The MIA Bund has been constructed to a height greater than 5m to attenuate noise emissions from the Mine Infrastructure Area.
- Haul Truck Replacement. More than half the CAT 785 haul trucks have been replaced by CAT 793XQ (eXtra Quiet) trucks which operate 1 to 2dB quieter than the CAT 785's (Spectrum, 2015).
- Attenuation of Haul Trucks. Noise assessment undertaken in accordance with ISO 6395 by Spectrum (2015) confirms the revised target noise attenuation level of 117.7dB(A) has been achieved for the CAT 785 haul trucks. The revised target was established due to the additional noise reduction achieved by the CAT 793XQ fleet so that the geometric sound power level of the entire truck fleet still achieves 116db(A).
- Real time noise monitoring. Monitoring of noise levels in real time is undertaken at the locations to the north and south of the Mine Site (see **Figure 4.1**). A dedicated 'Noise Control Operator' is employed to continually monitor real time noise levels and inform the Open Cut Examiner (OCE) if the dominant noise source is mining. Under these circumstances, the OCE would modify or partially suspend mining operations to achieve the nominated noise criteria[12]. As an illustration of the application of the real time noise monitoring and management, a total of 976.3 hours of production time was lost during the 2013/2014 AEMR period as a result of modified operations to accommodate noise issues.
- Real time meteorological monitoring. This is used to identify adverse weather conditions such wind direction/speed and temperature inversions with operations to be modified accordingly.
- Noise reduction planning. Noise reduction measures are discussed at the daily meeting based on the current location of mining activities and forecast weather conditions.
- Equipment Testing and Maintenance. Routine testing to confirm that the sound power levels of plant achieves the nominated targets is undertaken. Regular maintenance is undertaken to ensure noise attenuation on plant operates in accordance with manufacturer specifications.
- Bunding. Natural mine features or constructed bunds are utilised close to noise sources to create barriers to the propagation of noise towards receivers.

[12] This monitoring based administrative control has been implemented in preference to previously nominated and prescriptive controls on mobile equipment operation. On the basis of being more recently approved, the commitments and controls provided for in the Mine Noise Management Plan take precedence over those presented in RWC (2010). Section 5 includes a revised Statement of Commitments to provide consistency between the Project Approval and management plans.

- Rail spur noise mitigation. Measures including restricting train speeds to 15kph, minimising coal drop heights into wagons and maintaining coal within the loading bin at all times are enforced.

As a final resort, private agreements or property acquisition is negotiated with landholders.

4.2.4 Assessment Methodology

4.2.4.1 Mine Site Noise

The assessment of noise emissions was conducted by Spectrum (2015) using RTA Technology's Environmental Noise Model (ENM v3.06). Major noise producing items were modelled as point sources for a worst-case operating scenario towards the end of Mine life (when mining operations approach the northern extent of the open cut and overburden is being placed on the upper lifts of the extended overburden emplacement).

Figure 4.2 provides the locations of the equipment for this scenario and **Table 4.3** provides the sound power level for each noise source.

Table 4.3
Noise Source Sound Power Levels

Item	No. on Site	Function	Sound Power Level (LW) (dB(A))
Excavator (540t)	1	Overburden Excavation/Loading	116
Excavator (360t)	1		115
Excavator (190t)	3	Overburden/Coal Excavation/Loading	115
Haul trucks (Cat 785)[1]	9[2]	Overburden/Coal Haulage	117
Haul trucks (Cat 793XQ)[3]	10		115
Bulldozer (D11)	3	Overburden Prime Push, Overburden/Coal Rip/Push, Final Landform Development Clearing, Overburden Emplacement/Road Maintenance, Coal Stockpile Maintenance	116
Bulldozer (D10)	4		116
Bulldozer (D9)	1		116
Bulldozer (D6)	1	Campaign Rehabilitation	109
Bulldozer (D5)	1		109
Grader	1	Road/Overburden Emplacement Maintenance	110
Fuel/Service Truck	1	Equipment Refuelling/Servicing	107
Scraper	4	Campaign Topsoil/Subsoil Removal and Replacement	113
Drill Rig	3	Blast hole Drilling	107-108
Front-end Loader (FEL)	3	Screening Plant/Product Coal Loading	112
Water Cart	4	Dust Suppression	114-118
Fixed Coal (Crushing) Plant	1	Coal Crushing and Screening	118
Dry Separation Plant	1	Coal Screening and Separation	112

Note 1: Incorporates noise attenuation.
Note 2: Up to 3 additional operating trucks required when mining occurs at deepest point within open cut. Typically an extra two trucks are retained on the Mine Site as replacement for maintenance and repairs of operating trucks.
Note 3: XQ refers to Extra Quiet.
Source: Spectrum (2015) – Table 1

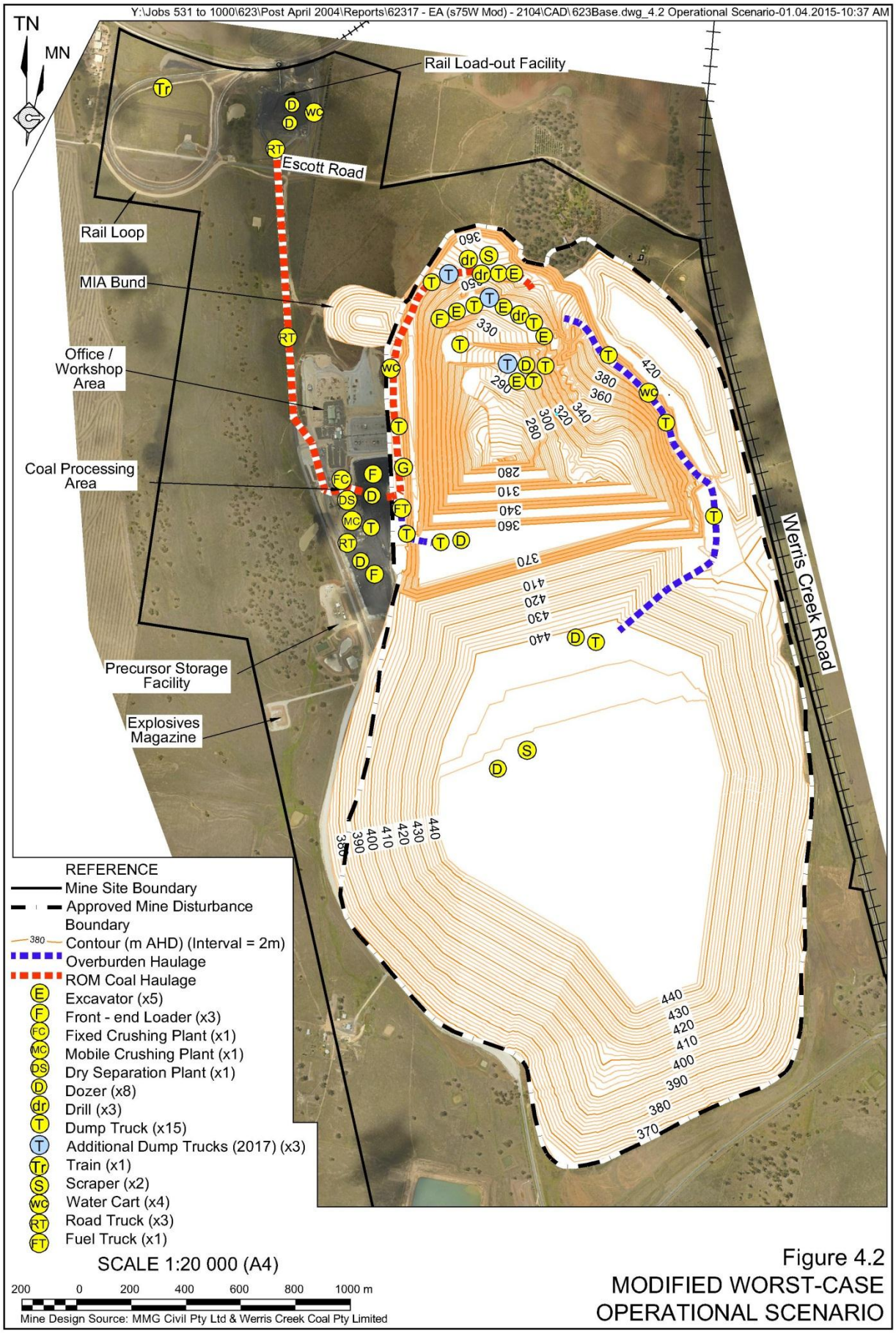


Figure 4.2
MODIFIED WORST-CASE OPERATIONAL SCENARIO

The noise model was conducted assuming the following adverse atmospheric conditions:

- *Adverse winds* – Air temperature 10°C, 70% RH, 3m/s wind from north west and south south-east; and
- *Inversion* – Air temperature 5°C, 85% RH, +12°C/100m vertical temperature gradient.

Noise contours were generated along with point calculations at critical receivers surrounding the Mine Site. It is noted that where apparent conflict between the noise contours and point calculations, the point calculation is the more accurate.

As identified in Section 2.2.4 and **Table 4.1**, the Proponent has advised that an additional three haul trucks could be required when mining the deepest sections of the open cut. To assess the impact of these additional noise sources, Spectrum (2015) modelled the mining operation with three additional trucks (both unattenuated [sound power level of 124dB(A)] and attenuated [sound power level of 117dB(A)]) (see **Figure 4.2**) and compared the results.

4.2.4.2 Road Traffic Noise

Road traffic noise is assessed as an equivalent (average) (L_{eq}) noise level over a defined period, with criteria provided for the day period (7:00am to 10:00pm) and night period (10:00pm to 7:00am) (refer to **Table 4.4**). Spectrum (2015) applied the methodology described in the document *Information on Levels of Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974* published by the US Environmental Protection Agency which relies upon the following equation.

$$L_{eq},T = L_b + 10\log\left[1+\frac{n\tau}{T}\left(\frac{10^{\frac{\Delta L}{10}}-1}{2.3}-\left(\frac{\Delta L}{10}\right)\right)\right]$$

Where:

L_{max} = maximum vehicle noise at residence (108dB(A));
L_b = ambient equivalent noise level, dB(A);
ΔL = $L_{max} - L_b$;
T = assessment period (minutes);
τ = "10dB-down" duration per vehicle; and
n = number of vehicles during assessment period.

Spectrum (2015) compared the L_{eq} noise level calculated for the 2010 LOM Project (noting this considered transport of 100 000tpa), to that of the current 50 000tpa proposal over the current 'day' period of 7:00am to 6:00pm and the proposed extended period of 7:00am to 10:00pm.

The L_{eq} road traffic noise level was then compared to the road noise criteria as well as the Leq noise level previously measured at a residence R110 located on Taylors Lane.

4.2.5 Assessment of Impacts

4.2.5.1 Mine Site Noise

Table 4.4 presents the predicted noise levels at receivers surrounding the Mine Site under the modelled worst-case scenarios. Inversion conditions represent by far the highest predicted noise levels and **Figure 4.3** presents the noise contours generated under 12°C/100m inversion conditions.

Table 4.4
Predicted Operational Noise Levels dB(A),$L_{eq(15minute)}$

Receiver[1]	Meteorological Condition			Criteria (night)	Maximum Differential
	Inversion (12°C/100m)	Wind (3m/s)			
		NW	SSE		
R3a	34	<20	29	35[3]	-1
R3b	35	<20	30	35[3]	0
R5	32	25	<20	35[3]	-3
R7	37	32	<20	37	0
R8	37	32	<20	37	0
R9	37	32	<20	37	0
R10	38	34	<20	39	-1
R11	38	36	<20	39	-1
R12	38	38	<20	38	0
R17	35	35	<20	35[3]	0
R21	37	23	27	37	0
R22	37	31	<20	36	**+1**
R24	37	35	<20	37	0
R26	35	<20	28	35[3]	0
R55	35	22	27	35[3]	0
R62	35	23	27	35[3]	0
R96	38	34	<20	37	**+1**
16, 64 & 97[2]	38	NA	NA	35[3]	**+3**
R98[4]	38	30	20	36	**+2**
R101	33	<20	27	35[3]	-2
R102	33	<20	27	35[3]	-2
R103	34	<20	27	35[3]	-1
R105	34	20	27	35[3]	-1

Note 1: see **Figure 4.2**
Note 2: As there is no residence, R prefix not provided. Noise exceeded on greater than 25% of the property
Note 3: Default criterion of PA 10_0059 applies
Note 4: The Applicant holds an agreement with the owner of R98 for noise levels up to 40dB(A)

Source: Spectrum (2015) – Table 2

After including three additional attenuated trucks in the noise model (at locations presented on **Figure 4.2**), as discussed in Section 4.2.4.1, Spectrum (2015) confirms that this would not increase the noise levels received and presented in **Table 4.4**.

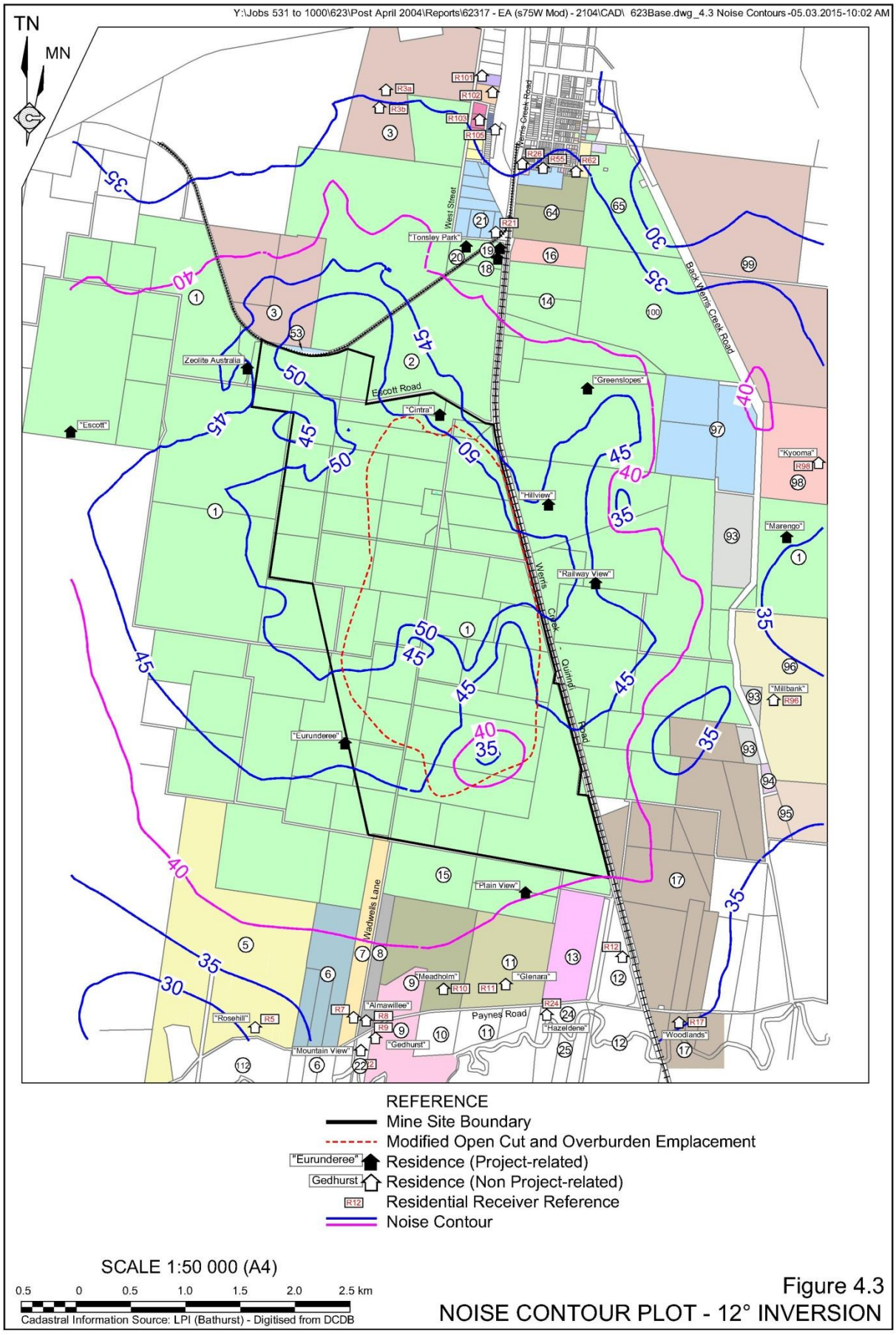


Figure 4.3
NOISE CONTOUR PLOT - 12° INVERSION

The modelling indicates that with the exception of R22, R96 and R98 compliance with the current noise criteria for residential receivers could be achieved for the modified operations. The modelling results support the evidence provided by recent monitoring which has identified exceedances of the current noise criteria at R22 (July 2013), R96 (September 2014) and R98 (September 2013).

The modelling results presented in **Table 4.4** support modification of the noise criteria of PA 10_0059 from 36dB(A) to 37dB(A) at R22, from 37dB(A) to 38dB(A) at R96 and 36dB(A) to 38dB(A) at R98. This is considered appropriate on the basis of the following.

- Noise criteria of 38dB and higher have been established at other receivers.
- The Applicant has demonstrated implementation of all reasonable and feasible noise mitigation measures (refer to Section 4.2.3).
- The noise model used for the current assessment has been reviewed and updated based on noise monitoring results and is therefore considered more accurate than previous noise models used for assessment and criteria establishment.
- The Applicant holds an agreement with the owners of R98 and R22 which requires the Applicant to implement additional noise mitigation measures at the residence in the event noise levels exceed 40dB and acquire the property in the event that noise levels exceed 45dB.

Additional to the residential receivers, the expected noise levels received on vacant land with building entitlement, namely properties 97, 16 and 64 have been assessed through review of the noise contours generated by the noise model (see **Figure 4.3**). Under worst case inversion conditions, the noise level that is predicted to be exceeded on greater than 25% of each property is 38dB(A).

Given the implementation of all reasonable and feasible noise mitigation measures (refer to Section 4.2.3), Spectrum (2015) recommend 38dB(A) be adopted as the noise criteria for Property 97, 16 and 64. It is noted that the EPA has advised that a noise limit should not be applied to a vacant property, however, the DPE has not yet advised whether a noise limit under PA 10_0059 should apply to such properties.

Finally, given Properties 14, 15, 18 and 20 have been purchased by the Applicant since PA 10_0059 was issued, it is recommended that Condition 1 of Schedule 3 be modified to remove reference to R14, R18 and R20 (see Section 5).

4.2.5.2 Road Traffic Noise

Spectrum (2015) calculated the equivalent noise level as noted in Section 4.2.4.2, with the results presented in **Table 4.5**.

The distance from the receiver to the centre line of the road was nominated as 42m, which is the approximate distance of the closest residential receiver to Taylors Lane (R6 – see **Figure 4.1**). Notably, the equivalent hourly noise level under the proposed modified road transport operations would be reduced and remain well below (-8.6dB) the RNP road noise criteria (refer to **Table 4.2**).

Table 4.5
Predicted Road Traffic Noise Levels (at R6)

	Hours of Transport	Movements/hr	Noise Level ($L_{Aeq(1hour)}$)
Proposed Road Transport (LOM Project) (RWC, 2010)	7:00am – 6:00pm	10	48.4
Approved Road Transport (PA 10_0059)	7:00am – 6:00pm	8.5	47.4
Proposed Road Transport	7:00am – 10:00pm	6.3	46.4
Source: Modified after Spectrum (2015) – Section 4.5			

Comparison to ambient evening noise levels of residences on Taylors Lane ($L_{Aeg(1\ hour)}$ of 45dB) (refer to Section 4.2.2.2 and **Table 4.1**) illustrates that the noise attributable to heavy vehicle transport would only marginally exceed ambient evening noise levels.

On the basis of compliance with relevant criteria and equivalence to ambient noise levels, it is assessed that the proposed increased in road transport hours of operation could be undertaken in compliance with road noise criteria and with no additional impact on local residents of Taylors Lane.

4.2.6 Monitoring

A continuation of the monitoring currently undertaken on and surrounding the Mine Site would be sufficient to confirm ongoing compliance and enable performance to be continually improved.

4.3 AIR QUALITY

4.3.1 Introduction

An *Air Quality Assessment* was undertaken by Heggies Pty Limited (Heggies) in 2010 to support a development application for the LOM Project (RWC, 2010) and confirmed mining could be undertaken without unacceptable impact (with respect to relevant criteria) on the air quality at surrounding residences. The results of these studies are provided in RWC (2010) and Heggies (2010). As noted in Section 3.3.3, the Proposal has the potential to impact upon air quality as a result of the additional sources of air emissions (dry separation plant) and changes to the location of dust emitting activities relative to surrounding receivers (Northern Extension of the 400m to 445m AHD section of the overburden emplacement).

SLR Consulting (SLR) was engaged to review the results of Heggies (2010) and complete an assessment of the anticipated impacts on local particulate levels associated with the proposed operational changes. The following subsections consider the previous air quality predictions, the results of ongoing air quality monitoring, as well as outlining potential impacts resulting from the proposal and any management measures proposed to be maintained and/or implemented. A copy of SLR's letter report is provided in full as **Appendix 4** and referred to as SLR (2015), with the following information summarising their report.

4.3.2 Existing Setting and Environmental Performance

4.3.2.1 Introduction

Since the commencement of mining operations in 2005, an air quality monitoring program has been undertaken on and surrounding the Mine Site to review the impact of the Mine on local air quality. **Figure 4.4** identifies the locations of air quality monitoring sites which include:

- 20 dust gauges (prefix DG) monitoring for dust deposition;
- a Tapered Element Oscillating Microbalance (prefix TEOM) which collects samples which can be analysed to determine particulate matter (measured as PM_{10} and $PM_{2.5}$) concentration; and
- a High Volume Air Sampler (prefix HVAS) for the monitoring of PM_{10} and total suspended particulates (TSP).

While historically, the Applicant has received complaints from local residents in relation to dust emissions (45 out of a total of 460 complaints since 2005), the results of monitoring have generally demonstrated compliance with the air quality criteria nominated in **Table 4.6**. It is noted that these criteria levels are also outlined in *Condition 3(16)* of PA10_0059, with the exception of annual and 24 hour averaged $PM_{2.5}$ levels.

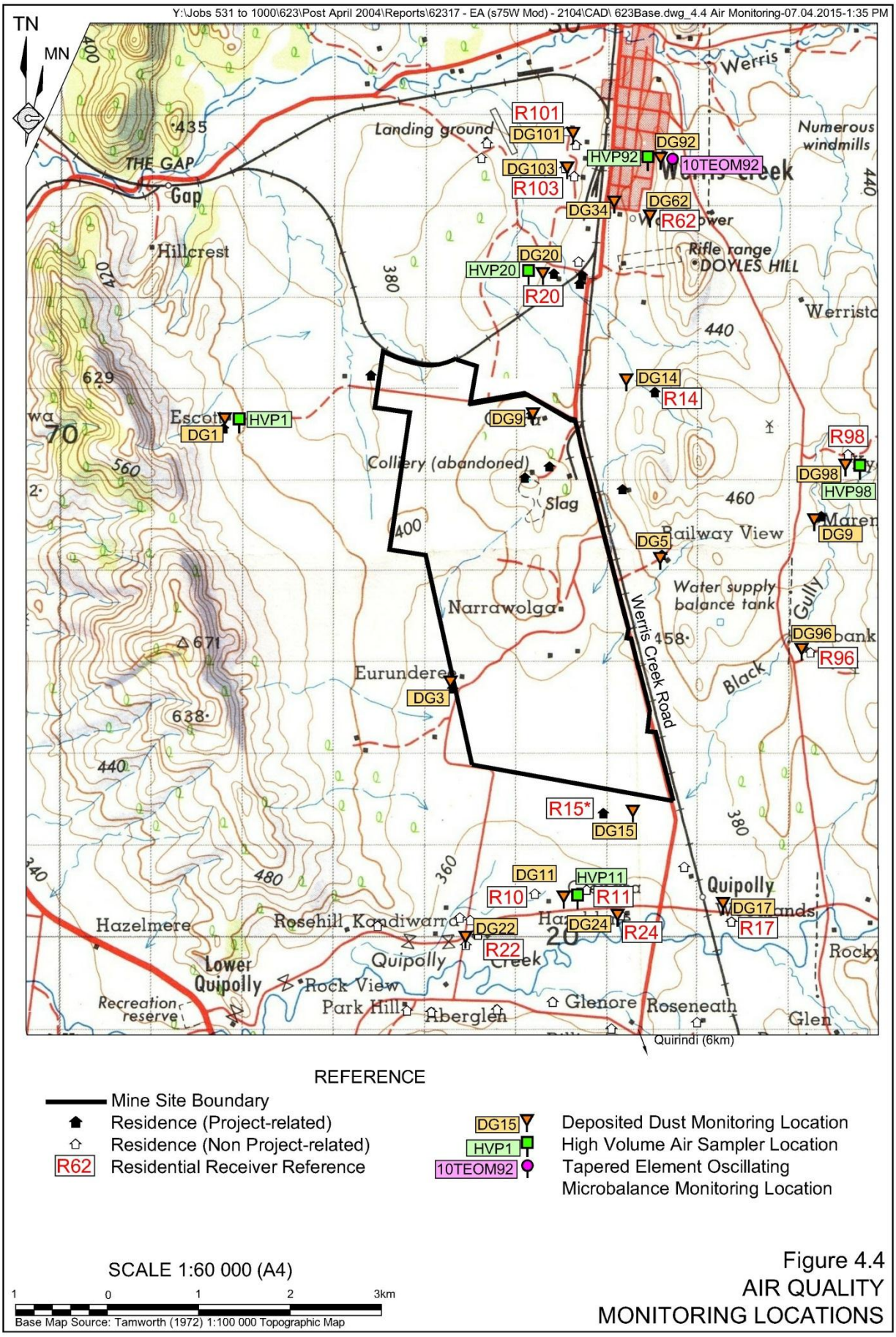
Table 4.6
Air Quality Criteria

Pollutant	Averaging Period	Criteria[1]
Total Suspended Particulate (TSP) Matter	Annual	90µg/m^3
Particulate Matter < 10 microns (PM_{10})	Annual	30µg/m^3
	24-hours	50µg/m^3
Particulate Matter < 2.5 microns ($PM_{2.5}$)	Annual	8µg/m^3
	24-hours	25µg/m^3
Deposited Dust (total)	Annual	4g/m^2/month
Deposited Dust (incremental increase)	Annual	2g/m^2/month
Note 1: TSP, PM_{10} and deposited dust from *Condition 3(16)* of PA10_0059. $PM_{2.5}$ from Air Quality and Greenhouse Gas Management Plan		
Source: Modified after SLR (2015) – Table 1		

Results from the 2013/2014 reporting period, which most closely reflects Scenario 1 of Heggies (2010), are discussed below to illustrate the general compliance of mining operations with the air quality criteria of **Table 4.6** (as predicted by Heggies, 2010).

4.3.2.2 Deposited Dust

With the exception of "Glenara" (DG24 – see **Figure 4.4**), the annual average dust concentrations recorded by the other monitoring locations during 2013/2014 were below the predicted levels in the Heggies (2010) for Scenario 1. The dust levels at "Glenara" are not considered to be significant with the drier and dustier conditions due to below average rainfall since 2013 and localized agricultural activities affecting the air quality more than dust generated from mining operations during the 2013/2014 period.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DG103
R103
DG92
HVP92
10TEOM92
DG62
R62
DG34
DG20
HVP20
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HVP11
R10
R11
DG17
R17
DG22
R22
DG24
R24
Landing ground
Numerous windmills
THE GAP
Gap
Hillcrest
Rifle range
DOYLES HILL
Colliery (abandoned)
Slag
Railway View
Water supply balance tank
Narrawolga
Werris Creek Road
Eurundere
Hazelmere
Rosehill
Kandiwarra
Quipolly
Lower Quipolly
Rock View
Park Hill
Aberglen
Glenore
Roseneath
Recreation reserve
Quirindi (6km)
REFERENCE
Mine Site Boundary
Residence (Project-related)
Residence (Non Project-related)
R62 Residential Receiver Reference
DG15 Deposited Dust Monitoring Location
HVP1 High Volume Air Sampler Location
10TEOM92 Tapered Element Oscillating Microbalance Monitoring Location
SCALE 1:60 000 (A4)
1 0 1 2 3km
Base Map Source: Tamworth (1972) 1:100 000 Topographic Map
Figure 4.4
AIR QUALITY
MONITORING LOCATIONS

With the exception of a single dust gauge located at 8 Kurrara Street, Werris Creek (DG34 – see **Figure 4.4**), all results were compliant with the 4g/m^2/month criteria. SLR (2015) concludes that the elevated results at this location are unrelated to the Mine and, given the significant difference to other surrounding dust gauges also in Werris Creek, most likely resultant from conditions in the immediate vicinity of this dust gauge, e.g. high organic matter levels.

Since deposited dust monitoring commenced in 2005, an increasing trend in deposited dust levels has only been identified at a single deposited dust gauge (DG2 on the Applicant-owned "Cintra" property). The results at all other deposited dust monitoring locations have fluctuated within the criteria guidelines (when averaged over an annual period). Further, SLR (2015) note that the average monthly dust deposition levels for the 2013/2014 period at half the monitoring locations (10 of 20) reduced from the previous period. Both the long-term trends and recent results are indicative of good dust management practices at the Mine, especially given the prevailing meteorological conditions during the 2013/2014 period (below average rainfall) were not conducive to reduced dust emissions.

4.3.2.3 Airborne Particulate Matter (PM_{10} and $PM_{2.5}$)

TEOM Monitoring Data (PM_{10} and $PM_{2.5}$)

Monitoring of PM_{10} and $PM_{2.5}$ is undertaken by a TEOM, located in the township of Werris Creek (10TEOM92 – see **Figure 4.4**), providing real-time air quality information for PM_{10} since April 2012 and $PM_{2.5}$ since September 2012.

During the 2013/2014 period, PM_{10} concentrations were as follows.

- Annual average concentration of 13.7µg/m^3, which is well below the 30µg/m^3 criteria and less than the predicted level of 15.1µg/m^3 predicted for Scenario 1 of Heggies (2010).
- A maximum 24-hour average of 43.7µg/m^3, which is below the 50µg/m^3 criterion and reflective of predictions of 24 hour concentrations for Scenario 1 of Heggies (2010).

During the 2013/2014 period, $PM_{2.5}$ concentrations were as follows.

- Annual average concentration of 8.1µg/m^3, fractionally above the 8µg/m^3 guideline level outlined within the AQGHGMP.
- The maximum daily $PM_{2.5}$ levels of 25µg/m^3 were exceeded on three occasions, however, on each occasions it was shown that these elevated levels were not attributable to mining operations.

High Volume Air Sampler Data (TSP and PM_{10})

The annual average PM_{10} and TSP concentrations at the four HVAS locations (located to the north [HVP20], east [HVP98 and HVT98], south [HVP11] and west [HVP1] of the Mine – see **Figure 4.4**) were below the relevant annual criteria (see **Table 4.5**).

A single 24 hour average result exceeding the 24 hour maximum criteria was recorded, 56.4µg/m^3 at HVP11 "Glenara". Through analysis of monitoring data from upwind locations unaffected by mining operations, SLR (2015) have estimated that the Mine contribution to this level was at most 42.8µg/m^3 (below criteria). SLR (2015) contend that the primary driver for elevated airborne particulate matter concentrations locally during the 2013/2014 period was below average rainfall as opposed to mining operations.

Notably, with the exception of the HVAS monitor at "Glenara" (HVP11), the recorded annual average particulate matter concentrations during 2013/2014 were below the predicted levels for Scenario 1 of Heggies (2010).

4.3.2.4 Meteorology

While wind data collected during the 2013/2014 period illustrated some minor differences to the wind patterns established from the long term meteorological dataset and used by Heggies (2010) for dispersion modelling purposes, SLR (2015) consider these differences not to be significant enough so as to invalidate the dispersion modelling predictions of Heggies (2010).

4.3.2.5 Validation of Heggies (2010) Modelling

As noted above, the operations for the 2013/2014 period most closely reflect Scenario 1 of Heggies (2010) for which dispersion modelling was completed. **Table 4.7** provides a comparison of activity levels against the modelled scenario.

Table 4.7
Comparison of Modelled (Scenario 1) and Actual Activity Levels

Parameter	Scenario 1[1]	2013/2014[2]
Annual coal extraction rate (tpa)	2,500,000	2,076,806
Coal transported to product stockpile by trucks (tpa)	2,400,000	1,893,180
Coal transported to domestic market by trucks (tpa)	100,000	3,481
Overburden production rate (bcm)	23,500,000	16,121,382
Water usage on roads (ML)	289	339.7
Note 1: Heggies (2010) Note 2: WCC (2014)		
Source: Modified after SLR (2015) – Table 3		

On the basis that the approximate 20% reduction in activity level is reflected in the reduced dust levels recorded, the dispersion model used by Heggies (2010) is considered to provide for accurate predictions of dust dispersion.

4.3.2.6 Summary and Conclusion

The results of air quality monitoring at the Mine indicate that, despite the prevalence of air quality-related complaints over the life of the Mine, compliance with air quality criteria has consistently been achieved. In fact, a general reduction in the concentration of deposited dust and airborne particulate matter has been observed at most locations indicating continuous improvement in the management of dust emissions. Monitoring has demonstrated that mining operations at WCC has little influence compared to the effects of prevailing climatic conditions on local dust levels.

Of particular importance, the results of monitoring for the 2013/2014 period, which closely reflects Scenario 1 of Heggies (2010), validates the dispersion model used by Heggies (2010) to predict dust dispersion.

4.3.3 Assessment Methodology

On the basis that the dispersion model used by Heggies (2010) has been validated, SLR (2015) updated the emission inventory to provide an estimate of TSP, PM_{10} and $PM_{2.5}$ emission rates for the Proposal. This update was based on the following.

- Modifications to the number and type of dust emissions sources (mobile and fixed plant) for a worst-case scenario (see **Figure 4.2**).
- The proposed activity areas nominated for the worst-case operating scenario (see **Figure 4.2**). Notably, the nominated operating scenario provides for a reduction in active disturbance areas as operations move closer to Werris Creek, however, incorporates a longer haul road length.
- A review of emission factors and calculation methodologies to comply with current best practice emission estimation techniques.

The modified emission rates were compared to the emission rates used for Scenarios 1, 2 and 3 of Heggies (2010), for which compliance with the air quality criteria of **Table 4.6** was predicted, to establish the potential for exceedance based on the modified operations. **Table 4.8** provides a comparison of activity levels against the modelled scenario.

Table 4.8
Comparison of Emission Rates

Scenario		Total Annual Estimated Emissions (tpa)			Percentage Increase in Estimated Emissions		
		TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Proposal[1]		**2,073**	**568**	**62**			
Heggies (2010)	Scenario 1	1,538	426	63	35%	33%	-2%
	Scenario 2	1,445	500	74	43%	14%	-16%
	Scenario 3	1,553	592	85	33%	-4%	-27%
Note 1: see **Figure 4.2**							
Source: Modified after SLR (2015) – Table 4							

4.3.4 Assessment of Impacts

Table 4.8 indicates that PM_{10} emissions for the Proposal would be equivalent to those estimated in the Heggies (2010) (for Scenario 3). This is expected given the operating scenario considered in the establishment of emissions rates for the Proposal most closely reflects Scenario 3. TSP and $PM_{2.5}$ emissions for the Proposal are, however, estimated to be higher than those used by Heggies (2010), primarily as a result of updates in the emission factors used for key sources (SLR, 2015).

On the basis that 24-hour PM_{10} concentrations are the constraining factor for air quality compliance, and that Scenario 3 (of Heggies, 2010) gave the highest off-site predictions, the results presented for Scenario 3 of Heggies (2010) were considered by SLR (2015) when assessing the likely compliance of the proposed modified operations against the air quality criteria (see **Table 4.6**).

Table 4.9 provides the predicted emissions received as a result of operations at the Mine equivalent to that modelled as Scenario 3 (Heggies, 2010). The following provides an assessment of likely compliance with air quality criteria based on the predicted emissions of **Table 4.9** and comparison of emission rates provided by **Table 4.8**.

$PM_{2.5}$

At the worst affected receptor (21), the maximum 24-hour and annual average concentrations predicted for Scenario 3 were 15.1µg/m^3 and 4.3µg/m^3 respectively. As the revised emission inventory for the Proposal provides for a lower $PM_{2.5}$ emission rate than the comparison scenario (see **Table 4.8**), and the locations of dust producing activities are not significantly different to those assumed for this scenario, SLR (2015) conclude that the worst case off-site concentrations would likely to be lower for the Proposal than those presented in **Table 4.9**, which are well below the relevant air quality criteria (see **Table 4.6**).

PM_{10}

At the worst affected receptor (21), the maximum 24-hour and annual average concentrations predicted for Scenario 3 were 42.2µg/m^3 and 19.1µg/m^3 respectively. Based on the same rationale as applied to likely $PM_{2.5}$, SLR (2015) conclude that the worst case off-site concentrations would not be significantly different for the Proposal than those presented in **Table 4.9**, which are well below the relevant air quality criteria (see **Table 4.6**).

TSP

The emissions estimated for the Proposal are 33% higher than the emissions used by Heggies (2010) (for Scenario 3). If the maximum annual average TSP concentration predicted at the worst affected receiver (21 - 40.6µg/m^3) was increased by 33%, the maximum predicted concentration would be around 54µg/m^3, which is still well below the assessment criterion of 90µg/m^3.

Deposited Dust

Given the predicted incremental and cumulative deposited dust levels at surrounding receivers are predicted to be well-below criteria, which is confirmed by annual monitoring results, and relatively small changes to proposed emission sources, locations and rates, it is considered unlikely that an increase in emission above the nominated criteria would be likely under the Proposal.

4.3.5 Monitoring

A continuation of the monitoring currently undertaken on and surrounding the Mine Site would be sufficient to confirm ongoing compliance and enable performance to be continually improved.

Table 4.9
Predicted Emissions (Heggies, 2010 – Scenario 3)

Receiver[1,2]		Annual Average TSP (µg/m³)		Annual Average PM_{10} (µg/m³)		24-Hour PM_{10} (µg/m³)		Annual Average $PM_{2.5}$ (µg/m³)	24-Hour Average $PM_{2.5}$ (µg/m³)	Annual Average Deposited Dust (g/m²/month)	
ID	Ownership	Increment	Cumulative	Increment	Cumulative	Increment	Cumulative	Increment	Increment	Increment	Cumulative
5	R. & A. George	0.7	30.9	0.3	15.4	3.5	32.0	0.4	6.2	<0.1	0.6
7	P.R. & J.S. Andrews	1.2	31.4	0.5	15.6	4.4	32.1	0.6	7.6	<0.1	0.6
8	P.A. & T.M. Hird	1.2	31.4	0.5	15.6	4.4	32.1	0.6	7.5	<0.1	0.6
9	B.R. & A.J. Smith	1.2	31.4	0.5	15.6	4.2	32.1	0.6	7.3	<0.1	0.6
10	A. Blackwell	1.9	32.1	0.8	15.9	5.2	34.6	0.8	8.3	0.1	0.7
11	W.H. & S.I. Ryan	2.0	32.2	0.8	15.9	5.5	34.6	0.8	8.3	0.1	0.7
12		3.4	33.6	1.5	16.6	7.5	32.8	0.9	7.9	0.1	0.7
17	M.M. Doolan & A.E. Hogan	1.6	31.8	0.7	15.8	5.0	32.0	0.7	6.5	0.1	0.7
21	G.J. Currey	10.4	40.6	4.0	19.1	18.4	42.2	2.3	15.1	0.4	1.0
22	L.F. & R.M. Parkes	1.1	31.3	0.5	15.6	4.2	32.1	0.6	7.2	<0.1	0.6
24	P. George	1.9	32.1	0.8	15.9	6.5	34.0	0.8	7.7	0.1	0.7
96		4.2	34.4	1.6	16.7	11.2	33.9	1.4	10.0	0.2	0.8
98	J. Colville	2.0	32.2	0.8	15.9	5.8	32.2	1.1	8.4	0.1	0.7
99	J. Colville	1.8	32.0	0.7	15.8	6.8	32.6	1.0	7.0	0.1	0.7
Criteria		***-***	***90***	***-***	***30***	***-***	***50***	***8***	***25***	***2***	***4***

Note 1: see **Figure 4.1** Note 2: Project-related Residences 14, 15, 18 & 20 included in Heggies (2010) excluded

4.4 VISUAL AMENITY

4.4.1 Introduction

As noted in Section 3.3.5, the Proposal has the potential to impact upon visual amenity from vantage points to the north of the Mine Site. It should be noted that the Proposal represents an extension of an existing feature of the Mine, which itself is now an established aspect of the local setting, rather than a new disturbance.

4.4.2 Design Features and Other Visual Controls

As discussed in Section 3.3.5, the Mine is visible from a number of publically accessible or privately owned vantage points of the Werris Creek / Quipolly locality (see **Plates 3.1** to **3.4**). Mitigation of this visual impact has been carefully considered by the Applicant in the past with the following controls included as part of Mine operation.

- An Acoustic and Visual Amenity Bund has been designed and follows the eastern perimeter of the open cut to "Cintra" Hill at the northern end of the open cut. This bund, which reaches an elevation of 425m AHD, is under construction and provides for the screening of the open cut and lower faces of the overburden emplacement from Werris Creek Road and Werris Creek town.
- Operations within the Mine Infrastructure Area are largely screened from vantage points within Werris Creek by "Cintra" Hill, which is to be retained for the life of the Mine. The MIA Bund has been constructed to provide additional visual screens of the processing operations from vantage points to the north.
- The maximum height of the overburden emplacement (445m AHD) was specifically chosen as this is equivalent to highest point of the pre-mining Mine Site topography, "Old Colliery" Hill, which is to be removed.
- The design of the overburden emplacement and Acoustic and Visual Amenity Bund incorporates the following design controls to mitigate against the impact of these structures.
  - The slope of the created landform would not exceed 10º. This is similar to the slopes of the existing "Old Colliery" Hill (of up to 7º). **Plates 3.3** and **3.4** provide an illustration of a completed 10º slope when viewed from Werris Creek Road and the Quipolly area.
  - A tree screen would be planted between the road reserve and the toe of the overburden emplacement and Acoustic and Visual Amenity Bund. These plantings have already been commenced (see Plate 3.3) and screen/obstruct views of the Mine from passing cars.
  - The closest distance between the toe of the overburden emplacement or Acoustic and Visual Amenity Bund and the road shoulder will remain at least 35m.
- Areas of disturbance would continue to be progressively rehabilitated once they are no longer required for mining purposes.

In 2012, in response to concerns raised by a local Werris Creek resident over night time lighting, the Applicant commissioned a *Visual Impact Mitigation Assessment*[13] (RWC, 2012) to review options for further mitigation of impacts. The assessment recommended either the construction of a fence or bund beyond the affected residence or an increase in height to the Acoustic and Visual Amenity Bund. While ultimately the recommended mitigation measures were not implemented, as implementation required the agreement of the affected resident, it illustrates the approach of the Applicant to identifying and resolving issues associated with the visibility of the Mine. It is understood that night time lighting related complaints are now rarely received as administrative controls around the use of lighting plants become more entrenched. Notwithstanding, the discussion above, the Applicant implements the following administrative controls on the operation of lights at the Mine.

- Where the use of lighting plants are required in locations visible from vantage points external to the Mine Site, lights would not shine above horizontal and where practicable, will be generally orientated in a westerly direction away from Werris Creek Road and adjacent communities.
- All fixed lights visible from offsite locations will comply with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.
- A lighting camera located adjacent to R62 on southern edge of Werris Creek orientated towards the Mine monitors in near real time night lighting impacts from the Open Cut and Rail Load Out facility allowing operations to be monitored and managed as required.

4.4.3 Potential Changes to Visibility of the Mine

Views of the Mine from the south are unlikely to change as a consequence of the Proposal with the overburden emplacement having reached the full extent to the south.

Views of the Mine from the elevated vantage points on properties to the east of the Mine would continue to change as the open cut and overburden emplacement are progressively developed to the north. Notably, the construction of the Acoustic and Visual Amenity Bund ensures that views of the open cut are screened from Werris Creek Road.

The extension of the upper lifts of the overburden emplacement will result in this visible component of the Mine Site encroaching approximately 250m closer to Werris Creek. Notably, this distance would remain greater than 3.7km from Kurrara Street Werris Creek, the most southerly residential street of Werris Creek.

Effects of night time lighting are unlikely to change significantly given it is not proposed to increase the number of lighting plants operated, the implementation of the administrative controls noted in Section 4.4.2, and the fact that the operation of these lights on the more elevated sections of the overburden emplacement would only encroach an additional 250m towards residents in Werris Creek (still remaining at least 3.7km away).

[13] In accordance with *Condition 3(38)* of PA 10_0059.

4.4.4 Assessment of Impacts

Figures 4.5 and **4.6** identify the visibility arc and selected cross-sections illustrating the small increase in the visible area of the overburden emplacement from receivers at the southern edge of Werris Creek (Kurrara Street). It is noted that some residences located on the more elevated areas of the eastern edge of Werris Creek would have an equivalent visibility arc and line of sight. The cross-sections illustrate that the Acoustic and Visual Amenity Bund would ensure that only that section of the overburden emplacement above 420m AHD would be visible (see **Figure 4.6**).

Notably, the visible area of the overburden emplacement would remain more than 3.7km from Kurrara Street, with the distinction between views at 3.7km and 4.0km likely to be practically imperceptible. On the basis of this very minor change to the visibility of the overburden emplacement, the preparation of modified montages of potential views has been deemed unnecessary.

Given the Applicant has demonstrated its ability to minimise and mitigate the visual impact of the overburden emplacement, the most prominent feature of the Mine, through a design sympathetic to the surrounding rural setting, e.g. set-back from Werris Creek Road, reduced slope (10°), and successful progressive rehabilitation, the additional impact on local visual amenity of this minor modification is unlikely to be significant.

4.5 SURFACE WATER RESOURCES

4.5.1 Introduction

As illustrated by **Figure 4.7**, the Proposal would require some minor adjustment to the design and construction of surface water management features around the northern perimeter of the Acoustic and Visual Amenity Bund.

It is notable, however, that as the Proposal does not extend the overall Mine impact footprint, there would be no change to the catchments and drainage external to the Mine Site. As a result, the assessment completed as part of the original *Surface Water Assessment for the Werris Creek LOM Project* (GSSE, 2010) remains valid.

The following sub-sections provide a brief overview of the approach to be taken by the Proponent to ensure that appropriate modifications to the *Site Water Management Plan* are completed.

4.5.2 Design Features, Operational Controls and Management Measures

Acoustic and Visual Amenity Bund Drainage

Rather than divert all runoff to the north, then west and then south around "Cintra" Hill (as originally proposed in the *Environmental Assessment* for the LOM Project, RWC 2010) which would require significant earthworks to flow, it is proposed to drain the northern section of the Acoustic and Visual Amenity Bund to a new sediment basin (SB18) (see **Figure 4.7**).

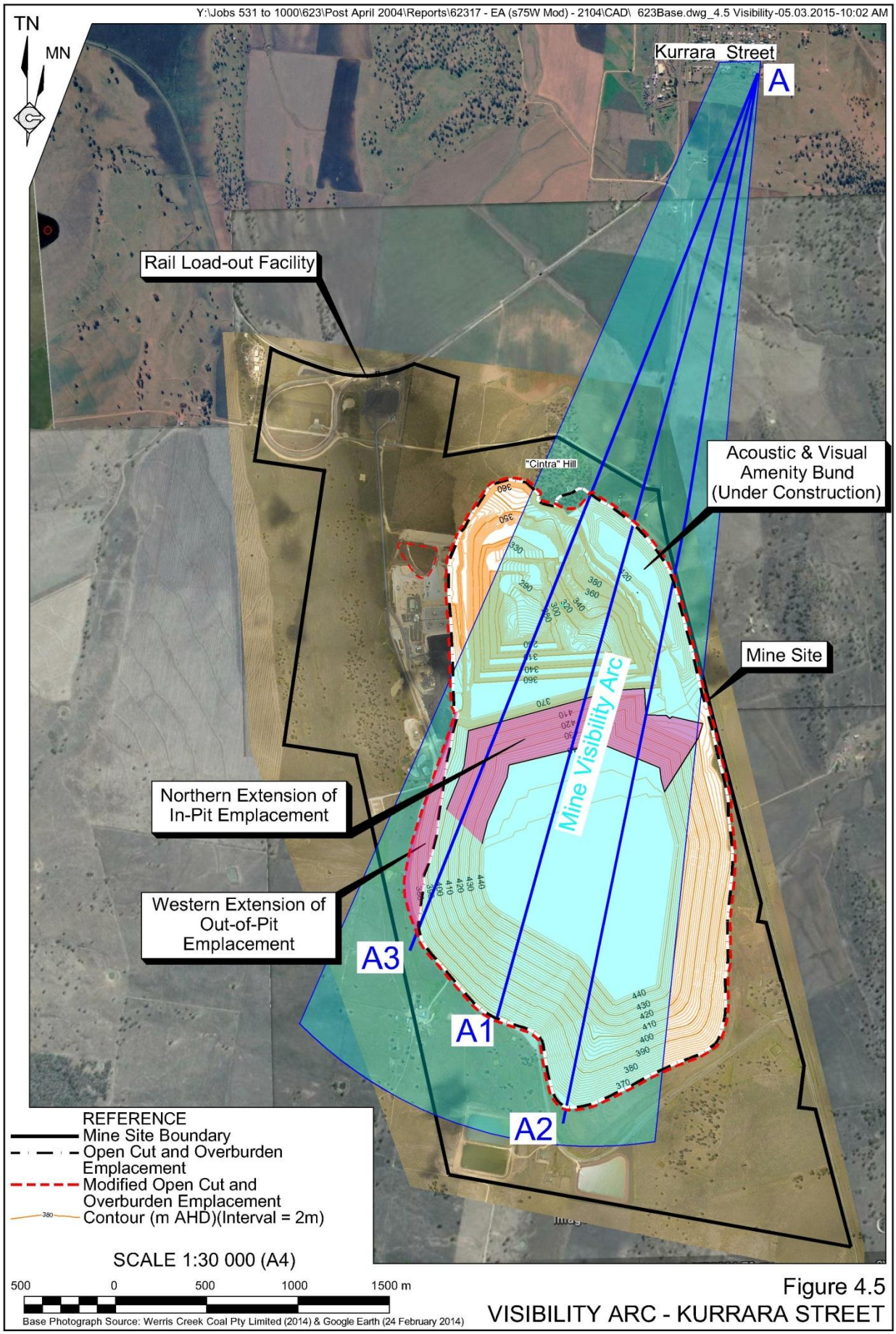

Figure 4.5
VISIBILITY ARC - KURRARA STREET

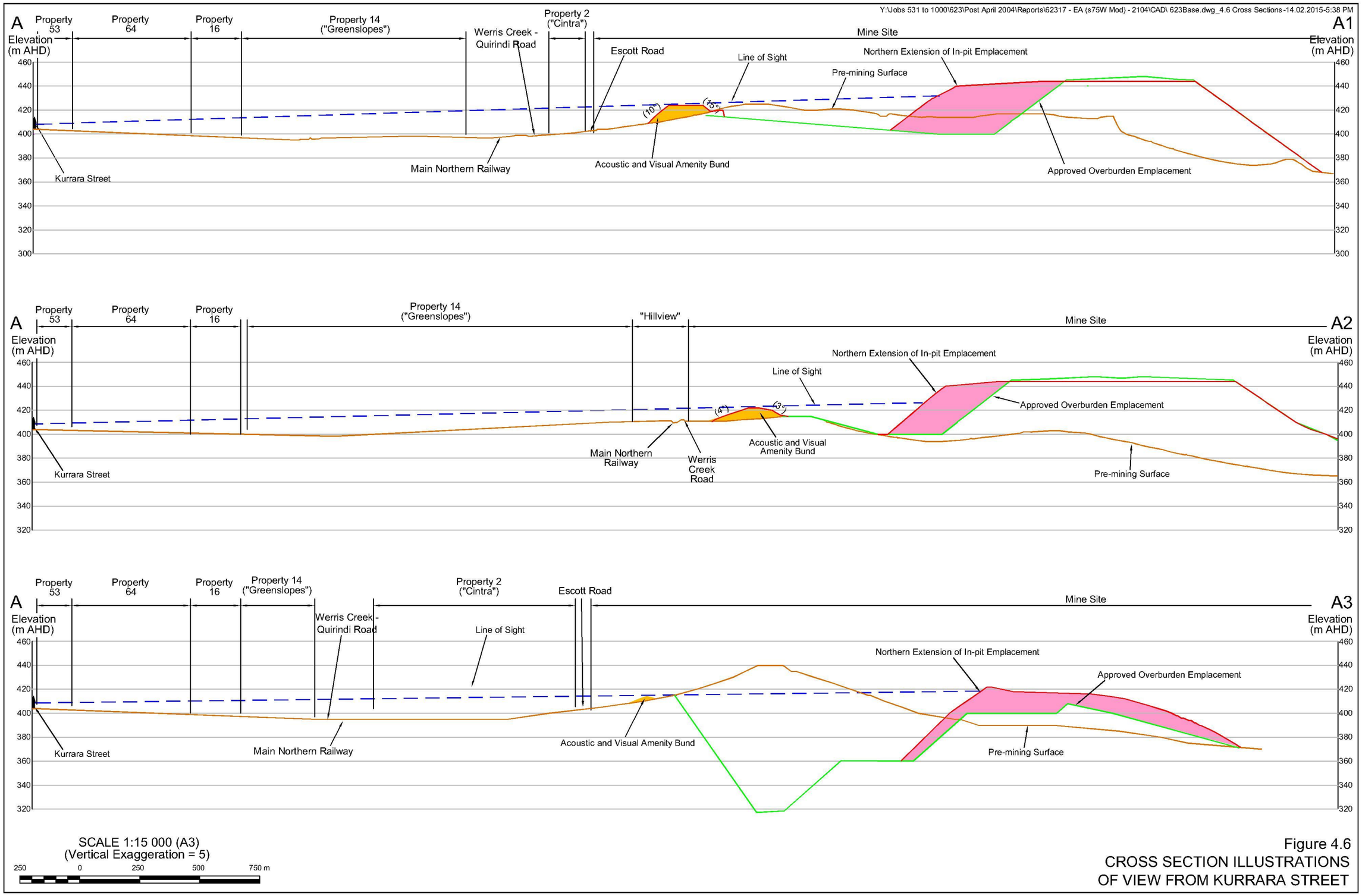

Figure 4.6
CROSS SECTION ILLUSTRATIONS
OF VIEW FROM KURRARA STREET

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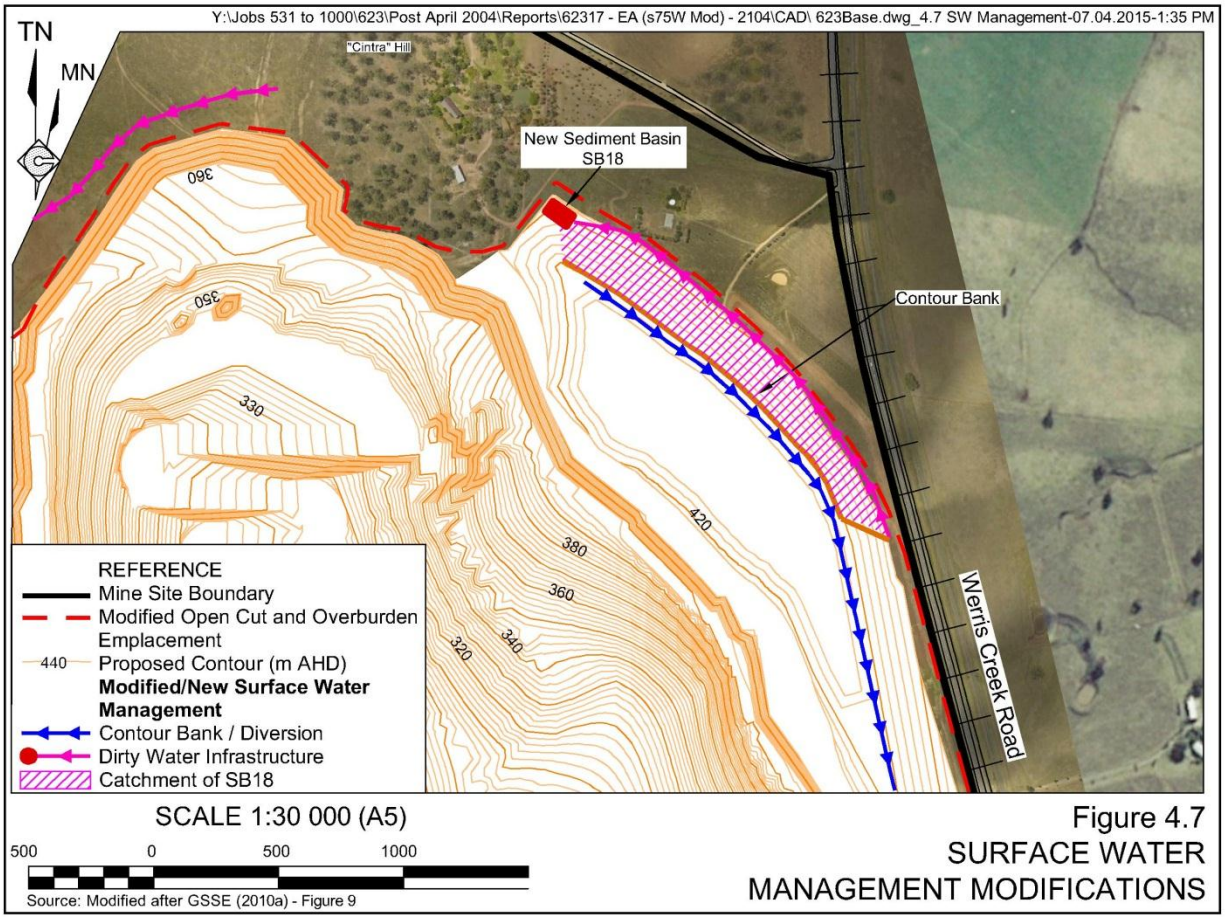


It is proposed to locate SB18 within the approved impact footprint of the Acoustic and Visual Amenity Bund to provide storage capacity for at least 2 000m^3 of sediment and water. This capacity, if appropriately managed would provide the necessary sediment storage and water settling zone capacity requirement for a 5-day 90th percentile rainfall event (39.2mm) and design features in accordance with Standard Drawing (SD) 6-4 of *Managing Urban Stormwater: Soils and Construction Vol. 1 4th Eds.* (Landcom, 2004) ("the Blue Book")the Blue Book.

The minimum sediment storage capacity has been calculated using the Revised Universal Soil Loss Equation (RUSLE) (Equation 1) to calculate 2 months soil loss.

$$(1)\quad S = \frac{0.17 \times A(R \times K \times LS \times P \times C)}{1.3}$$

Where:

- 0.17 = one sixth of the computed average annual soil loss
- 1.3 = the bulk density of the deposited sediment.
- A = the disturbed catchment area (<3ha).
- R = rainfall erosivity for the location (1500).
- K = soil erodibility (0.02).
- LS = length/gradient factor (9.05).
- P = erosion control practice factor (1.3).
- C= groundcover factor (1.0).

Using Equation 1, the minimum sediment storage capacity requirement for the catchment of SB18 is 138m^3.

To estimate the volume of runoff for a design rainfall event (5-day 90th percentile), Equation 2 was applied.

(2) $V = 10 \times C_v \times A \times R_{5\text{-day, }90\text{-\%ile}}$ (m^3)

Where:

10 = a unit conversion factor.

C_v = volumetric runoff coefficient for the design rainfall. Hydrologic Group D, as defined by Landcom (2004) as fine-textured (clay), surface sealed soils with high runoff potential, has been assumed (0.64).

A = the catchment (5ha).

$R_{5\text{-day, }90\text{-\%ile}}$ = rainfall for the design rainfall event (39.2mm).

Using Equation 2, the minimum water settlement capacity requirement for the catchment of SB18 is 753m^3.

A marker would be installed in SB18 to identify the water level above which less than 900m^3 storage capacity remains. Within 5 days of this level being exceeded, the water would either be pumped to another on-site structure or treated to achieve the water quality criteria of EPL 12290 assigned to other discharge points prior to discharge. Accumulated sediment would also be periodically excavated and placed with other overburden to maximise storage capacity. In the event of rainfall exceeding the design event (39.2mm in five days), water would overflow via a spillway designed in accordance with SD 6-4 of the Blue Book to the vegetated agricultural land to the north.

Overburden Emplacement Drainage

The design of drains, which provide for a fall of 1.2% to move runoff from the slopes of the overburden emplacement, would be reviewed and revised as required to ensure sufficient capacity for rainfall events up to a 1 in 20 ARI rainfall event.

4.5.3 Assessment of Impact

Acoustic and Visual Amenity Bund Drainage

SB18 has been designed and would be managed to collect runoff from the northerly portion of the Acoustic and Visual Amenity Bund within the existing approved impact footprint of this structure. If managed appropriately to retain the design storage capacity, and treat water prior to controlled discharge, any controlled discharge would be likely to comply with the water quality criteria of EPL 12290.

As the new sediment basin will be located within an already approved impact footprint, there will be no additional impacts on biodiversity or heritage features of the local setting.

Overburden Emplacement Drainage

Given the very small increase in catchment to the 1.2% drains which carry runoff off the surface of the overburden emplacement, it is considered unlikely these would require modification to maintain performance up to a 1 in 20 ARI rainfall event. Confirmation of this, or revision to design, would be included in an updated *Site Water Management Plan* for the Mine.

4.6 VOID WATER

4.6.1 Introduction

In order to cater for a possible surplus of void water under high rainfall conditions, the Applicant proposes to make this water available for beneficial agricultural uses on land surrounding the Mine Site. To confirm that irrigation could be undertaken without adverse effect on this agricultural land, the Applicant commissioned Strategic Environmental and Engineering Consultants (SEEC) to:

- assess the suitability of the void water for irrigation;
- review local soil parameters; and
- model the application of void water to local land in order to:
  - provide an indication of the area and application rate required to remove the predicted void water surplus; and
  - assess whether this irrigation would impact adversely on the receiving soils and catchment.

A complete version of the *Void Water Impact Assessment* of SEEC (2015) is provided as **Appendix 5**.

The following sub-sections provide a review of those features of the local setting critical to the assessment of irrigation potential (local topography, soil properties and void water quality), the assessment methodology, an overview of operational safeguards and management measures to be implemented, and an assessment of the potential impact of irrigation should it be undertaken.

4.6.2 Local Setting and Suitability

4.6.2.1 Topography and Drainage

Advice provided by SEEC (pers. comm. A. McLeod of SEEC) indicates that with the exception of poorly drained areas with slopes of less than 3%, the topography and drainage of the land surrounding the Mine Site would be conducive to irrigation. Two properties adjacent to the Mine were further investigated ("Escott" and "Cintra") as being representative of the landforms and soil types of the wider area and therefore able to be used for assessment as to the feasibility of irrigation of the Mine void water to agricultural lands in the local setting.

The topography of the "Escott" property to the west of the Mine Site rises gently to the west with some area of almost flat terrain (<3%) rising to moderately slopes approaching 10%. Surface drainage is to the north towards Werris Creek which flows at least 4km to the north.

The topography of the "Cintra" property to the north has relatively minor undulations with slopes generally between 3% and 5%. Surface drainage is also to Werris Creek approximately 3.5km to the north.

4.6.2.2 Water Quality

Table 2.2 provides a detailed summary of the quality of water sampled from the open cut void and void water dams. These results illustrated each of the analytes tested, generally comply with the Short Term Exposure (STE) trigger level for irrigation of ANZECC (2000). In particular, the concentration of metals was generally undetectable or present at very low concentrations (several orders of magnitude below the trigger levels).

SEEC (2015) reviewed these water quality results and summarised those parameters required as inputs to the irrigation model (ERIM) (see **Table 4.10**).

Table 4.10
Void Water Quality for Input to Irrigation Model

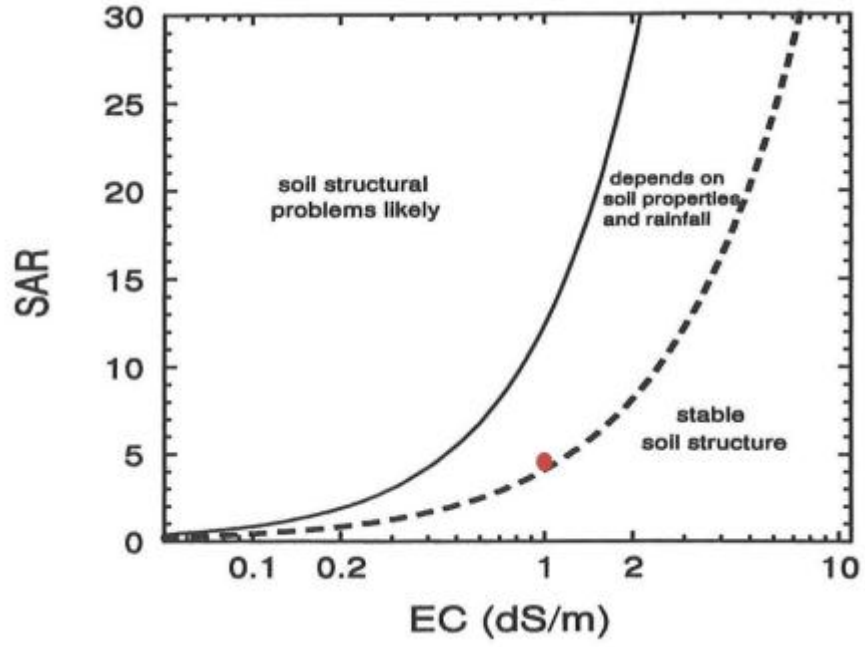
Sample Location	Electrical Conductivity µS/cm	pH	Sodium Absorption Ration (SAR)	Nitrate mg/L	Nitrite mg/L	Total Nitrogen (as N) mg/L	Total Phosphorous mg/L	BOD mg/L
VWD1	1 100	8.35	4.59	2.29	0.03	2.8	0	ND
VWD2	1 070	8.41	-	4.86	0.05	5.6	0	-
VWD3	994	8.74	4.82	2.48	0.07	3.6	0.06	-
VWD4	1 030	8.97	4.74	4.78	0.07	5.8	0	ND
Void (wet)	921	8.02	3.03	6.23	0.07	7.3	0.01	ND
Void (dry)	929	7.92	3.24	6.13	0.08	7.5	<0.01	<2
Mean	1 023	-	4.3	4.1	0.05	5.0	0.01	ND
Median	-	8.41	-	-	-	-	-	-

VWD = Void Water Dam
Source: Modified after SEEC (2015) – Table 3

Considering the void water quality, SEEC (2015) calculated the root zone salinity and plotted this against sodium absorption ratio (SAR). The root zone salinity (EC_{se} in dS/m) is calculated as EC_i (salinity of the water) divided by (2.2 x the root zone leaching fraction [LF]). Based on the texture of the soil, SEEC (2015) applies a LF of 0.3, therefore:

Root Zone Salinity = 1.02 / (2.2 x 0.3) = 1.55

The red circle on **Figure 4.8** represents the plotted root zone salinity against the SAR of 4.3 (see **Table 4.10**) over a base graph from ANZECC (2000) which defines the relationship between salinity, sodicity and affects on soil structure. This plot indicates that the void water would be suitable for irrigating common pasture without affecting soil structural stability.



Source: SEEC (2015) – Figure 2 / ANZECC (2000) – Figure 4.2.2

Figure 4.8
REVIEW OF VOID WATER SUITABILITY

4.6.2.3 Soils

A review of the soil landscape mapping of the Tamworth 1:100 000 map sheet (Banks, 2001) indicates that three soil landscapes are common on the land surrounding the Mine Site (see **Figure 4.9**), namely:

- 'The Siphon' Soil Landscape to the west;
- 'Escott' Soil Landscape to the north; and
- 'Duffs Gully' Soil Landscape to the north and south.

Banks (2001) notes that the 'Escott' Soil Landscape is derived from sandstone whilst 'The Siphon' and 'Duffs Gully' Soil Landscapes are of volcanic origin and derived from the Werrie Basalt. Anecdotal evidence provided by the Applicant with respect to land use suggests that the soils of the "Cintra" property to the north of Escott Road are in fact derived from Werrie Basalt and therefore more indicative of 'Duffs Gully' Soil Landscape. However, in order to remain consistent with previous soil and land capability assessments conducted on the Mine Site (GCNRC, 2004, GSSE, 2010), reference to the Escott Soil Landscape is retained. In any event, soil sampling and analyses completed for this assessment provide a more accurate representation of soil characteristics.

In order to identify the specific soil properties of the land of the local setting, for modelling and assessment purposes, soil samples from four locations were taken and analysed. **Figure 4.9** identifies the four soil sampling locations and **Table 4.11** presents the results of soil analyses.

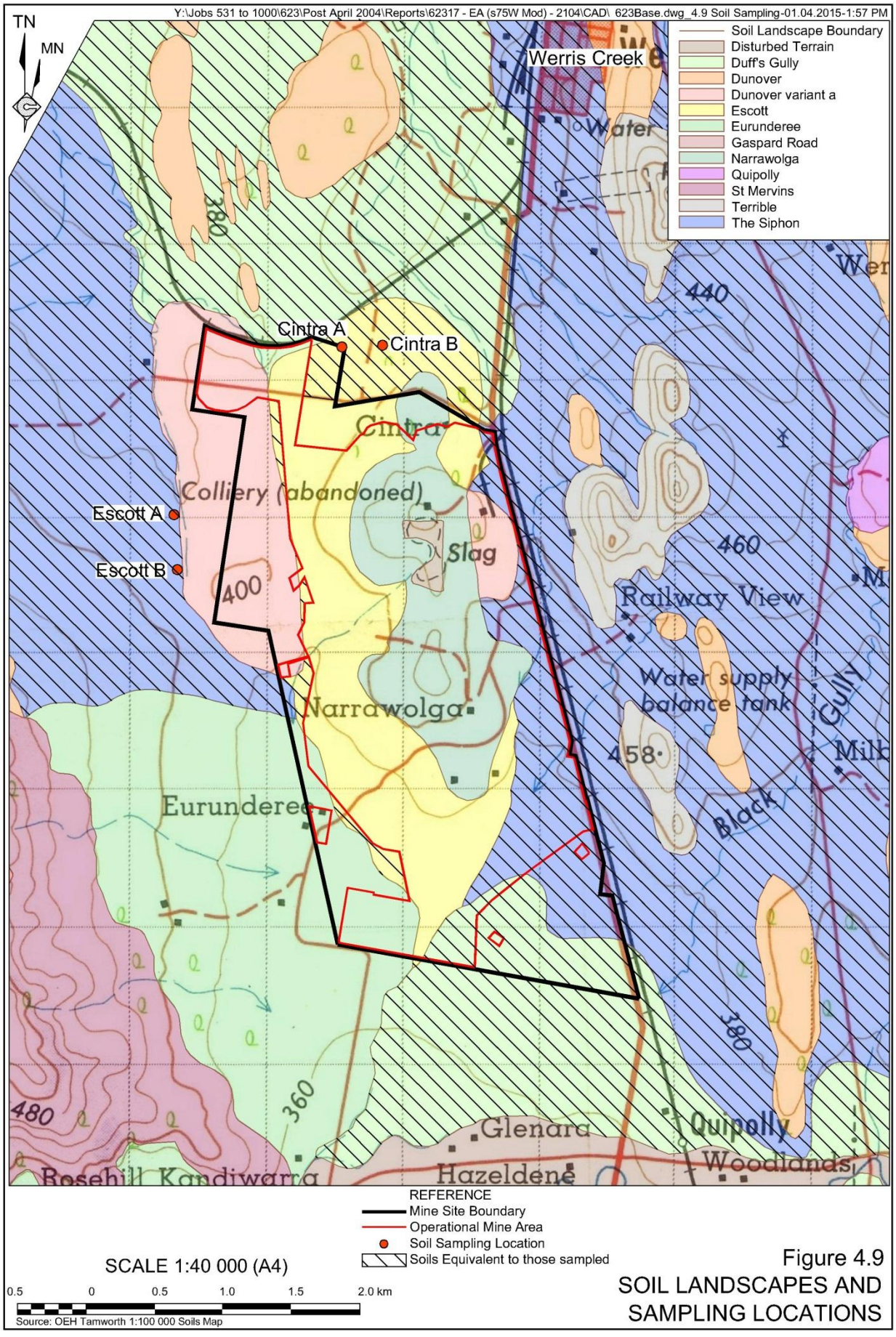


Figure 4.9
SOIL LANDSCAPES AND SAMPLING LOCATIONS

Table 4.11
Soil Properties

Sample Location and layer[1]	Texture	pH	Electrical Conductivity (µS/cm)	Cation Exchange Capacity (meq/100g)	Phosphorous Sorption (mg/kg)	Emerson Aggregate Test	Total carbon (%)
Cintra A1	Silty clay	6.6	55	30.7	1210	4	1.15
Cintra A2	Silty clay	7.9	40	43.4	1700	4	0.24
Cintra A3	Sandy clay	8.5	129	57.6	2480	4	0.25
Cintra B1	Silty clay	5.9	113	19.9	1400	4	0.9
Cintra B2	Silty clay	6.5	121	32.5	2410	4	0.46
Cintra B3	Sandy clay	7.2	73	36	1680	4	0.22
	Mean	7.1	88	36	1 813	4	**1.03**[2]
Escott A1	Silty clay	7.2	23	49.9	1340	4	1.09
Escott A2	Silty clay	7	46	54.1	1460	4	1.22
Escott A3	Silty clay	9.4	123	90.5	988	4	0.25
Escott B1	Silty clay	7.5	20	52.1	1660	4	0.94
Escott B2	Silty clay	8.1	26	48.7	2270	4	0.73
Escott B3	Clay loam	8	30	44.4	4670	4	0.4
	Mean	7.9	41	56.6	2065	4	**1.02**[2]
Note 1: See **Figure 4.9** Note 2: Topsoil							
Source: Modified after SEEC (2015) – Table 5							

SEEC (2015) provides a review of these results which suggest some small differences between the soils of the two properties. Most notably, the soils of the "Cintra" property are sandier at depth and have a lower Cation Exchange Capacity (CEC) (although in both cases the CEC is identified as high by SEEC, 2015).

Based on the observations of the Applicant noted above, the samples taken to the north of Escott Road, while mapped as 'Escott' Soil Landscape, are considered indicative of the 'Duffs Gully' soils which are mapped further to the north, as well as south of the Mine Site. On the basis of the soil sampling being representative of soils from the volcanic origin 'The Siphon' and 'Duffs Gully' Soil Landscapes, **Figure 4.9** also identifies (indicatively) the areas of land within the local setting to which the modelling described in Section 4.7.3 is directly relevant.

4.6.3 Assessment Methodology

As noted in Section 2.5.4, modelling the ability of land to accept void water without adversely impacting on soil properties or receiving waters has been undertaken by SEEC (2015) using the EPA endorsed *Effluent Reuse Irrigation Model* (ERIM)[14]. The model inputs, derived from the void water quality and soils sampling and analyses described in Sections 4.7.2.2 and 4.7.2.3, are provided in *Section 5.2.2.2* of SEEC (2015) and are not repeated here.

[14] The void water is not effluent as described in the POEO Act, however, the salinity of the void water exceeds the relevant trigger for stream water quality for a NSW upland stream (350µS/cm) (ANZECC, 2000). For this reason, SEEC (2015) took a conservative approach to assessment by treating the water as effluent and applying the *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004).

4.6.4 Operational Controls and Management Measures

As discussed in Sections 2.5.4.3 and 2.5.4.4, prior to the commencement of irrigation an assessment of the specifically nominated irrigation area(s) soils would be completed using ERIM. Based on the information obtained on specific location, additional sampling would be undertaken (unless samples taken and presented in **Table 4.11** are suitable based on location) to establish site specific parameters including soil texture, soil structure, effective root zone and those included in **Table 4.11**. Additionally, more detailed information on application method and crop type[15] would be available to enable these factors, which will influence the rate of water uptake, to be applied.

Following the confirmation of suitability of the land for irrigation, a site specific irrigation impact assessment would be prepared. **Table 4.12** presents an example of an Irrigation Schedule Protocol based on the soil samples of the local area to the Mine to demonstrate the practical application of void water to land by irrigation with the following information provided to aid interpretation of the protocol.

- Day 0 represents a rainfall day that produces runoff or previous irrigation, i.e. when the soil is saturated. On this date the soil water storage is set to the maximum permissible.
- Irrigation commences when soil water storage reaches zero, or alternatively a lighter irrigation could occur for a defined soil water storage value between 0 and the maximum.
- The amount of water applied (mm/m^2) is presented as effective rainfall. Once irrigation replenishes soil water storage back to the maximum allowable value again (soil is saturated) resets the protocol (i.e. starts back at Day 0).

4.6.5 Assessment of Impact

4.6.5.1 Introduction

It is noted that the impacts are assessed based on the ERIM outputs of SEEC (2015) which consider the more general evaluation of irrigating void water to the lands characterized by the soil sampling (see Section 4.7.2.3).

4.6.5.2 Irrigation Area / Rate

SEEC (2015) reviewed the graphs produced by ERIM comparing storage requirement versus land area. These graphs (presented as *Figures 3* and *4* in SEEC, 2015), illustrate that given the available storage for void water would exceed 600ML for the life of the Mine, the land area required for irrigation could be kept low (32ha if 200ML to be irrigated and 80ha if 500ML to be irrigated). This represents an indicative irrigation rate of 6.25ML/ha/year.

[15] On the basis of the recorded sodium concentration of void water, it is recommended that sensitive crops (as defined by ANZECC, 2000) are avoided.

Table 4.12
Irrigation Schedule Protocol Spreadsheet (Example)

Date	Evaporation (mm)[1]	Crop Factor[2]	Crop water Use (mm)[3]	Effective Rainfall (mm/m^2)[4]	Soil Water Storage (mm)
Day 0				Irrigated	70[5]
Day 1	3	0.9	2.7	0	67.3
Day 2	2.3	0.9	2.07	0	65.23
Day 3	5	0.9	4.5	0	60.73
Day 4	8	0.9	7.2	0	53.53
Day 5	6	0.9	5.4	0	48.13
Day 6	5.5	0.9	4.95	0	43.18
Day 7	7.5	0.9	6.75	0	36.43
Day 8	8.5	0.9	7.65	0	28.78
Day 9	0	0.9	0	5	33.78
Day 10	0	0.9	0	5	38.78
Day 11	9	0.9	8.1	0	30.68
Day 12	5	0.9	4.5	0	26.18
Day 13	3	0.9	2.7	0	23.48
Day 14	0	0.9	0	5	28.48
Day 15	5	0.9	4.5	0	23.98
Day 16	8	0.9	7.2	0	16.78
Day 17	3	0.9	2.7	0	14.08
Day 18	2.3	0.9	2.07	0	12.01
Day 19	5	0.9	4.5	0	7.51
Day 20	8	0.9	7.2	0	0.31
Day 21	6	0.9	5.4	Irrigate	

Note 1: Evaporation may be obtained for a nearby locality from the Bureau of meteorology

Note 2: This will vary depending on the crop and time of year. Advice from a qualified agronomist would be sought.

Note 3: Refers to Evaporation x Crop Factor

Note 4: Effective rainfall assumes the first 5 mm of any rainfall event in spring, summer and autumn is ignored. Daily rainfall would be measured on site.

Note 5: This is the estimated allowable water depletion (70 mm for silty clay). Advice from a qualified agronomist should be sought.

Source: Modified after SEEC (2015) – Table 6

4.6.5.3 Nutrient Concentration

SEEC (2015) note that as nutrient concentrations in the water are very low, they would not match crop demand and so the model predicts they would not increase in the soil over time (refer to *Figures 5* and *6* of SEEC, 2015).

4.6.5.4 Other Contaminants

As noted in Section 4.6.2.2, the concentration of metals and other analytes tested were generally undetectable or present at very low concentrations (several orders of magnitude below the trigger levels).

4.6.5.5 Salinity

On the basis of the relatively low salinity of the water, and the low percolation rate adopted, SEEC (2015) report that salt should not build up in the soil nor become entrained in surface runoff or leach to groundwater. Therefore, there should be no discernible impact on the overall salt load in the Namoi Catchment and the completion of a quantified salt balance is not considered necessary.

4.6.6 Monitoring

Monitoring of void water quality, for the parameters identified in **Table 4.10**, would be included in the quarterly surface water monitoring program of the Mine. Ongoing sampling and analysis of soils representative of land being irrigated would be undertaken to quantify potential soil impacts.

4.7 TRANSPORTATION

4.7.1 Introduction

As noted in Section 3.3.9, the Proposal has the potential to change traffic conditions on Werris Creek Road and Taylors Lane between the hours of 6:00pm and 10:00pm. As discussed in Section 4.2.4, this would have no influence on compliance with road noise criteria, however, could affect local road users.

4.7.2 Design Features, Operational Controls and Management Measures

4.7.2.1 Design Features

Mine Access – Werris Creek Road Intersection

This intersection has been constructed as a Modified Basic Right (BAR) intersection and remains appropriate for the relatively small number of trucks which would enter and exit the Mine Site on any one day (refer to Section 2.6.3) and low numbers of traffic using Werris Creek Road. Sight distance is extensive in both directions and local gradients allow trucks to accelerate to local speed limits quickly.

Werris Creek Road – Taylors Lane Intersection

As reported in RWC (2010), the Auxiliary Right Turn (AUR) and the Auxiliary Left Turn (AUL) treatment of the Werris Creek Road – Taylors Lane Intersection assists in achieving the dimensional capacity to improve B-Double manoeuvres onto and off Werris Creek Road. While the current storage zone for right turning traffic is restricted, it does provide for the storage of the configuration of trucks used for coal haulage.

Given coal carrying trucks from the Werris Creek Coal Mine would continue to represent only a small proportion of vehicles using this intersection (which was constructed for the purpose of providing a by-pass for heavy vehicles around Quirindi), and no increase in the number of trucks emanating from the Mine is proposed, there is no need for any modification to this intersection.

Taylors Lane – Kamilaroi Highway Intersection

This intersection does not meet the appropriate Austroads Standard. However, given the use of this intersection by Mine generated traffic would remain a relatively small proportion of total vehicle traffic (6%), and the fact that the intersection falls below the Austroads Standard regardless of Mine traffic, it has been previously assessed (Constructive Solutions, 2010) that the intersection upgrade remains the responsibility of the road authority.

4.7.2.2 Operational Safeguards and Management Measures

The truck configurations that would be used for the road haulage of the coal would be the same as those currently used, namely: Truck and Stag; Truck and Superdog; and 25m B-Double configurations.

Existing management of road haulage from the Mine would continue to be implemented including the processes for:

- Convoying of trucks exiting the Mine Site would be avoided.
- Drivers would be instructed to obey all speed restrictions, other road rules and always operate in an appropriate and courteous manner to other road users.

4.7.3 Assessment of Impacts

The volume of truck movements from the Mine Site would be restricted by the limit on road transport imposed by PA 10_0059. Therefore, road traffic from the Mine Site would continue to be undertaken as periodic campaigns to supply specific domestic customers, the largest of which is the Whitehaven CHPP.

Considering the records of road transportation maintained by the Applicant (see Section 2.6.3), even on the heaviest traffic days, truck movements would generally be restricted to less than 86. When spread over the 15 hours proposed for road transport, this represents less than six movements per hour. This would have no noticeable impact on road capacity or intersection performance and considering the small number of trucks which would be operated, the movement of trucks could be easily schedule to avoid convoying.

There would be no change to previous assessments of road traffic noise which indicated road traffic levels well below criteria (refer to Section 4.2.5). As no road transport is proposed during the night time period, sleep disturbance does not require consideration.

It is the conclusion of this assessment that the proposed increase in hours of road transportation would allow for the concurrence of hours of operation between transport and the Whitehaven CHPP, the largest domestic customer of Werris Creek Coal, without any significant impact on road condition, intersection performance or noise. In fact, by allowing for evening transport of coal, the number of trucks travelling between the Mine and Whitehaven CHPP during the day when the majority of other road users are on the roads would be reduced.

5. SUMMARY OF PROPOSED MODIFICATIONS TO CONDITIONS OF PA 10_0059

As noted in Section 2.1.2, the Applicant proposes a range of minor administrative adjustments to the conditions of PA10_0059 to further clarify the intent of the conditions and remove conditions that are deemed no longer applicable. These are summarised as follows.

Schedule 2 Administrative Conditions

6. The Proponent shall not extract more than 2.5 million tonnes of ROM coal from the site in a ~~calendar~~ financial year.

Schedule 3 Environmental Performance Conditions

1. The Proponent shall ensure that the noise generated by the project (including noise generated on the Werris Creek Rail Spur) does not exceed the criteria in Table 1 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 1: Noise criteria

Location	***Day dB(A)*** $L_{Aeq(15\ min)}$	***Evening & Night dB(A)*** $L_{Aeq(15\ min)}$	***Night dB(A)*** $L_{A1\ (1\ min}$
~~R18~~	~~40~~	~~37~~	~~45~~
R10, R11~~, R14~~	39	39	45
~~R20,~~ R21	39	37	45
R12, R96, 97, R98, 16, 64	38	38	45
R7, R8, R9, R22, R24	37	37	45
All other privately-owned land	35	35	45

3. Upon receiving a written request from the owner of the land listed in Table 3, the Proponent shall implement additional noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at any residence on the land in consultation with the owner. These measures must be reasonable and feasible.

   If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

Table 3: Land subject to additional noise mitigation measures

R10	~~R18~~
R11	~~R20~~
R12	R21
~~R14~~	R96

~~33. Prior to the use of the Northern Site Access Road, the Proponent shall:~~
~~(a) construct the intersection of the Northern Site Access Road (see the figure in Appendix 2) to the satisfaction of Council;~~
~~(b) tar seal Escott Road from Werris Creek Road to the coal haul road to the satisfaction of Council;~~
~~(c) upgrade the intersection of Escott Road and Werris Creek Road to a CHR type intersection to the satisfaction of RTA and Council;~~
~~(d) install appropriate rail crossings at the rail loop on Escott Road; and~~
~~(e) install appropriate advance warning signs and lighting on Escott Road and at the intersection of the Northern Site Access Road to the satisfaction of Council.~~

~~34. Within 3 months of the commencement of coal transport from the Northern Site Access Road, the Proponent shall close the existing mine entrance on Werris Creek Road (see Figure 1 of Appendix 2) to coal transport (unless required in an emergency).~~

6. UPDATED STATEMENT OF COMMITMENTS

Since the completion of RWC (2010) and issue of PA 10_0059, the Applicant has prepared, implemented and in some cases updated a number of management plans with the objective of minimising and managing impacts on the local environment. As a consequence, some commitments included as *Appendix 6* of PA 10_0059 have been superseded by operational controls or management measures documented in the management plans.

Furthermore, this *Environmental Assessment* provides for several additional commitments in relation to environmental management of the Mine.

Table 6.1 provides an updated list of the commitments to environmental management applicable to the Mine, as currently operating and modified.

- Blue text represents new or modified commitments as a result of operations since the issue of PA 10_0059.
- Struck through ~~blue text~~ reflects commitments no longer relevant or superseded by controls or measures included in subsequently prepared and implemented management plans.
- Red text represents new or modified commitments provided for by this Proposal.
- Struck through ~~red text~~ reflects commitments no longer relevant as a result of this Proposal.

Table 6.1
Draft Statement of Commitments for Site Operations and Management

Page 1 of 17

Desired Outcome	Action	Timing
1. Environmental Management System		
A systematic set of documents are in place to guide the planning and implementation of all environmental management strategies.	1.1 Incorporate the environmental procedures in an on-site management system.	As required
	1.2 Implement the following management plans; • Mining Operations Plan (Rehabilitation Management Plan) • Heritage Management Plan • Site Water Management Plan • Noise Management Plan • Blast Management Plan • Air Quality and Greenhouse Gas Management Plan • Biodiversity and Offset Management Plan • Waste and Hydrocarbon Management Plan	Ongoing
	1.3 Incorporate relevant environmental data / information in Annual Environmental Management Reports.	Annually

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
2. Groundwater		
~~Effective management of water dewatered from the former Werris Creek Colliery underground workings.~~[16]	~~2.1 Dewater water from the underground workings to the already approved groundwater storage cells Void Water Dams and use it preferentially for dust suppression activities.~~	~~Ongoing~~
Effective management of the potential contamination and/or reduction in availability of groundwater resources.[17]	2.2 Implement impact mitigation measures ~~associated with the contamination of groundwater due to a hydrocarbon spill~~ in accordance with ~~the~~ an approved Site Water Management Plan.	~~If contamination of groundwater due to a hydrocarbon spill occurs~~ As defined by the Site Water Management Plan
	2.3 Undertake ~~Increase the~~ groundwater monitoring in accordance an approved Site Water Management Plan ~~regime analytes monitored and/or frequency of sampling to confirm the magnitude and extent of any change in water chemistry and verify the change is a consequence of operations associated with the LOM Project~~.	~~If pH or EC trigger level exceeded~~ As defined by the Site Water Management Plan
	2.4 Implement additional assessment, land owner notification and contingency or compensatory measures in accordance with an approved Site Water Management Plan~~. In the event that routine monitoring indicates that a groundwater trigger has been reached, commission a hydrogeologist to review the data, and provide independent advice as to the cause of the trigger. The outcomes of that review, including any recommendations, will be subject to discussion and agreement with hydrogeologists from NOW.~~	~~In the event that routine monitoring indicates that a groundwater trigger has been reached~~ As defined by the approved Site Water management Plan
	~~2.5 If the saturated thickness in any bore is reduced below trigger level, notify the affected landowner(s).~~	~~If the saturated thickness trigger level is achieved in any bore~~
	~~2.6 If a reduction in the saturated thickness within any bore is in excess of the trigger level, and is determined to be as a consequence of operations associated with the LOM Project, negotiate with the affected landowner(s) with the intent of formulating an agreement in accordance with the *Site Water Management Plan.*~~	~~In the event that monitoring identifies a reduction in the saturated thickness and is determined to be a consequence of operations associated with the LOM Project~~

[16] Dewatering of the former Werris Creek Colliery underground workings has been completed.
[17] Groundwater management, monitoring and contingency measures are based upon but may supersede commitments included in assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
Prevent Accumulation of void water within the final landform which may impact on final land form and land use.[18]	2.7	Backfill overburden into the final void above the equilibrium water level ~~following the cessation of mining in order to avoid leaving a potentially saline water body~~.	Following the cessation of mining
3. Surface Water			
Effective management of the potential contamination and/or reduction in availability of surface water resources.[19]	3.1	Construct and maintain surface water management infrastructure of the Mine in accordance with an approved *Site Water Management Plan*.	Ongoing
	3.2	Implement impact mitigation measures in accordance with an approved *Site Water Management Plan.*	As defined by the Site Water Management Plan
	3.3	Undertake surface water monitoring in accordance an approved Site Water Management Plan.	As defined by the Site Water Management Plan
Prevention of void water discharge off site.	3.4	Operate void water dams with sufficient freeboard to prevent discharge during high rainfall events.	Ongoing
	3.5	Complete an irrigation assessment for specific irrigation campaigns in accordance with EPA requirements.	Prior to commencement of off-site irrigation
	3.6	Provide each irrigation assessment to the EPA for review and approval.	Prior to commencement of off-site irrigation
4. Biodiversity			
Avoid, minimise, mitigate or offset impacts (in that hierarchical order) on native vegetation (including the two identified EECs), native fauna (including threatened species) and their habitat.[20]	~~4.1~~	~~Ensure disturbance associated with the relocation of site infrastructure occurs in the locations specified on **Figure 2.1**, i.e. on cleared and cultivated land (Condition Class 1), or derived native grassland without native tree overstorey (Condition Class 3).~~[21]	~~Ongoing~~
	4.2	Implement the impact avoidance, minimisation, mitigation and offset measures of an approved Biodiversity Offset Strategy and Biodiversity and Offset Management Plan (BOMP) for the Mine in consultation with the ~~DECCW~~ OEH, ~~DoP~~ DPE and ~~DSEWPaC~~ DoE.	Ongoing

[18] This commitment is additional to measures included in the Site Water Management Plan.
[19] Groundwater management, monitoring and contingency measures are based upon but may supersede commitments included in assessment documentation.
[20] Biodiversity management, monitoring and contingency measures are based upon but may supersede commitments included in assessment documentation.
[21] Relocation of the Mine Infrastructure Area has been completed.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
Avoid, minimise, mitigate or offset impacts (in that hierarchical order) on native vegetation (including the two identified EECs), native fauna (including threatened species) and their habitat.[22] (Cont'd)	4.3 Include detail on the following activities in the BOMP. • Identification and demarcation of areas to be cleared. • Retention of felled trees for subsequent use during rehabilitation activities • Identification of ~~Identify, as part of the Pre-start Clearing Inspection,~~ biological resources within the disturbance area including habitat resources such as hollows, stag trees and coarse woody debris, and the availability of endemic seed. • Seed collection. • Monitoring and inspection programs. • Noxious weed management.	As defined within the BOMP
	~~4.4 Limit vegetation clearing each year to an area required for the following 12 months mine development.~~	~~Annual~~
	~~4.5 Undertake vegetation clearing during a single campaign each year (except when there are extenuating circumstances), preferably during seasons that minimise the risk of impacting on hibernating microbats or breeding woodland birds, i.e. Autumn.~~	~~Vegetation clearing and ongoing~~
	~~4.6 Commission a Pre-start Clearing Inspection of the proposed disturbance area by an ecologist to identify the presence of native fauna (including threatened species such as the Koala and microbats).~~	~~Vegetation clearing and ongoing~~
	~~4.7 Suspend all clearing activities, in the event a koala (or other threatened fauna species) is present in the trees to be cleared, until it moves away from the subject area or is relocated by a suitably qualified person.~~	~~Prior to clearing operations within areas of remnant vegetation.~~
	~~4.8 Clearly mark / peg areas required for surface infrastructure establishment and mining.~~	~~Ongoing~~
	~~4.9 Retain felled trees on the Project Site for subsequent use during rehabilitation activities.~~	~~Site establishment and rehabilitation phases~~

[22] Biodiversity management, monitoring and contingency measures are based upon but may supersede commitments included in assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
~~Mitigate unavoidable disturbance to native vegetation and fauna habitat.~~	4.10 ~~Implement a seed collection strategy and program to harvest endemic seed from local vegetation to either directly sow or propagate for tube stock planting in either biodiversity offset or rehabilitation areas.~~	~~Ongoing~~
	~~4.11 Complete monitoring and inspection programs to review the progress of rehabilitation against criteria based on vegetation community benchmark data.~~	~~Annual~~
Rehabilitate disturbed areas to create a final landform that maintains or improves biodiversity values of the Mine Site.[23]	4.12 Complete rehabilitation in accordance with an approved Rehabilitation Management Plan (RMP) or Mining Operations Plan (MOP). ~~Create a final landform generally similar to that of the pre-mining landform, i.e. approximating the conceptual final landform provided by **Figure 2.18**.~~	Ongoing
	~~4.13 Revegetate the final landform as nominated by **Figure 2.18** **Figure 2.**6 (or subsequent Rehabilitation Management Mining Operations Plan), i.e. predominantly native woodland vegetation which will supplement the LOM Project BOS and improve the linkage between remnant areas of native woodland vegetation to the east and west.~~	~~Ongoing~~
	~~4.14 Designate approximately 3.7ha of the final landform as Brigalow woodland to replace the 0.35ha of this vegetation type removed.~~	~~During rehabilitation~~
~~Rehabilitate disturbed areas to create a final landform that maintains or improves biodiversity values of the Project Site.~~	~~4.15 Augment habitat through the placement of previously cleared timber (on the ground as well as upright 'stags') to provide important habitat value for arboreal and ground hollow dependant fauna and perching sites.~~	~~During rehabilitation operations~~
~~Manage the impacts of noxious weeds~~	~~4.16 Monitor noxious weeds on a regular basis, and if required, conduct weed management campaigns to manage weed outbreaks.~~	~~Ongoing~~
~~Minimise or avoid impacts on native fauna ()~~	~~4.17 Undertake vegetation clearing during a single campaign each year (except when there are extenuating circumstances), preferably during seasons that minimise the risk of impacting on hibernating microbats or breeding woodland birds, i.e. Autumn.~~	~~Vegetation clearing and ongoing~~
	~~4.18 Commission a Pre-start Clearing Inspection of the proposed disturbance area by an ecologist to identify the presence of native fauna (including threatened species such as the Koala and microbats).~~	~~Vegetation clearing and ongoing~~

[23] Rehabilitation measures contained within the Rehabilitation Management Plan are based upon but may supersede commitments included in assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
~~Minimise or avoid impacts on native fauna ()~~ (Cont'd)	~~4.19 Suspend all clearing activities, in the event a koala (or other threatened fauna species) is present in the trees to be cleared, until it moves away from the subject area or is relocated by a suitably qualified person.~~	~~Prior to clearing operations within areas of remnant vegetation.~~
~~Offset residual impact of the Mine LOM Project~~	~~4.20 Develop and implement, in consultation with the DECCW OEH, DoP DPE and DSEWPaC DoE, a Biodiversity Offset Strategy and Management Plan for the LOM Project.~~	~~Ongoing.~~
5. Heritage		
Maintain Aboriginal heritage values on site.	5.1 Implement the Heritage Management Plan for the Mine in consultation with OEH and DPE.	Ongoing
	5.2 Relocate ~~Re-instate~~ the Narrawolga Axe Grinding Grooves to ~~a position as close as possible to their original location following rehabilitation of the Project Site~~ the Willow Tree Visitor Information Centre (at Willow Tree), as nominated in the Mine Heritage Management Plan, and in accordance with a care agreement transferring the responsibility from Werris Creek Coal to Nungaroo LALC ~~consultation with local Aboriginal community representatives~~.	~~Following mine closure~~ Timing to be negotiated with Nungaroo LALC and Liverpool Plains Shire Council
	~~5.3 Continue awareness training of staff and contractors for cultural heritage matters~~	~~Ongoing~~
	~~5.4 In the event the Project Site disturbance footprint changes, ensure that appropriate consultation and field survey is undertaken to confirm no sites or objects of Aboriginal heritage significance are impacted.~~	~~If the disturbance footprint changes~~
~~Maintain Aboriginal heritage values on site.~~	~~5.5 In the event any previously unidentified 'objects' or other Aboriginal sites (such as burials) are uncovered, ensure that work in that area is suspended and the OEH Western Regional Archaeologist (Dubbo Office) and local Aboriginal community are contacted to discuss how to proceed.~~[24]	~~If a previously unidentified object or Aboriginal site is uncovered~~
~~Develop an historic context for the Project Site particularly in reference to the operation of the former Werris Creek Colliery.~~	~~5.6 Salvage the concrete marked with the hand and footprints of the former Deputy Mine Manager's daughter at the residence and provide to Ms Dora Koops (one of the daughters) for posterity.~~	~~Prior to the demolition of the residence~~
	~~5.7 Provide the photo record held by the Proponent and its consultants to the Werris Creek Historical Society (or other similar community group) as a record of the remnant features at the time of removal.~~	~~Once available~~

[24] Commitments 5.3 – 5.5 may be superseded by the Mine Heritage Management Plan

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
~~Develop an historic context for the Project Site particularly in reference to the operation of the former Werris Creek Colliery.~~ (Cont'd)	~~5.8 Provide a copy of the Cultural Heritage Assessment (Landskape, 2010) to the Werris Creek Historical Society (or other similar community group) as a record of the remnant features at the time of removal.~~[25]	~~Once available~~
6. Transport Aspects		
Product haulage by public road is conducted in an appropriate and safe manner.[26]	~~6.1 Design all recommended road and intersection upgrades to accommodate B-Double use and to the satisfaction of the relevant road authority.~~	~~In designing road and intersection upgrades~~
	~~6.2 Complete all intersections to a standard providing appropriate dimensional capacity and signage and to the satisfaction of the relevant road authority.~~	~~During road and intersection construction~~
	6.3 Prevent spillage from the trucks through the continuation of a 'covered load' policy.	Ongoing
~~Accommodate the increased volume of traffic using Escott Road.~~	~~6.4 Upgrade the intersection between Escott Road and Werris Creek Road as recommended by Constructive Solutions (2010) to the satisfaction of the relevant road authority.~~	~~During the construction phase of the Project~~
	~~6.5 Upgrade Escott Road as recommended by Constructive Solutions (2010) to the satisfaction of the relevant road authority.~~	~~During the construction phase of the Project~~
~~Maintain access across the rail turn-around loop.~~	~~6.6 Construct two level crossings across the rail turn-around loop.~~[27]	~~During construction of the rail turn-around loop~~
	~~6.7 Construct an emergency side track around the rail loop to allow emergency access should the road be blocked by a train.~~[28]	~~During construction of the rail turn-around loop~~
~~Contribute to the maintenance of Taylors Lane.~~	~~6.8 Provide ongoing funding for maintenance of Taylors Lane on a per tonne basis (in the form of section 94 contributions).~~[29]	~~Ongoing~~
7. Noise		
Attenuate mining noise sources to ensure compliance with Project Specific Noise Criteria.	7.1 Construct an Acoustic and Visual Amenity Bund at the northern extent of mining operations.	~~Once~~ Prior to mining through the "Old Colliery" Hill
	7.2 Implement noise mitigation and management measures in accordance with an approved Noise Management Plan (NMP).[30]	Ongoing

[25] Commitments have been completed as nominated and no longer require inclusion.
[26] No upgrades now proposed as part of mine operations and so reference to road and intersection standards unnecessary.
[27] Crossings not required as road constructed around rail loop.
[28] Commitment has been completed as nominated and no longer requires inclusion.
[29] Included under "Community Contributions".
[30] Blasting related management measures include in BMP are based upon but may supersede commitments contained within the assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
Attenuate mining noise sources to ensure compliance with Project Specific Noise Criteria. (Cont'd)	~~7.3 Locate all mining related infrastructure, e.g. the Coal Processing Area and Site Administration and Facilities Area, in such a way that local topography (of "Old Colliery" and "Cintra" Hills) provides a natural acoustic barrier to the town of Werris Creek and the residential receivers located to the south of the town.~~	Ongoing ~~During the construction phase of the Project~~
	~~7.4 Use temporary ROM coal stockpiles from time to time within the open cut mine area to minimise the transmission of noise during night-time operations.~~[31]	~~Ongoing during night-time period~~
	~~7.5 Continue to cover the conveyor belt of the rail load out facility.~~	~~Ongoing~~
	7.6 Employ a dedicated Noise Control Operator (NCO) to continually monitor real time noise levels and inform the Open Cut Examiner (OCE) if the dominant noise source is mining.	Ongoing
	7.7 Modify or partially suspend mining operations to achieve the nominated noise criteria when elevated noise levels a result of mining noise.	On advice from NCO of elevated mining noise
	~~7.8 Ensure that all noise mitigation measures nominated in an approved Noise Management Plan are implemented to ensure that all noise emissions from the Project Site meet predicted noise levels. This may include the following.~~	
	~~• Apply the manufacturer specified attenuator kits to each truck to achieve a noise reduction of 8dB.~~	~~Ongoing~~
	~~• Apply a 1 600rpm reverse gear limiter on bulldozers operating on exposed areas of the Project Site such as the Product Coal Storage Area and ROM Pad.~~	~~Ongoing~~
	~~• Construct a 5m high barrier around the northeastern perimeter of the relocated coal processing infrastructure.~~	~~Within 6 months of Project Approval~~
	~~• Ensure that all equipment exhibits sound power levels consistent with the schedules in *Appendix D* of Spectrum Acoustics (2010).~~	~~Ongoing~~
	~~• Limit the number of operating drills (non exploration) on the Project Site to two at any one time.~~	~~Ongoing~~
	~~• Stand down all mobile equipment operating to the north of the advancing open cut under noise enhancing conditions during the evening and night-time, i.e. temperature inversion and winds from the south-southeast or northwest.~~	~~During adverse meteorological conditions during the night time period~~

[31] Superseded by use of Real Time Noise Monitor and Noise Control Officer.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
Attenuate mining noise sources to ensure compliance with Project Specific Noise Criteria. (Cont'd)	~~• Whilst the Coal Processing Area remains in its current location, limit the number of trucks and excavators operating during inversion conditions to 10 and 3 respectively.~~ ~~• Ensure that during periods of noise enhancing winds, overburden emplacement activities are preferentially undertaken 'in-pit'.~~	~~Ongoing until the coal crushing and screening infrastructure are relocated~~ ~~Ongoing~~
Monitor and manage noise generated by the LOM Project	7.9 Implement noise monitoring in accordance with an approved NMP for the ~~LOM Project~~ Mine.	As defined within the NMP ~~12 months of project approval~~
	~~7.10 Continue the existing monthly Noise Monitoring Program at the existing site to include five new locations to be affected by the Project.~~	~~Ongoing~~
	~~7.11 Implement a real-time monitoring program at selected residential locations that would be most affected by the LOM Project.~~	~~Within 12 months of project approval~~ ~~Ongoing~~
	~~7.12 Implement a real-time meteorological monitoring program at the Project Site to gather data on wind speed and direction, and deduce inversion conditions.~~	~~Ongoing~~
	~~7.13 Use the real time meteorological data in the management of mining operations to minimise impact of noise on the environment.~~ [32]	~~Ongoing~~
8. Blasting		
Minimise impacts from blasting on surrounding receptors and infrastructure. [33]	8.1 Undertake blasting in accordance with an approved Blast Management Plan (BMP).	Ongoing
	~~8.2 Maintain the Deed of Agreement that has been established with ARTC.~~	~~Ongoing~~
	~~8.3 Continue to implement the road closure management procedure when blasting occurs within the 500m of Werris Creek Road.~~	~~Ongoing~~
	~~8.4 Minimise the number of blasts by maximising blast size without compromising compliance with the environmental criteria.~~	~~Ongoing~~
	~~8.5 Implement refinements to blast design components on the basis of monitoring results and the achievement of specific blasting objectives.~~	~~Ongoing~~

[32] Monitoring contained within the Noise Management Plan is based upon but may supersede commitments included in the assessment documentation.
[33] Blasting related management measures include in BMP are based upon but may supersede commitments contained within the assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
Minimise impacts from blasting on surrounding receptors and infrastructure. [34] (Cont'd)	~~8.6 Blast design and implementation is undertaken by a suitably qualified blasting engineer and/or experienced and appropriately certified shot-firer.~~	~~All blasts~~
	~~8.7 Ensure that the minimum practicable weight of explosive detonates at an instant for each blast.~~	~~All blasts~~
	~~8.8 Maintain a blast exclusion zone of 500m around each blast.~~	~~All blasts~~
	8.9 Continue to monitor blasting impacts in accordance with BMP.	All blasts
9. Air Quality		
~~Minimise impacts to air quality relating to the Project.~~	~~9.1 Cover the conveyor belt on the rail load out facility.~~	~~Ongoing~~
	~~9.2 Cleared vegetation would not be burnt.~~	~~Ongoing~~
	~~9.3 Limit groundcover removal in advance of mining to be consistent with operational requirements.~~	~~Ongoing~~
Minimise impacts to air quality relating to the Project.	9.4 Undertake all surface disturbance, mining, processing, transportation and other air emissions activities in accordance with an approved Air Quality and Greenhouse Gas Management Plan (AQGHGMP) for the ~~LOM Project~~ Mine. ~~Where practicable, soil stripping operations would be undertaken at a time when there is sufficient soil moisture to prevent significant lift-off of dust.~~	Ongoing ~~During soil stripping operations~~
	~~9.5 Overburden emplacement would be limited on the top lift of the overburden emplacement area when winds are from a northerly direction and greater than 3m/s over more than four consecutive 15 minute periods during operations similar to those operations modelled in Scenario 1.~~ [35]	~~Ongoing until Coal Processing Area relocated to the north~~
	~~9.6 Apply water at the feed hopper, crusher and at all conveyor transfer and discharge points.~~	~~Ongoing~~
	~~9.7 Fit all conveyors with appropriate cleaning and collection devices to minimise the amount of material falling from the return conveyor belts.~~	~~Ongoing in the current CHPP and prior to the operation of the relocated CHPP~~

[34] Blasting related management measures include in BMP are based upon but may supersede commitments contained within the assessment documentation.

[35] Scenario 1 has been completed, commitment no longer relevant.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
Minimise impacts to air quality relating to the Project. (Cont'd)	~~9.8 Cease coal processing activities during periods of concurrent high winds and temperatures which cause coal dust dispersal, independent of water applications.~~	~~During high winds and temperatures which cause coal dispersal independent of water applications~~
	~~9.9 Apply water to exposed surfaces with emphasis on those areas subject to frequent vehicle / equipment movements which may cause dust generation and dispersal.~~	~~Ongoing~~
	~~9.10 Water all internal haul roads regularly.~~	~~Ongoing~~
	~~9.11 Ensure operators use appropriate speeds to limit trafficable dust emissions on all vehicles and equipment.~~	~~Ongoing~~
	~~9.12 Progressively rehabilitate areas of disturbance once they are no longer required for mining purposes.~~	~~Ongoing~~
	~~9.13 Use water injection or vacuum extraction on all drill rigs.~~	~~Ongoing during drilling operations~~
	~~9.14 Cover all product coal trucks prior to leaving the Project Site~~	~~Ongoing~~
	~~9.15 Water all product coal prior to being railed from site.~~	~~Ongoing~~
Monitor and manage dust emissions generated by the LOM Project.[36]	9.16 Undertake air quality monitoring in accordance with an approved ~~the Air Quality and Greenhouse Gas Management Plan~~ AQGHGMP for the ~~LOM Project~~ Mine.	As defined within the AQGHGMP
	~~9.17 Continue the existing deposited dust, PM_{10} and TSP monitoring in accordance with AQGHGMP~~	~~Ongoing~~
	~~9.18 Implement a continuous real-time particulate matter monitoring program in Werris Creek~~	~~Within 12 months of project approval Ongoing~~
	~~9.19 Use the real time monitoring data in the management of mining operations to minimise the impact of PM_{10} on the environment.~~	~~Ongoing~~
	~~9.20 Include a review the existing Energy Savings Action Plan as a component of the AQGHGMP.~~	~~Ongoing~~

[36] Monitoring measures included in the AQGHGMP are based upon but may supersede commitments made in assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
10. Visibility		
Screen the operation visually from the surrounding local area.[37]	10.1 Construct an Acoustic and Visual Amenity Bund at the northern extent of mining operations.	~~Once~~ Prior to mining through the "Old Colliery" Hill
	~~10.2 Locate all mining-related infrastructure, e.g. the Coal Processing Area and Site Administration and Facilities Area, in such a way that local topography (of "Old Colliery" and "Cintra" Hills) provides a visual barrier to the town of Werris Creek and the residential receivers located to the south of the town.~~[38]	~~As infrastructure is constructed~~
	10.3 ~~Plant~~ Maintain screening vegetation and constructed landforms in accordance with an approved RMP (or MOP) ~~a screen of native trees and shrubs in front of the Acoustic and Visual Amenity Bund prior to its construction~~.	Ongoing
	~~10.4 Plant trees around the perimeter of the extended product coal storage area.~~	~~On completion of construction of the extended product coal storage area~~
	~~10.5 Continue to construct the existing overburden emplacement area to create a visual barrier to the east of the Project Site including Werris Creek Road.~~	~~Ongoing~~
	~~10.6 Progressively rehabilitate areas of disturbance once they are no longer required for mining purposes.~~	~~Ongoing~~
	10.7 Continue to position and direct floodlights to not shine above horizontal and generally orientated in a westerly direction away from Werris Creek Road and adjacent communities ~~minimise emissions~~.	During night-time operations
	10.8 Ensure fixed lights visible from offsite locations will comply with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting	During night-time operations
	10.9 Maintain a lighting camera located adjacent to R62 on southern edge of Werris Creek orientated towards the Mine.	Ongoing (or until advised by resident)
	~~10.10 Construct the second rail load-out bin with a similar green shade as the existing bin.~~[39]	~~During construction phase~~
	10.11 Maintain the ~~LOM Project area and associated areas of disturbance~~ Mine Site in a clean and tidy condition at all times.	Ongoing

[37] Management measures related to visual screening through vegetation or constructed landforms contained within the Mine Rehabilitation Plan (or MOP) are based upon but may supersede commitments contained within the assessment documentation.
[38] Relocation of Mine Infrastructure Area is now complete.
[39] No longer forms part of mine plans and is therefore redundant.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
11. Soils, Land Capability and Agricultural Suitability		
Create a final landform that is safe, stable and is amenable to a combination of agricultural and native flora/fauna conservation activities.[40]	11.1 Undertake final landform construction and rehabilitation in accordance with an approved RMP or MOP. ~~(Where practicable), immediately transfer stripped soil from source to active rehabilitation.~~	Ongoing ~~During soil stockpiling activities~~
	~~11.2 Stockpile the soils of each soil unit separately. This will allow the Dark Brown Vertosol soils to be preferentially used for areas of the final landform designated for the re-establishment of higher quality agricultural land.~~	~~During soil stockpiling activities~~
	11.3 ~~Maintain a soil inventory:~~ • ~~to ensure appropriate volumes of different soil units are stripped consistently with the soil requirements of the final landform.~~ • ~~to identify the age of various soil stockpiles on the Project Site and therefore assist in minimising the length of time soils remained stockpiled.~~ • ~~to assist the Proponent in using the most appropriate soils for the different elements of the final landform.~~	
	~~11.4 Construct the eastern, southern and western surfaces of the overburden emplacement at 10° or less.~~	~~During regrading of the final slopes~~
	~~11.5 Construct the northern surface of the overburden emplacement, which runs into the open cut void with steeper slopes which would ultimately be reduced to 18° (1V:3H) or less in the final landform.~~	~~During regrading of the final slopes~~
	~~11.6 Create a series of contour banks, similar to those on the existing landform, on the outer slopes of the regraded emplacement to manage surface water runoff and assist in minimising erosion of these slopes.~~	~~During rehabilitation activities~~
	~~11.7 Conduct monitoring of rehabilitation performance against the proposed sustainable land use outcome and carry out amelioration works where necessary.~~	~~During rehabilitation activities~~
	~~11.8 Reinstate at least 37a of Class III land on the rehabilitated landform.~~	~~By the end of mine life~~
	~~11.9 Backfill the final void to above the modelled final water table level.~~	~~During construction of the final void~~

[40] Management measures associated with soil management and rehabilitation of the final landform contained within the Mine Rehabilitation Plan (or MOP) are based upon but may supersede commitments contained within the assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
~~Minimise the degradation to and maximise retention of soil resources.~~	~~11.10 Undertake vegetation clearing and soil stripping activities in accordance with an approved Mining Operations Plan activities so as to minimise soil disturbance.~~	~~Ongoing During clearing of larger vegetation~~
	~~11.11 Retain smaller vegetation and leaf litter in the soil to be stripped.~~	~~During soil stripping activities~~
	~~11.12 Stripping of soil during periods of excessive soil moisture content will be avoided to reduce the likelihood of damage to soil structure.~~	~~During soil stripping activities~~
	~~11.13 Soil to be preferentially respread on areas of the final landform immediately following stripping rather than being stockpiled.~~	~~During soil stripping activities~~
	~~11.14 Where stockpiling is necessary, soil stockpiles would not exceed 3m in height.~~	~~During soil stockpiling activities~~
~~Maximise the retention of soil resources.~~	~~11.15 Soil is to be generally stripped in accordance with **Table 2.7.**~~	~~During soil stripping activities~~
12. Waste		
Manage waste appropriately on site.	12.1 Prepare and implement waste management activities in accordance with an approved Waste and Hydrocarbon Management Plan (WHMP) ~~Maintain a register of the types and quantities of wastes produced on the Project Site~~.[41]	Ongoing
	~~12.2 Design and maintain storage areas to contain spillages.~~	~~Ongoing~~
	~~12.3 Segregate and retain recyclable and non-recyclable waste in designated storage areas prior to removal from the Project Site.~~	~~Ongoing~~
	~~12.4 Keep the Project Site in a clean and tidy condition.~~	~~Ongoing~~
	~~12.5 Ensure waste is regularly removed from the Project Site by a licensed contractor.~~	~~Ongoing~~
13. Hazards		
Manage bushfire hazards appropriately.	13.1 Prepare and implement fire prevention, management and suppression measures in accordance with a Fire Management Strategy which forms part of an approved BOMP. ~~Maintain an immediate method of egress from the Project Site to Project personnel in the event of bushfire attack on the Project Site.~~[42]	Ongoing.
	~~13.2 Follow all instructions provided by the NSW Rural Fire Service (RFS) or police in the event of a local bushfire event threatening the Project Site.~~	~~In the event of a local bushfire event threatening the Project Site.~~

[41] Waste and hydrocarbon management measures are based upon but may supersede commitments included in assessment documentation.

[42] Fire prevention, management and suppression measures are based upon but may supersede commitments included in assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
Manage bushfire hazards appropriately. (Cont'd)	~~13.3 Provide access to all Project Site water storages to the RFS and any reasonable assistance offered to RFS or police personnel.~~	~~In the event of a local bushfire event threatening the Project Site.~~
	~~13.4 Refuelling to be undertaken within designated fuel bays or within cleared area of the Project Site.~~	~~Ongoing.~~
	~~13.5 Turn off vehicles during refuelling.~~	~~During refuelling.~~
	~~13.6 Enforce a no smoking policy in designated areas of the Project Site.~~	~~Ongoing.~~
	~~13.7 Maintain fire extinguishers within site vehicles and refuelling areas.~~	~~Ongoing.~~
	~~13.8 Ensure a water cart is available to assist in extinguishing any fire ignited.~~	~~In the event of a fire.~~
	~~13.9 Equip all equipment on site with adequate and fully operational fire suppression equipment in accordance with AS 1841 and AS 1851.~~	~~Ongoing.~~
	~~13.10 Train all employees in the proper use of fire fighting equipment held on site.~~	~~Ongoing.~~
	~~13.11 Set aside water especially for fire fighting on site.~~	~~Ongoing.~~
	~~13.12 Ensure that fire fighting equipment is made available to the local Rural Fire Service if required in the event of a bushfire in the land surrounding the Project Site.~~	~~In the event of a bushfire in the land surrounding the Project Site~~
	~~13.13 Develop and maintain firebreaks at the edge of the Project Site.~~	~~Ongoing.~~
~~Minimise the potential for a traffic incident on a public road involving a Project related vehicle.~~	~~13.14 Locate the Escott Road Entrance to the Project Site to the east of the Rail Load-out Road with light vehicle traffic to the Project Site offices not required to cross the Rail Load-out Road.~~	~~During the construction phase of the Project~~
	~~13.15 Install level crossings at the two points where Escott Road crosses the turn-around rail loop.~~	~~During construction of the rail loop~~
	~~13.16 Construct an emergency access road around the perimeter of the turn-around rail loop.~~[43]	~~During construction of the rail loop~~
The storage and handling of hazardous materials is appropriately managed.	13.17 Prepare and implement hydrocarbon management activities in accordance with an approved WHMP ~~Maintain a register of the types and quantities of wastes produced on the Project Site~~.[44]	Ongoing
	~~13.18 Direct all water from wash-down areas and workshops to oil separators and containment systems.~~	~~Ongoing~~

[43] Escott Road upgrade no longer forms part of the proposed mining operations.
[44] Waste and hydrocarbon management measures are based upon but may supersede commitments included in assessment documentation.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
The storage and handling of hazardous materials is appropriately managed. (Cont'd)	~~13.19 Ensure that all storage tanks are either self bunded tanks or bunded with an impermeable surface and a capacity to contain a minimum 110% of the largest storage tank capacity.~~	~~Ongoing~~
	~~13.20 Securely store all hydrocarbon products.~~	~~Ongoing~~
	~~13.21 Designate areas for refuelling and minor maintenance work (with the exception of less mobile mining equipment, e.g. excavators which would be refuelled within the open cut area) and enforce the use of these areas.~~	~~Ongoing~~
14. Community Contributions		
Provide for ongoing support to the Werris Creek local community and Liverpool Plains Shire Council.	14.1 Maintain the Community Consultative Committee or similar and include local community representatives.	Ongoing
	14.2 Complete and distribute regular newsletters regarding project progress and operations.	At least 6 monthly
	14.3 Continue to provide funding towards maintenance of Taylors Lane through Section 94 contributions.	Ongoing
	14.4 Implement the Community Enhancement Fund with the Liverpool Plains Shire Council.	Ongoing
~~15. Environmental Monitoring~~[45]		
~~Implement a comprehensive and ongoing surface water monitoring program.~~	~~15.1 Monitor surface water quality in accordance with SWMP.~~	~~Quarterly and during surface overflow events from licensed discharge points~~ ~~Quarterly and within 12 hours after an overflow event to the receiving waters~~
~~Implement a comprehensive and ongoing groundwater monitoring program.~~	~~15.2 Continue monitoring of piezometers and groundwater bores on and surrounding the Project Site in accordance with the SWMP.~~	~~Bimonthly~~
	~~15.3 Review and update the Groundwater Monitoring Program.~~	~~Within 12 months of project approval~~
	~~15.4 Commission an experienced hydrogeologist to collate and review the monitoring data collected annually in order to assess the impacts of the project on the groundwater environment, and to compare any observed impacts with those predicted from groundwater modelling.~~	~~Annual~~

[45] Environmental Monitoring commitments are included within the various management plans nominated by Commitment 1.2.

Table 6.1 (Cont'd)
Draft Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
~~Implement a comprehensive and ongoing groundwater monitoring program.~~ (Cont'd)	~~15.5 Implement the Groundwater Contingency Plan as required.~~	~~As defined by the SWMP~~ ~~In the event that routine monitoring indicates that a trigger has been reached~~
~~Implementation of an appropriate noise monitoring program to ensure continuing compliance with EPA guideline levels.~~	~~15.6 Undertake attended noise monitoring at the residences most likely to be affected by the LOM Project.~~ ~~• R20: "Tonsley Park"~~ ~~• R9: "Almawillee"~~ ~~• R11: "Glenara"~~ ~~• R12: Fletcher~~ ~~• Werris Creek Town (R55 or R62)~~ ~~• R14: "Greenslopes & Banool"~~	~~Monthly~~
	~~15.7 Implement a real-time noise monitoring program with monitoring to be conducted at the most affected receiver based on the prevailing conditions at the time~~	~~Within 6 months of project approval~~
~~Implementation of an appropriate noise monitoring program to ensure continuing compliance with EPA guideline levels.~~	~~15.8 Review and update the Noise Monitoring Program to reflect additional attended and real time monitoring sites.~~	~~Ongoing~~
~~Implementation of an appropriate air quality monitoring program to ensure continuing compliance with DECCW guideline levels.~~	~~15.9 Maintain the existing dust (WC1 to WC10), PM_{10} (WCHV1 to WCHV4) and TSP (WCTSP) monitoring network as nominated identified in the Werris Creek Coal Mine Air Quality Monitoring Program.~~	~~Ongoing~~
	~~15.10 Install a new High Volume Air Sampler, monitoring for $PM_{2.5}$,~~	~~Within 12 months of project approval~~
	~~15.11 Implement a real-time particulate matter monitoring program at locations to be determined within 12 months of approval.~~	~~Within 12 months of project approval~~

7. EVALUATION AND JUSTIFICATION OF THE PROPOSAL

7.1 INTRODUCTION

As a conclusion to the *Environmental Assessment*, the proposed modified operations of the Werris Creek Coal Mine is evaluated against the principles of Ecologically Sustainable Development (ESD) in order to provide further guidance as to its acceptability and justified through consideration of its potential impacts on the environment and potential benefits to the local and wider community.

7.2 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

7.2.1 Introduction

Sustainable practices by industry, all levels of government and the community are recognised to be important for the future prosperity and well-being of the world. The principles of Ecologically Sustainable Development (ESD) that have been recognised for over a decade were based upon meeting the needs of the current generation while conserving our ecosystems for the benefit of future generations. In order to achieve sustainable development, recognition needs to be placed upon the integration of both short-term and long-term environmental, economic, social and equitability objectives.

In determining the proposed activities to modify, the Applicant has endeavoured to address each of the sustainable development principles. The following sub-sections draw together the features of the Proposal that reflect the four principles of sustainable development, namely:

- the precautionary principle;
- the principle of social equity;
- the principle of the conservation of biodiversity and ecological integrity; and
- the principle for the improved valuation and pricing of environmental resources.

7.2.2 The Precautionary Principle

In order to satisfy this principle of ESD, emphasis must be placed on anticipation and prevention of environmental damage, rather than reacting to it. During the planning phase for the Proposal, and throughout the preparation of the *Environmental Assessment*, the Applicant engaged specialist consultants to examine the existing environment, predict possible impacts and recommend controls, safeguards and/or mitigation measures in order to ensure that the level of impact satisfies statutory requirements or reasonable community expectations.

Throughout the development of the Proposal, the Applicant and its consultants have adopted an anticipatory approach to impacts by undertaking an analysis of the risks posed by activities of the Proposal, an appropriate level of research and baseline investigations and environmental evaluation. The controls, safeguards and/or mitigation measures have therefore been planned with a comprehensive knowledge of the existing environment and the potential risk of environmental degradation posed by proposed modified activities.

Examples of matters relating to the precautionary principle that were considered during the various stages of the Proposal are listed below.

Identification of Project Objectives

The Proposal has been designed with the principal objective of providing for a more efficient mining operation without additional impacts on the local biophysical or socio-economic environment. The Applicant has demonstrated through comprehensive environmental assessment, consideration of feasible alternatives, and implementation of appropriate controls, safeguards and mitigation measures, that this objective can be achieved.

Design of Project Components

Noting the minor modifications to the impact footprint, this assessment has demonstrated that there would be no increase in the impact of the Mine on the biophysical environment.

In particular, the following is noted.

- The proposed modifications to the overburden emplacement would not require any new disturbance on the Mine Site. The visibility of the overburden emplacement would increase slightly, however, given the distance between the overburden emplacement and affected receivers (3.7km) this is unlikely to be noticeable.
- The proposed modifications would not result in any change to operations which would result in a noticeable increase in noise or air emissions.
- The proposed modification to surface water management consider and comply with the relevant standards.
- The proposed use of void water on surrounding agricultural land can be undertaken without adverse effect on the receiving soil or catchment. In fact, the use of water in this way is considered more beneficial than the alternatives considered (in Section 2.11.3).

Integration of Safeguards and Procedures

The framework for ongoing environmental management, operational performance and rehabilitation of the Mine Site would continue to be provided by PA 10_0059 and be managed in accordance with approved management plans. The Mining Operations Plan for the Mine would be updated to reflect the Proposal and would provide quantified goals for rehabilitation of the Mine Site including performance criteria, monitoring methods and contingency actions to demonstrate achievement of these goals. Annual Environmental Management Reports would be prepared to report on the progress of the operation and provide an opportunity to review the effectiveness of the environmental management strategies adopted. In addition, the following safeguards and procedures would continue to be implemented at the Mine.

General Safeguards and Procedures

- All on-site procedures would be regularly reviewed, particularly in light of monitoring results.

- Surface water, groundwater, noise, blasting, deposited dust and PM_{10} levels would be monitored at those locations (or equivalent) identified on **Figure 4.1**) in order to ensure the continued compliance with conditional requirements of PA 10_0059 of EPL 12290.

Noise and Blasting Related Safeguards and Procedures

- Noise would continue to be managed in accordance with the Mine Noise Management Plan.
- If required, the Applicant would continually review and update noise attenuation measures as new technologies or methods are identified.
- Real-time noise and meteorological monitoring would continue to be undertaken with feedback provided to ensure operations are managed to comply with noise criteria.
- Blasting would continue to be managed in accordance with the Mine Blast Management Plan.

Surface Water Related Safeguards and Procedures

- Wherever possible, areas not required for mining-related activities or not already disturbed by previous mining activities would remain vegetated to assist in minimising erosion and reducing the suspended sediment load in surface water flowing through the Mine Site.
- Sediment control structures would be maintained to design capacities to ensure optimum settling rates.
- Water collected in the open cut, void water dams, and/or dirty water dams, would be preferentially used for dust suppression or operational purposes.
- Excess void water would be applied to agricultural land in the local area in accordance with an assessment of irrigation and EPA approval.
- Water generated on the Mine Site that requires discharge would be conducted in accordance with the appropriate discharge protocol in order to avoid discharges that are not compliant with licence conditions.

Air Quality Related Safeguards and Procedures

- Vegetation clearing and soil stripping procedures would be implemented to ensure that dust emissions from these processes are minimised.
- Water would be applied to coal both during processing and being loaded onto trains, in order to minimise dust emissions from site as well as to minimise dust emissions from coal wagons.
- Coal processing activities would cease during periods of concurrent high winds and temperatures which may cause coal dust dispersal, independent of water applications.

- Water would be applied to exposed surfaces, with emphasis on those areas subject to frequent vehicle / equipment movements which may cause dust generation and dispersal.
- Water injection and/or vacuum extractors would be used on all operating drill rigs where required to reduce dust emissions from drilling operations.
- All product coal trucks would be covered prior to leaving the Mine Site to minimise dust emissions from road transport associated with the LOM Project.

Traffic and Transport Related Safeguards and Procedures

- Convoying of trucks would be avoided.
- Drivers would be instructed to operate the truck in a safe and courteous manner, abiding by all road standards and speed limits.

Aboriginal Heritage Related Safeguards and Procedures

- The Narrawolga Axe Grinding Grooves would be relocated to the Willow Tree Visitor Information Centre, Willow Tree, in accordance with the approved Heritage Management Plan and the wishes of the local Aboriginal community.
- Staff and contractors would undergo cultural heritage awareness training as part of the Mine induction process.
- In the event any previously unidentified 'objects' or other Aboriginal sites (such as burials) are uncovered, work in that area would be suspended and the OEH Western Regional Archaeologist (Dubbo Office) and local Aboriginal community contacted to discuss how to proceed.

Visual Amenity Related Safeguards and Procedures

- Where the use of lighting plants is required in locations visible from vantage points external to the Mine Site, lights would not shine above horizontal and where practicable, will be generally orientated in a westerly direction away from Werris Creek Road and adjacent communities.
- All fixed lights visible from offsite locations will comply with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.
- A lighting camera located adjacent to R62 on southern edge of Werris Creek orientated towards the Mine monitors in near real time night lighting impacts from the Open Cut and Rail Load Out facility allowing operations to be monitored and managed as required.
- Progressive rehabilitation would continue to be undertaken to mitigate the impact on the overburden emplacement when viewed from vantage points external to the Mine Site.
- The Applicant would continue to respond to complaints raised in relation to visual amenity.

Waste Management Related Safeguards and Procedures

- Waste management practices would continue to be implemented to ensure that waste produced on the Mine Site is appropriately managed.

Hazard Related Safeguards and Procedures

- The fire management strategy prepared as part of the Biodiversity and Offset Management Plan would continue to be implemented utilising the local Rural Fire Service as required to ensure that the appropriate management and response procedures are implemented to reduce the risk of bushfire hazard on the Mine Site and Biodiversity Offset Area and subsequently the potential safety risk to employees and the local community.
- Strategies would continue to be implemented to mitigate and manage areas of spontaneous combustion on site including the former underground workings of the Werris Creek Colliery .
- The Waste and Hydrocarbon Management Plan would continue to be implemented to mitigate and manage the potential land contamination associated with the storage and handling of hydrocarbons or hazardous materials on the Mine Site.

Rehabilitation and Subsequent Land Use

Long term adverse impacts on the local environment would be avoided through the design and rehabilitation of disturbed areas to a landform and vegetation structure equivalent to that outlined in Section 2.10 of this document. The majority of the final landform would be restored back to woodland communities consistent with those vegetation communities secured as part of the Biodiversity Offset Strategy for the Mine.

Conclusion

The precautionary principle has been considered during all stages of the design and assessment of the Proposal. The approach adopted, i.e. risk analysis, impact identification, specialist investigations and safeguard design, provides a high degree of certainty that the Proposal would not result in any major unforeseen impacts.

7.2.3 Social Equity

Social equity embraces value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to the community. Social equity includes for both inter-generational (between generations) and intra-generational (within generations) equity considerations.

Equity within generations requires that the economic and social benefits of the development be distributed appropriately among all members of the community. Equity between generations requires that the non-material well-being or "quality of life" of existing and future residents of the local community would be maintained throughout and beyond the life of the Mine.

As demonstrated throughout Section 4, the Proposal would have little effect on the specific impacts of the Mine. Furthermore, the Proposal would not influence the overall life of the Mine. On this basis, it is not considered there would be any change to impacts on social equity of the Mine as a result of the Proposal.

7.2.4 Conservation of Biological Diversity and Ecological Integrity

The protection of biodiversity and maintenance of ecological processes and systems are central goals of sustainability. It is important that developments do not threaten the integrity of the ecological system as a whole or the conservation of threatened species in the short- or long-term.

As identified in Section 3.3.8, and throughout Section 4, the Proposal would not result in any additional direct or indirect impacts on biodiversity to those previously identified, assessed, mitigated and offset by the Applicant.

7.2.5 Improved Valuation and Pricing of Environmental Resources

The issues that form the basis of this principle relate to the acceptance that the polluter pays, all resources are appropriately valued, cost-effective environmental stewardship is adopted and the adoption of user pays prices based upon the full life cycle of the costs.

As the Proposal provides for the continued recovery of coal, more efficient management of overburden and a potential beneficial use of void water (application to agricultural land), while not increasing impacts on the environment, this principle of ESD is achieved.

7.2.6 Conclusion

The approach taken in planning for the Proposal has been multi-disciplinary, involved consultation with potentially affected local residents and various government agencies. The emphasis has been on the application of appropriate safeguards to minimise potential environmental, social and economic impacts and it is concluded that the Mine would continue to achieve a sustainable outcome for the local and wider environment.

7.3 JUSTIFICATION OF THE PROJECT

The Proposal would serve four important functions.

1. Provide for an increase in the capacity (both total and active) of the overburden emplacement.
2. Provide for an improvement in coal quality through dry separation of impurities, particularly from the coal recovered from the previously mined coal seam of the former Werris Creek Colliery.

3. Provide for the management of void water excess to surface storage capacity, thereby avoiding the potential for impact on access to the lower coal seams under high rainfall conditions.
4. Provide local property owners / managers with access to an additional water source for beneficial use on these properties, e.g. irrigation, stock watering.
5. Allow road transportation to be undertaken for an additional four hours between 6:00pm and 10:00pm, which is concurrent with the hours of operation of the Whitehaven CHPP.

This *Environmental Assessment* has been prepared to assist in the assessment of the likely environmental impacts associated with the Proposal to PA 10_0059. The potential impacts have been identified and carefully assessed following consideration of the design features, operational controls and management measures currently in place or proposed.

On the basis of the assessment of each potential impact, the Proposal can be justified as the residual impacts on the biophysical environment can be predicted and appropriately managed, there would be no notable additional socio-economic impacts and the consequences of not proceeding are considered more adverse than proceeding. Each of these factors considered in the justification of the Proposal are presented below.

Biophysical Considerations

The Proposal would not result in any increase in the area of disturbance on the Mine Site, with the minor modifications to the overburden emplacement unlikely to result in a perceptible change in the visibility of the Mine from vantage points external to the Mine Site. In particular, while the visual section of the overburden emplacement (above 425m AHD) would extend approximately 250m closer to Werris Creek, it would still remain approximately 3.7km from the closest residential receiver (in Werris Creek).

A review of the likely emissions from the modified mining operations has confirmed that subject to the continued implementation of dust mitigation measures, continued compliance with air quality criteria is anticipated.

Additional noise modelling considering the worst-case scenario associated with the modified mining operations has confirmed that compliance with the noise criteria of PA 10_0059 can be achieved at all previously assessed receivers. A noise criterion of 37dB is recommended for an additional property to the northeast of the Mine Site which currently does not contain a residence but on which building entitlement is held.

As there would be no increase to the impact footprint of the Mine, the volume of dirty water generated by the Mine would not change. However, the Applicant has taken the opportunity to propose an improvement in the dirty water management system through the addition of a sediment basin (SB18) to collect runoff from the northern section of the Acoustic and Visual Amenity Bund. The sediment basin would become an additional discharge point from the Mine, with discharge criteria the same as other discharge points to be applied.

No impacts on the local road network, road users or property owners/residents adjoining the transport route from the Mine Site additional to those of current road transport operations, have been identified as a result of the proposed extension in hours of operation for the road transport of coal.

A review of the Water Balance Model for the Mine has confirmed that under median to high rainfall conditions, the current storage capacity of the void water dams could be exceeded (even with the operation of two misting evaporator units). Considering the various alternatives for managing this excess water, which if retained within the open cut void could prevent access to the lower coal seams, application to agricultural land surrounding the Mine Site has been identified as the preferred option. Through consideration of the physical and chemical parameters of the void water and receiving soils, it has been confirmed that application to land, at a rate of 6.25ML/ha/year could be accommodated by the land without adverse impact on the soils and/or receiving waters of the catchment.

Socio-economic Considerations

The Proposal is unlikely to result in any changes to local socio-economic conditions on the basis that the scale of operations would not be changed, there would be no additional impact on mine emissions and no significant change to the visibility of operations.

Consequence of Not Proceeding

The consequences of the Proposal not proceeding, both direct and indirect, are considered significant.

Direct Consequences

- By not increasing the active and total storage capacity of the overburden emplacement, the risk that access to the lower coal seams may be prevented or delayed as a result of encroachment of the in-pit overburden emplacement would be increased. Should this occur, production levels and efficiency would be reduced.
- By not increasing the storage capacity of the overburden emplacement, the opportunity to relocate the internal open cut haul ramps from the low wall to the high wall which would increase active storage capacity and allow for the construction of a second egress from the open cut, would not eventuate.
- By not allowing the dry separation process to be undertaken on the Mine Site, the value of coal produced would be reduced.
- By not approving the off-site application of void water to surrounding agricultural land, the potential for restricted access to the lower coal seams (as a consequence of water surplus to the storage capacity of the void water dams accumulating in the open cut) would be increased. Based on the Water Balance Model for the Mine, should a high rainfall year be experienced between 2015 and 2020, surplus water of up to 500ML could accumulate in the open cut. The effect of restricted access to the lower coal seams could be reduced production, reduced employment and an increased life of Mine (as annual production rates would be reduced).
- Not approving the off-site irrigation of void water would also require excess water to be removed by evaporation alone. It is considered that application to agricultural land is a more beneficial use of the water.
- The limited number of truck movements between the Mine and the Whitehaven CHPP (Gunnedah) would not occur during the evening (6:00pm to 10:00pm). As a result there would be no reduction in the number of truck movements on these roads during the day time, when most other road users are on the roads.

Indirect Consequences

As a result of reduced production at the Mine, as a consequence of delayed or restricted access to the lower coal seams, the following indirect impacts could eventuate.

- Reduced mining and production rate could result in reduced employment at the Mine, with the subsequent flow-on effects to the communities within which the mining workforce reside.
- Reduced coal recovery rates would likely result in an increase in the life of Mine and therefore time before the Mine Site is rehabilitated.
- Reduced coal recovery would also reduce the overall contribution of the Mine to the local, regional and state economies

On consideration of the above, the Proposal would provide for important improvements to operations at the Werris Creek Coal Mine, while only having very minor impacts on other features of the local environment. On balance, the benefits of the Proposal more than compensate for these minor and temporary impacts.

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Appendices

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Appendix 1 Correspondence from Department of Planning and Environment

Appendix 2 Water Balance Assessment by Environ Pty Ltd

Appendix 3 Noise Impact Assessment by Spectrum Acoustics Pty Limited

Appendix 4 Air Quality Impact Assessment by SLR Consulting Pty Ltd

Appendix 5 Void Water Irrigation Assessment by Strategic Environmental and Engineering Consulting (SEEC)

Note: A colour version of the Appendices is available on the Project CD

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