Appendix L

Visual Impact Assessment





Boggabri Coal Mine

VISUAL IMPACT ASSESSMENT
Modification 8

for

Boggabri Coal Operations Pty Limited

April 2021

Hansen Bailey

ENVIRONMENTAL CONSULTANTS

BOGGABRI COAL MINE MODIFICATION 8

VISUAL IMPACT ASSESSMENT

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1 INTRODUCTION

1.1 OVERVIEW

Hansen Bailey has been engaged by Boggabri Coal Operations Pty Limited (BCOPL) to undertake a Visual Impact Assessment (VIA) to support an application for a Modification to State Significant Development (SSD) 09_0182 under Section 4.55 of the EP&A Act (MOD8) for Boggabri Coal Mine (BCM).

1.2 BACKGROUND

BCOPL has operated BCM on behalf of Idemitsu Australia Resources (IAR) and its joint venture partners since 2006. BCM is located approximately 15 km north-east of the township of Boggabri in the North West Region of NSW and is located wholly within the Narrabri Local Government Area (LGA).

The original Visual Impact Assessment was undertaken by as part of the 'Continuation of Boggabri Coal Mine Environmental Assessment' (Hansen Bailey, 2010) (EA) titled 'Continuation of Boggabri Coal Mine Visual Impact Assessment' (Integral, 2010a) (EA VIA).

Since the determination of SSD 09_0182, seven modifications have been approved, none of which modified the visual character of the BCM and therefore no additional visual assessment has been recommended to support any modification.

MOD8 primarily consists of an increase in the depth of approved mining operations and to facilitate the construction of a fauna movement crossing of the existing haul road at BCM (further described in **Section3.1**).

1.3 PURPOSE

The EA VIA depicted the visual landscape of the area and determined the impacts of BCM on the character of the landscape within and adjacent to the Project Boundary. The Project Boundary is shown on **Figure 1**.

This VIA provides an assessment of the visual impacts of MOD8 within the contemporary landscape and in consideration of current visual values against the approved BCM as considered in the EA VIA.

In relation to MOD8, this VIA generally:

- Provides an assessment of the existing visual settings created by various landscapes in and around BCM;
- Establishes the visual character and visual effect created by BCM;
- Considers the visibility of the MOD8 from sensitive receivers;
- Determines the likely visual impacts giving regard to visual effect and sensitivity;
- Recommends mitigation strategies to ameliorate additional adverse visual impacts; and
- Consideration of cumulative visual impacts in the locality and includes a consideration of night light effects.

1.4 DOCUMENT STRUCTURE

This document is structured as follows:

- **Section 2** provides a discussion on the topography, natural features, land use and land ownership of the existing BCM. It also describes any changes that have taken place since the preparation of the EA VIA.
- **Section 3** describes the methodology used to develop this VIA and refers to the EA VIA where relevant. The evaluation of the existing visual environment consists of the assessment of both the landscape and viewing locations within it, and the effects of BCM within the visual environment.
- **Section 4** considers each sector and describes the visual impact at representative locations as a result of MOD8 in the contemporary environment surrounding BCM. It also provides an overall summary where impacts are likely to change as a result of MOD8.
- **Section 5** describes proposed mitigation measures resulting from MOD8 impacts;
- **Section 6** lists abbreviations; and
- **Section 7** relevant references used in this document.

2 EXISTING ENVIRONMENT

This section provides a discussion on the topography, natural features, land use and land ownership of the existing BCM. It also describes any changes that have taken place since the preparation of the EA VIA.

2.1 NATURAL ENVIRONMENT

The topography surrounding BCM is dominated by the Willow Tree Range which wraps around the north, east and west of the currently approved BCM (**Figure 1**). The lower lying floodplains associated with the Namoi River and its tributaries are located to the south and south-west of the BCM. The Willow Tree Range includes steep slopes and crests (up to a maximum elevation of 430 m Australian Height Datum (AHD)) and forms a broad south-west facing basin.

Goonbri Mountain (543 m AHD) is located approximately 3 km east of the BCM Project Boundary and is an isolated mountain located on the western extremity of the Nandewar Range. The Nandewar Range lies 10 km to the north-east of the BCM Project Boundary.

The major watercourse in the region is the Namoi River. It has a catchment area of approximately 4,200,000 hectares (ha) and forms part of the Murray Darling Basin (MDB). The Namoi River catchment is bounded by the Great Dividing Range in the east, the Liverpool Ranges and Warrumbungle Ranges in the south, and the Nandewar Ranges to the north. The catchment area upstream of the Boggabri township is 2,200,000 ha and yields a mean annual streamflow of 906,470 Megalitres per year (ML/year).

The Namoi River is regulated by Keepit Dam on its main channel as well as Split Rock Dam on Manilla River (a tributary of the Namoi River). These dams facilitate the provision of flows for downstream water users. BCM is located within the catchments of Nagero Creek and Bollol Creek, both of which are tributaries of the Namoi River.

2.2 LAND OWNERSHIP

Landownership within and surrounding BCM is shown in **Figure 2.** The figure divides the surrounding areas into sectors with an indicative 7.5 km buffer applied to the highest point of the OEA to assist with the description of potential visual impacts resulting from MOD8.

As stated in the EA VIA “private residences that are within a 7.5 km radius of the Project Boundary may have high sensitivity, dependant on visibility and view orientation. Residences beyond this distance would have a moderate sensitivity if they have views of the southern OEA.” Although this VIA uses a 7.5 km buffer at the highest point of the OEA, all sensitive receivers from the EA VIA (including those which have view toward the southern OEA) are included.

The BCM is located within the Leard State Forest, which is Crown land. The land within the Leard State Forest is managed by the Forestry Corporation of NSW on behalf of the Crown.

BCOPL owns the land on which the rail spur is located, with the exception of those parts jointly owned with Whitehaven Coal and small parcels of Crown land and local roads.

Whitehaven Coal has significant landholdings to the north, west and south of Leard State Forest. These landholdings are associated with Maules Creek Mine and Tarrawonga Mine. Due to the significant landholdings of BCOPL and Whitehaven Coal, there is a significant buffer from the BCM mining operations to the nearest private freehold land.

The mining operations associated BCM will generally be undertaken on Crown land (Leard State Forest) and a small area of land owned by Whitehaven Coal. The ownership of land in the vicinity of BCM is illustrated in **Figure 2.**

There are three remaining private residences with acquisition rights (i.e. within the Zone of Affectation (ZOA)) under SSD 09_0182. These include location property identification (ID) 44, 48 and 90. All other residences previously within the ZOA are either owned by BCOPL, Whitehaven Coal or jointly owned between BCOPL and Whitehaven Coal.

The closest private receivers, not within a ZOA, are IDs 140 and 147 which are located 5.5 km and 6.5 km east-south-east respectively of the Project Boundary and the Approved Mine Disturbance Boundary. IDs 140 and 147 are located within the South East Sector.

Since the EA VIA, there have been changes to the ownership of previously private receivers within 7.5 km of the proposed OEA (shown in **Figure 2**). It is noted that there may be impacts to receivers beyond 7.5 km, however these impacts are not anticipated to be significant. The private receivers within 7.5 km of the proposed OEA are shown in **Table 1**.

Table 1
Private Landownership Status**

Dwelling ID	Property Name	Landownership Status	
		EA VIA	MOD8 VIA
East Sector			
67	Goonbri (Mallee Park)	Private Landholder	BCOPL
68	Goonbri	Private Landholder	Boggabri Coal Operation Pty Limited (BCOPL)
South East Sector			
54	Tarrawonga	Private Landholder	Joint Ownership
85	Ambardo	Private Landholder	Whitehaven Coal
86	Kyalla	Private Landholder	Whitehaven Coal
98	Flixton	Private Landholder	Whitehaven Coal
100	Bailey Park	Private Landholder	Whitehaven Coal
140	Sylvania	Private Landholder	MHPF Bellevue Land Pty Ltd
147*	Coomalgah	Private Landholder	MHPF Bellevue Land Pty Ltd
South West Sector			
44*	Glenhope	Private Landholder	No change
48*	Wilberoi East	Private Landholder	No change
52	Jeralong	Private Landholder	BCOPL
West Sector			
None	-	-	-

**Outside of 7.5 km but has been considered for assessment within this VIA.*
*** Private landowner names stipulated in Appendix A of the Modification Report.*

2.3 LAND USE

The major land uses in the vicinity of BCM are agriculture, coal mining and forestry. Each is briefly described below.

2.3.1 Agriculture

Agriculture is the dominant land use in the North West Region of NSW. Historically, agricultural enterprises in the region included grazing and dry land pasture improvement. The construction of Keepit Dam and Split Rock Dam ensured a more reliable supply of water during prolonged dry periods. As a result, these dams facilitated the introduction of intensive cropping to the region.

The alluvial floodplain of the Namoi River supports highly productive agricultural land. The floodplain supports both dry land and irrigated cropping, as well as pasture establishment enterprises. The land surrounding the floodplain is primarily used for grazing, including sheep and cattle grazing.

2.3.2 Extractive Industries

BCM is surrounded by Maules Creek Mine (Maules Creek) to the north and Tarrawonga Mine (Tarrawonga) to the south as shown on **Figure 1.** The three mines are collectively referred to as the Leard Forest Mining Precinct (or the Boggabri-Tarrawonga-Maules Creek (BTM) Complex). A number of other smaller coal mines are present in the region including Narrabri Mine, Rocglen Mine, Sunnyside Mine, Vickery Mine and Werris Creek Mine. The Watermark Coal Project is also approved to take place within the region, however has not yet commenced coal production.

Mining operations at Tarrawonga were considered within the EA VIA however, since the approval of the Boggabri EA in 2012, Tarrawonga has obtained approvals for changes to mining operations and Maules Creek has been approved, both of which have resulted in changes to the surrounding visual landscape.

Maules Creek Mine

The currently approved Maules Creek was not considered in the EA VIA as it was not yet approved.

Maules Creek operates under Project Approval (PA) 10_0138 which was approved 23 October 2012 and has been modified on three occasions.

A visual impact assessment was undertaken for Maules Creek to support the ‘Maules Creek Mine Environmental Assessment’ (Hansen Bailey, 2011) (Maules Creek EA). MODs 1 and 2 for Maules Creek included an assessment of visual impacts, however these impacts were not material beyond those assessed in the Maules Creek EA. The main visual features identified in the Maules Creek VIA (Integral, 2010b) relevant to this VIA are discussed below.

Open Pit Face

A high visual effect was created by the colour of the raw earth and exposed rock contrasting with the surrounding landscape. A strong form was created due to the shape and line characteristics differing to the surrounding landscape.

This effect could not be reduced until the final landform was created at the end of mining with only the void left untreated to some degree. These voids would not be visible to sensitive receivers in the foreground and middle-ground so the visual effect had no impact significance. Potential views would be limited to far background locations within Mt Kaputar National Park over 25 km away.

The open pit face occurs in the existing environment as part of the BCM and Tarrawonga.

Overburden Emplacement Area

The northern Overburden Emplacement Area (OEA) would reach 440 m between years eight and nine with rehabilitation of the eastern, northern and north western faces completed in year 10. The western and southern faces were to be rehabilitated at the end of mining.

The western in pit OEA has a top elevation of 440 m. This elevation is close to existing ground levels to the south west, approximately 20 m higher along the north western boundary, 40 m higher on the south eastern face and 80 m higher on the eastern face. The western in pit OEA is scheduled to be completed by year 21. The steep eastern face of the OEA would not be rehabilitated until mining is completed and the final landform created.

The eastern in pit OEA is constructed behind and to the north of the mining face. Its elevations are such that this OEA will screen views from the east to the western in pit OEA. The OEA was proposed to be constructed over the full life of the mine and at year 21 reach its final elevation of approximately 430m. At the highest point this is approximately 80 m above natural ground level on the eastern face. Significantly the outer faces of this emplacement could not be rehabilitated during the mine life and would be rehabilitated when mining is complete.

The OEA already occurs in the existing environment as part of the BCM and Tarrawonga.

Tarrawonga Mine

Tarrawonga was considered in the EA VIA.

Tarrawonga operates under PA 11_0047 which was approved 22 January 2013 and has been modified on six occasions.

A visual impact assessment was undertaken for Tarrawonga to support the 'Tarrawonga Coal Project Environmental Assessment' (Resource Strategies, 2011) (Tarrawonga EA). MOD5 for Tarrawonga included an assessment of an increase in bank cubic meters of rock to its OEA, however there was no change to the final landform and impacts were considered less than what was assessed in the Tarrawonga EA. The main visual features identified in the Tarrawonga VIA (Urbis, 2011) relevant to this VIA are discussed below.

Extension of the Open Cut

Extension of mining further east in ML 1579 and MLA 2 and further north within CL 368 with progressive backfilling of the mine void.

Potential visual impacts would result from the contrasting colour and texture of the existing landscape and the disturbed open cut.

Progressive rehabilitation of the open cut would reduce contrast with surrounding environment. Visual screening in the form of a flood bund (up to 2.5 m high) and earth bund (up to 6 m high), once vegetated, would reduce potential views of the open cut.

Expansion of the Northern and Southern Emplacement Extents

The final elevation of the Northern Emplacement remains unchanged at 370 m AHD.

The height of the Southern Emplacement would temporarily increase to a maximum height of 360 m AHD (i.e. an increase of 20 m) during operations. During rehabilitation, the elevation of the Southern Emplacement would be reduced to a final height of 330 m AHD.

Progressive rehabilitation of the Northern Emplacement, Southern Emplacement would be undertaken in order to reduce the contrast between landforms and the surrounding environment. Visual screening in the form of a flood and earth bund, once vegetated, would reduce potential views of the emplacement areas.

Cumulative Assessment

The assessment of cumulative visual impacts considered the combined effects of Tarrawonga with the effects of BCM. The combined disturbance areas of Tarrawonga and BCM represent a very small proportion of the Namoi Valley and cumulatively would not detract from the region's essentially rural nature.

Views of Tarrawonga and BCM would generally only be available from viewpoints to the south or west, where receivers were located on elevated areas with no vegetation screening present.

To minimise cumulative impacts, the Northern Emplacement would be integrated with the waste rock emplacement at the BCM. Given the above, it is expected that the cumulative visual impacts as a result of Tarrawonga and BCM would continue to be low.

2.3.3 Town Centres

The township of Boggabri is situated on the Kamilaroi Highway between Gunnedah and Narrabri and 15 km to the south west of the Boggabri Coal Mine (**Figure 2**). The town has a mix of residential, institutional, commercial and industrial land uses.

The township is located immediately adjacent to the Namoi River Flood plain and is generally on flat to gently sloping land.

2.3.4 Public Roads

Key public roads in the vicinity of BCM are the Kamilaroi Highway, Manilla Road, Goonbri Road and Leard Forest Road (see **Figure 2**).

2.3.5 State Forest and Conservation Area

The Leard State Forest is located within and adjacent to the Project Boundary and is approximately 8,134 ha in size (in total). Dominated by native vegetation communities consisting of Ironbark, White Box, Blakely's Red Gum and White Cyprus Pine, selective logging activities have been undertaken in the past, but the Leard State Forest remains in a generally forested state. The parts of the Leard State Forest that are not reserved for mining can be used for recreation purposes. In 2004, recreational hunting within the Leard State Forest was permitted in order to control pest species.

The Leard State Conservation Area is located approximately 5 km north-west of the Project Boundary, and covers an area of 1,176 ha. In addition, Mt Kaputar National Park is located approximately 25 km to the north of the BCM Project Boundary. Mt Kaputar National Park covers an area of approximately 36,817 ha and possesses significant recreational value.

2.3.6 Biodiversity Offsets

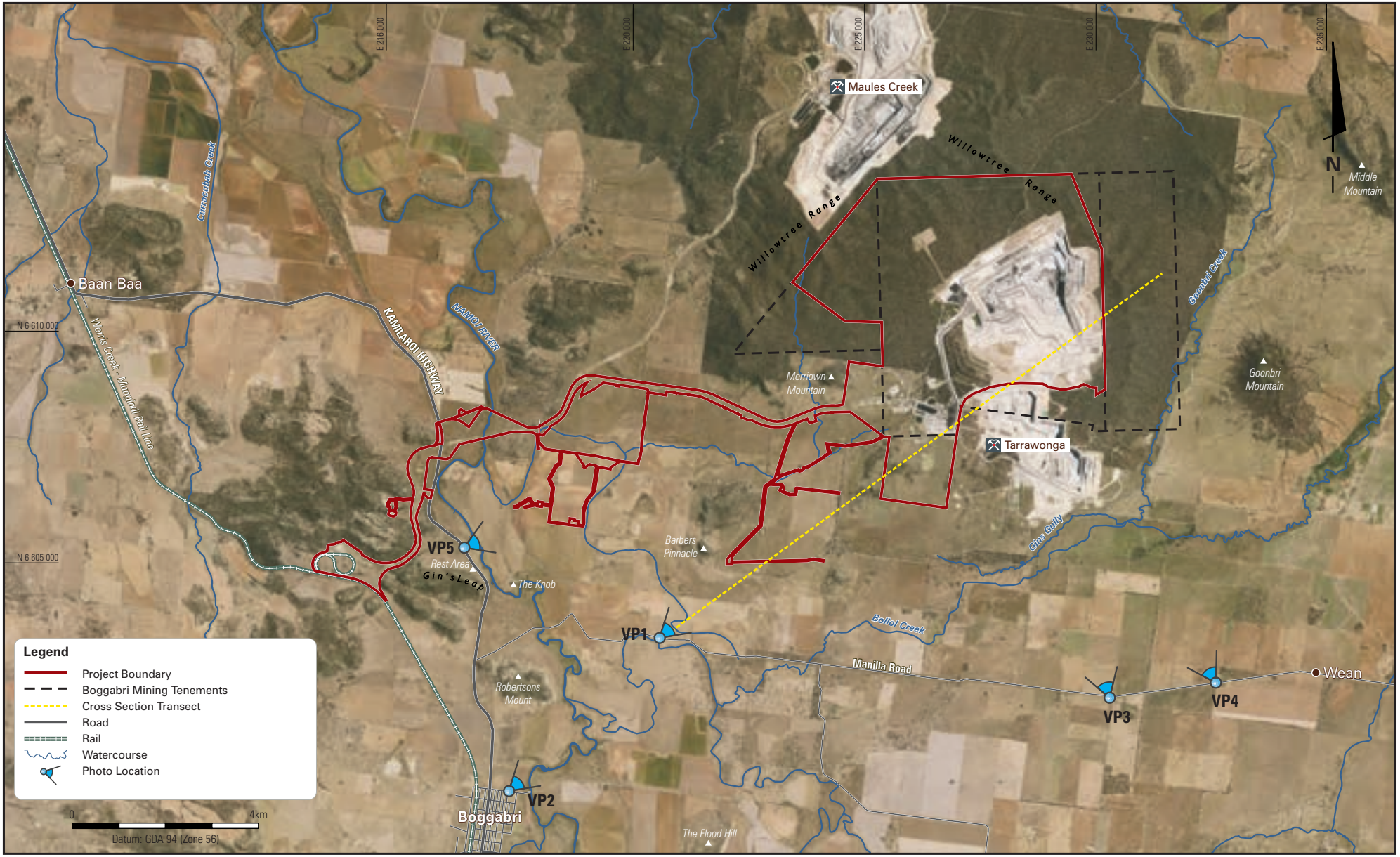
BCM's Namoi Offset is located on either side of the existing operational rail line, within the South West Sector. The property supports significant areas of floodplain vegetation including numerous natural soaks and approximately 7 km of the Namoi River. The western portion of the Namoi property contains significant areas of grassy and shrubby woodland with relatively few disturbances.

BCM's Jerralong Offset adjoins the Namoi Offset and is located within the South East Sector. The Jerralong property has been used as grazing land in the past and much of it remains as open grassland habitats with remnant woodlands dominated be Poplar Box (*Eucalyptus populneus*), White Box (*E. albens*) and stony rises dominated by White Cypress Pine (*Callitris glaucophylla*). Overtime, BCM Offsets will regenerate into open woodland which in some instances, will result in improved amenity of the area.

2.3.7 Mine Rehabilitation

Rehabilitation is an ongoing activity at BCM that is progressively undertaken to minimise the long-term effects of mining. Rehabilitation objectives at BCM include revegetation of the landscape with native vegetation, comprising a mixture of native grassy woodland, shrubby woodland/open forest, riparian forest vegetation types and Box-Gum Woodland with fauna habitat for threatened species to encourage the re-establishment of pre-mining biodiversity values.

Rehabilitated areas form part of a regional east-west wildlife corridor regional east-west wildlife corridor created as part of the BCM Biodiversity Offset Strategy. The proposed corridor will create a linkage to remnant vegetation between Namoi River (west of BCM) through the Leard State Forest to the Nandewar Range (east of BCM).

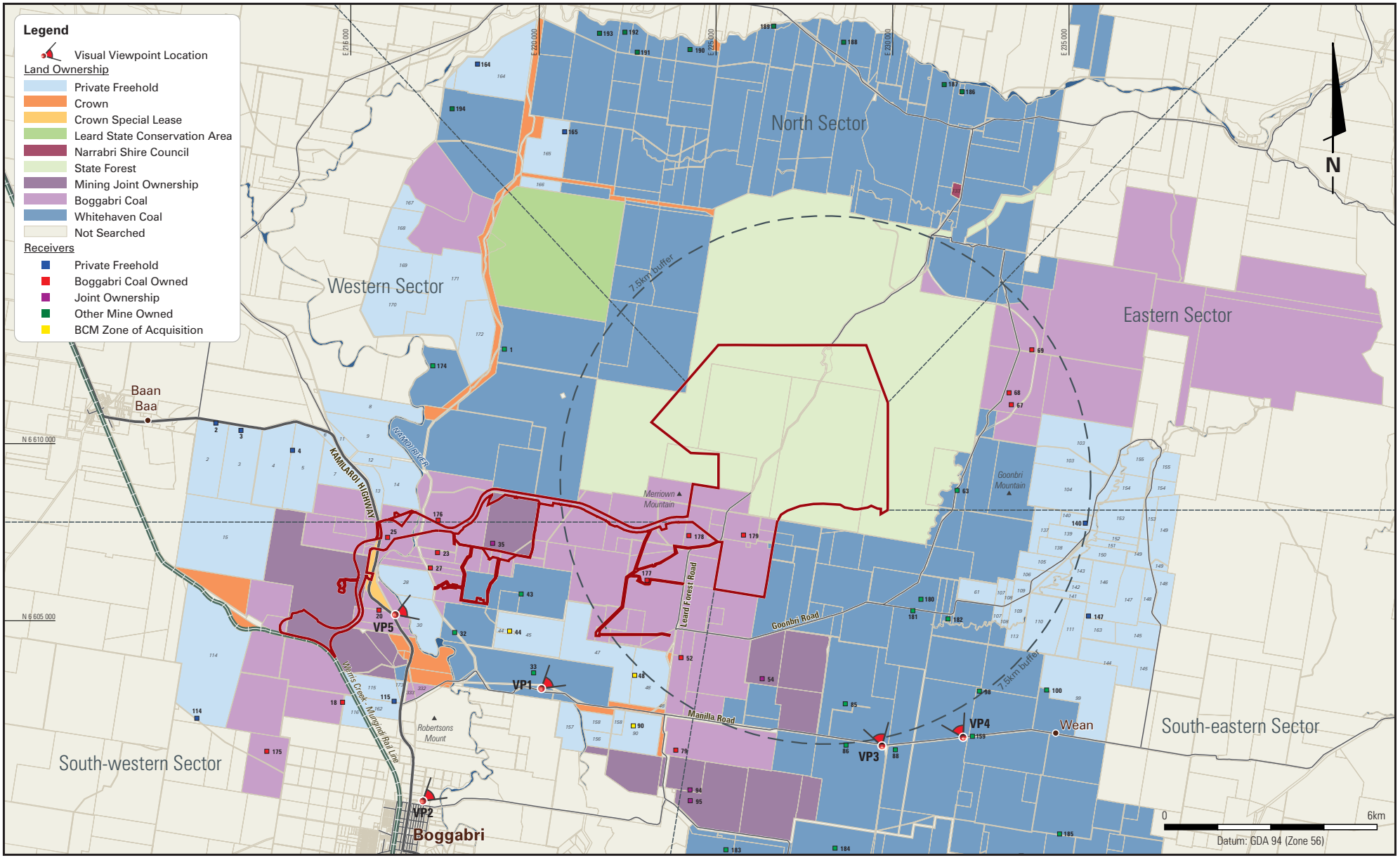


HB BOGGABRI 1974 F1 Visual Viewpoint Locations 04 12 2020 Rev B

BOGGABRI COAL MINE

Visual Viewpoint Locations

FIGURE 1



HB BOGGABRI MOD8 1824 F2 Indicative View Sectors 23 11 2020

BOGGABRI COAL MINE

Indicative View Sectors

FIGURE 2

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IDEMITSU
BOGGABRI COAL

2.4 PRIMARY VISUAL CATCHMENT

The Primary Visual Catchment (PVC) for BCM was identified in the EA VIA and represented the area within which the majority of potential critical views of BCM were obtained, based on a consideration of topography alone as a screening element.

The PVC has not changed for this VIA.

2.5 VISUAL CHARACTER UNITS

A landscape setting can be defined in terms of topography, vegetation, hydrology and land use features. These elements define the existing visual character of the landscape that BCM interacts with. Within any landscape there are areas of similar visual features are defined as a Visual Character Units (VCUs).

VCUs are rarely seen in isolation but rather in combination with one another from any viewing location. Defining the landscape in terms of these VCUs assists in understanding the visual character of the landscape with BCM interacts. In consideration of the existing environment (**Section 2**), the EA VIA identified the following VCUs within the PVC that combine to make up a particular view from any viewing location: Namoi River Flood Plain; Lowland Foothills; Rural Lands; Town Area; Surrounding ranges; and Mine and Infrastructure Area.

These VCU's remain contemporary and are each briefly described below.

2.5.1 Namoi River Flood Plain

The Namoi River Flood Plain VCU is relatively flat with grass / crop cover that allows for long views from the cleared rural lands to the surrounding ranges. Also occurring on the flood plain are remnant Red Gum woodlands that can restrict long distance views.

There are a number of scattered rural residences within the Namoi River Flood Plain VCU. However, they are generally limited due to the flood potential within the Namoi River Flood Plain VCU. They occur at the edges or on slightly elevated areas above the floodplain.

There are a number of roads which pass through this VCU. Generally, these roads skirt the flood plain and like the rural Residences, are generally located in the lower part of the Foot Hill VCU for flood avoidance purposes. The Namoi River Plain Unit supports and provides a connection between the Town Area and Lowland Foothills VCUs.

2.5.2 Lowland Foothills

To the north, these hills are generally gently sloping rising to form the ridges of the surrounding ranges. These hills for the greater part have been cleared for grazing purposes and support grasslands with scattered trees or open forest woodlands on steeper areas and along some gully lines. The southern part of the VCU has a number of foothills that exist in isolation and in most instances are not connected directly to any particular surrounding range in the south. The elevation of the hills in the vicinity of Barbers Pinnacle limits visibility to the BCM in a northerly direction, however residences located on the elevated slopes of the foothills have potential views to existing mining operations.

In the east, these hills are dominated by more gently sloping low elevation hills, the land cover is a mixture of grasslands, woodlands and open forest. These hills generally continue to the east eventually linking with the Vickery State Forest with an average elevation of 320 m. These hills limit views of existing mining operations at BCM, however, there are views from the elevated locations in some areas.

To the west, the foothills are a series of hills to the north west of the Boggabri township, the most prominent being Mount Boggabri. This series of foothills also provide screening for the Boggabri and Maules Creek Rail Spur and connection to the Werris Creek Mungindi Railway. The lookout at 'Gins Leap' provides views to the north east across the flood plain.

This VCU supports many rural Residences in the lower and more gentle sloped areas adjacent to the flood plain and in the more intensively cleared grazing areas Rural Lands.

2.5.3 Rural Lands

The rural lands VCU is the most extensive unit covering a range of agricultural land uses, the major use is grazing. The general character of the unit is of gently rolling topography with scattered tree cover and stronger tree belts in some locations along roadways and drainage lines. There are rural residences within this VCU.

2.5.4 Town Areas

The township of Boggabri is situated on the Kamilaroi Highway between Gunnedah and Narrabri and 15 km to the south west of the Project Boundary. The town has a mix of residential, institutional, commercial and industrial land uses, this along with its open space and streetscape character help create the visual character of the town.

2.5.5 Surrounding Ranges

The surrounding ranges generally consist of steep forested slopes that define the edges of the VCU. The surrounding ranges VCU include the Willow Tree Range, Mt Boggabri and associated ridges to the west and the Nandewar Range to the east. The Willow Tree Range encompass BCM, on the western, northern and eastern side of the mining area and forms an unbroken line that functions as a visual barrier to the mine as seen from those directions.

2.5.6 Mine and Industrial Area

The visual character and scale of the BTM Complex (as defined in **Section 2.3.2)** are strong enough to create a VCU based on the visual character of the mines.

The visual impacts of Tarrawonga and Maules Creek are described in **Section 2.3.2**.

The existing BCM generally consists of an active mine pit, OEA, haul roads, and mine infrastructure facilities. The site already has a strong industrial visual character.

3 METHODOLOGY

This section describes the methodology used to develop this VIA and refers to the EA VIA where relevant. The evaluation of the existing visual environment consists of the assessment of both the landscape and viewing locations within it, and the effects of BCM within the visual environment.

3.1 MOD8 VISUAL EFFECT

Visual effect is a combination of the visual properties of BCM, with the proportion of the view occupied by BCM.

The degree to which the visual characteristics of MOD8 contrasts with the existing landscape will determine the type of visual effect. For example, a newly created mine pit and pre-rehabilitated OEA has high visual contrast and low visual integration.

In a similar way, a development is said to be integrated with the existing landscape based on issues of scale, position in the landscape and contrast. High visual integration is achieved if a development is dominated by the existing landscape, is of small scale and or of limited contrast.

The visual properties of MOD8 interact with the proportion of the view that is occupied by a development to produce the level of visual effect. For any type of visual properties, the lower the proportion of the view that is occupied by the development, the lower will be the level of visual effect.

The more the visual element integrates with the surrounding environment, the larger proportion of the view it will need to occupy to have the same level of visual effect as a higher contrasting visual element.

3.1.1 MOD8 Overview

The Modification is seeking approval for the following changes to the BCM:

- Increasing the approved maximum depth of mining down to the Templemore Coal Seam (and associated mine plan amendments) to recover an additional 61.6 Million tonnes (Mt) of Run of Mine (ROM) coal resource within the currently approved Mine Disturbance Boundary, resulting in a six year extension to mine life (i.e. from 31 December 2033 to 31 December 2039); and
- Construction of a specifically designed fauna movement crossing the existing haul road between the mining area and the Mine Infrastructure Area (MIA) to encourage the movement of fauna from the Leard State Forest to the Southern Rehabilitation Area (SRA).

MOD 8 does not seek to make changes to various aspects of the BCM including (but not limited to): the approved Mine Disturbance Boundary, operational hours, mining methods, mining related infrastructure, coal handling, processing and transport methods and rates and access to the site.

3.1.2 Mine Components

From a visual perspective, MOD8 relates to increasing the scale of two major elements: the open cut mining area and the OEA. There will be some additional infrastructure including the construction of a fauna movement crossing of the existing haul road.

The mine development elements have been divided into major and minor elements which are relevant to this VIA. Major elements have the potential for significant visual effect in relation to external view. Minor elements, although not insignificant in horizontal scale, have a less significant visual effect due to lack of vertical scale and visual projection outside the Project Boundary.

Both the major and minor components already occur within the existing environment because of the already established BCM, and the neighbouring Tarrawonga and Maules Creek Mines.

Major mine development components include:

- Open cut mining area; and
- OEAs.

Minor mine development components include:

- Fauna movement crossing.

3.1.3 Mine Areas

Physical Character

MOD8 seeks approval to recover up to an additional 61.6 Mt of ROM coal by mining eight additional coal seams to the deeper Templemore coal seam within the currently approved Mine Disturbance Boundary.

Currently approved mining operations are scheduled to continue towards the north-west using east-west strips until the end of December 2033. The EA VIA concluded that BCM is largely contained within the basin formed by the natural ridge line of the Willow Tree Range and that mining in the north-western direction along the lower eastern slopes of the western ridge would not impact the ridge line / skyline.

The mine plan changes resulting from MOD8 are proposed to take place between 2022 and 2039. Between 2033 and 2039, the direction of mining will change from what was assessed in the VIA EA. Mining operations will realign the box cut with an advancing north-south face towards the west, as opposed to the currently approved east-west strips which advance in a north westerly direction. Mining direction will still occur below the lower eastern slopes of the Willow Tree Range and will continue not to impact the ridge line / skyline.

Visual Effect

The EA VIA described the visual effect of the mine void on the character of the surrounding landscape. As the MOD8 mine plan does not seek to change the current footprint of approved

mining operations, there are unlikely to be material additional visual effects. The description of visual effect from the EA VIA is therefore likely to remain the same, as follows:

> *"The mine void consists of two significant components, the 'highwall' (active mining area) and the 'low wall' which forms part of the OEA. These are the major visual components of the void, however both are generally below natural ground level and therefore only visible to view points with higher elevations.*
>
> *The exception may be a limited extent of the highwall above an elevation of 380m, close to the end of the mine life. These areas are limited in scale and are fragmented. These small areas may be visible over the top of existing topography and vegetation and or the rehabilitated overburden emplacement areas to the south of the highwall towards the end of the mine life of 21 years.*
>
> *The visual effect of mine void is created by the colour of the raw earth and exposed rock contrasting with the surrounding landscape. The open mining face also creates strong form, shape and line characteristics that differ from the existing landscape. These effects are greatly decreased over distance and by atmospheric conditions such as cloud cover, backlight and heat haze.*
>
> *The location of the void within Leard State Forest, its enclosure by the Willow Tree Range and the OEA eliminates views into the mine void from all locations.*
>
> *The mine void creates a moderate to high visual effect. This effect cannot be reduced until the final landform is created at the end of all mining activity with only the void left untreated to some degree. However as stated above, these voids are not visible to sensitive receptors in the surrounding landscape so the visual effect has no impact significance."*

It is noted that whilst MOD8 seeks to realign the mining operations with north-south aligned strips advancing to the west during the later years of the mine life, it is anticipated that this change is likely to result in reduced visual effects when compared to that approved for BCM. This is because the main highwall will be facing away (i.e. towards the east) from the available views of receivers to the south west of the mine.

3.1.4 Overburden Emplacement Area

Physical Character

MOD8 seeks approval to recover up to an additional 61.6 Mt of ROM coal. The increased ROM coal production will lead to an increase in the total volume of overburden and reject materials to be moved.

The additional overburden materials to be recovered by the deeper mining activities will be emplaced within the northern extension to the existing OEA at BCM. The proposed OEA will cover a larger area further to the north of that previously approved at BCM. A Temporary OEA will also be constructed on the north-western slope of the existing OEA to accommodate

overburden materials which will be utilised at the end of the mine life to partially infill the final mining area to a level higher than the pre-mining groundwater levels.

The proposed OEA located in the south of the Project Boundary will be constructed to a maximum height of 400 m RL. Whilst this is 5 m higher than the maximum height of the OEA within the approved Conceptual Final Landform design, the increase in the maximum height is required to incorporate macro-relief elements to the surface of the final landform design.

The rehabilitation objective under Schedule 3 Condition 69 of SSD 09_0182 is for "constructed landforms to drain to the natural environment". The need for macro-relief is a contemporary landform enhancement post approval of the approved Conceptual Final Landform design from the Boggabri EA and has been incorporated into the proposed Conceptual Final Landform design for MOD8 to improve visual and environmental outcomes.

Visual Effect

2024

Figure 6 from the Modification Report shows the revised 2024 landform. When compared to the conceptual year 10 mine plan from the EIS, the MOD8 2024 landform results in delayed rehabilitation of the highest point of the OEA whilst the extended OEA landform is constructed. The western face which forms the predominant view from VP1 is largely rehabilitated with existing and proposed rehabilitation by 2024, with some more distant, higher points actively being shaped and rehabilitated until 2027.

2029

Figure 7 from the Modification Report shows the revised 2029 landform. When compared to the conceptual year 21 mine plan from the EIS, the MOD8 2029 landform rehabilitation is generally consistent from this view with the majority of rehabilitation on the western side and up to 400 RL being completed. The view from VP1 will see visible and established rehabilitation up to and after year 2029.

Final Landform

The final landform that has macro-relief elements as shown in Figure 8 of the Modification Report is also of greater visual interest than one which is uniform as well as providing benefits including improved drainage.

Visual Effect Summary

The EA VIA described the visual effect of the OEA on the character of the surrounding landscape. Whilst the MOD8 OEA would be 5 m higher than what is approved, the significance of the visual effects are reduced by the size and scale of the approved OEA. The increase in elevation from 395 m to 400 m is not considered visually significant as it is only a small increase in bulk over the whole of the OEA (representing 1.3% increase).

As the MOD8 OEA will not result in any additional significant visual effects, the description of visual effect from the EA VIA remains the same, as follows:

"The OEAs will create strong contrasting form in the landscape, and will initially also have a strong colour contrast. This contrast and high visual effect will be reduced to moderate/low by landscaping and progressive rehabilitation following mining. The high contrast is somewhat offset by the moderate integration level achieved by the OEA being below the natural forested ridge line of the Willow Tree Range.

Visual effect levels are generally moderate due to the small area of OEA that would be in an un-rehabilitated state at any one time. These effects would reduce to low over and very low as tree cover matures and obtains mature foliage colour and texture values."

3.1.5 Infrastructure Elements

Physical Character

MOD8 seeks to construct a fauna movement crossing over the haul road on the western side of the existing rehabilitation area. The ultimate design of the fauna movement crossing will be determined during the detailed design process, post approval of MOD8. It is proposed that the crossing will be a minimum of 50 m wide and will be located generally within and to the west of the MOD8 Disturbance Footprint (see Figure 5 of the Modification Report).

Whilst the infrastructure for the fauna movement crossing will generally be located within the currently approved Mine Disturbance Boundary, some minor disturbance will be required to connect the proposed landform into the remanent vegetation.

Visual Effect

The fauna movement crossing will have no significant visual effect as following rehabilitation it will blend with the surrounding vegetation and be built in proximity to locations where other infrastructure already exists (i.e the haul road).

3.2 MOD8 VISUAL EFFECT SUMMARY

The visual effects of the mine elements continue to vary from high to low. However, most significant high visual effect areas are not visible to external view locations. Only the outer face of the OEA will continue to be visible to some southern view locations, and visual effects of this element will reduce by completion of rehabilitation of high visibility outer slopes.

3.2.1 Mine Area

The establishment and excavation of the mine area will continue to have a high visual effect throughout the life of the mine. However, views towards the mine area will be limited from external viewing locations.

3.2.2 OEA

The southern outer face of the OEA (particularly the upper sections to be constructed) will continue to be the main element that is most visible to external view. This southern face of the OEA will entail overburden emplacement and progressive rehabilitation conducted up to 2026. During this period exposed areas of pre-rehabilitated OEA that have high contrast and low

integration will continue to not dominate the primary view shed and therefore will continue to have a moderate visual effect. If this level is exceeded a high visual effect will temporarily occur until rehabilitation is complete. However, this high visual effect will only occur from VP1 in the South West Sector and from VP3 and VP4.

Between 2024 and 2029, progressive and establishing rehabilitation will be visible on the western side and up to 400 RL. The view from VP1 will see established rehabilitation up to and after year 2026 and have a low visual effect from VP1. Continuing overburden emplacement and shaping will continue to occur to the north however will be at lower than 400 RL and as such not be visual from the south.

3.2.3 Other Infrastructure Elements

Although the infrastructure elements defined in **Section 3.1.5** are considered of moderate scale, the visual effects are low as following rehabilitation it will blend with the surrounding vegetation and they occur adjacent to or replace other elements of the landscape which are of similar scale and character.

3.3 VIEWING LOCATIONS

The viewing locations are those areas where people are likely to obtain a view of BCM. These viewing locations have different significance based on numerous factors, collectively evaluated through land use and distance.

The EA VIA evaluation was in terms in terms of north, east, south east, south west and western sectors.

This VIA uses the viewing sectors developed in the EA VIA, which are shown in **Figure 2.** The description for each sector provided below is relevant for the contemporary landscape within this VIA.

Additionally, an initial desktop review and location visit on 22 October 2020 for this VIA identified five key view points within sectors representative of viewing locations for inclusion in the assessment. The locations of the five view points are provided in **Table 2** and shown in **Figure 1**. A photo from each view point is provided in this section in the relevant sector.

Table 2
Viewing Points and Approximate Distance to OEA

View Point	Description	Approximate Distance to OEA (km)
VP1	Manilla Road / South West Sector	10
VP2	Braymont Road, Boggabri Town / South West Sector	15
VP3	Corner of Bluevale and Manilla Road (South East Sector)	7
VP4	Manilla Road East / South East Sector	7
VP5	Kamilaroi Highway / South West Sector	13

3.3.1 North Sector

Immediately to the north of the Project Boundary are the forested ridges of Willow Tree Range. The Willow Tree Range will continue to screen mining activities from view from this sector. Further, the Maules Creek Mine has been established and developed since the EA VIA. Maules Creek has three approved OEAs ranging from 430 m to 440 m RL.

This sector was assigned a low sensitivity to BCM in the EA VIA which will continue to apply for MOD8.

3.3.2 East Sector

There are no private receivers in the East Sector within 7.5 km of the proposed OEA (see **Table 1**). Nevertheless, the Willow Tree Range (with a maximum height of 423 m AHD) continues to screen the mining operations from external view at two mine owned receivers. Therefore, the sector continues to have low sensitivity to BCM.

3.3.3 South East Sector

Residences

The EA VIA stated that:

> *"In some situations there are potential views based on topography so that if there are no foreground trees there may be some views to the Project Boundary, especially when the OEA achieves approximately RL 395. Also above this elevation there may be potential views to small sections of the highwall of the mining void in the latter years of the mine life. However, if seen these will be isolated elevated pockets of disturbance contained within the framework of surrounding forest and rehabilitated OEAs."*

There are two remaining private residences remaining in this sector (see **Table 1**). They include houses (ID 140 and 147). ID 140 is the closest residence and is over 6 km from the highest point of the OEA.

Views from ID 140 toward the Project Boundary are screened by topographic features associated with Goonbri Mountain (with a natural elevation of 470 m) and the Willow Tree Range. Therefore, this view location is considered to have a low sensitivity.

ID 147 is located outside 7.5 km of the proposed OEA landform. The EA VIA stated that residences beyond 7.5 km "would continue to have a moderate sensitivity if they have views of the southern OEA." ID 147 is partially screened by the Willow Tree Range (375 m elevation at this location). The view from ID 147 would also include the Tarrawonga southern OEA, therefore, in consideration of both the partial screening and views toward Tarrawonga, ID 147 is considered to have a low sensitivity.

The remaining houses within this sector are mine owned.

Local Roads

There have been two changes to the local road network since the EA VIA. Heavy vehicles now transport coal from Tarrawonga coal south along "Haul Road south of Goonbri Road"

(Halcrow, 2011), and head east along Manilla Road before exiting south onto Bluevale Road. This transport route is used in both directions by up to 156 heavy vehicles per day at a coal production rate of 2 Mtpa (Halcrow, 2011).

Goonbri Road was also upgraded in 2014 after the closure of Leard Forest Road.

The abovementioned changes do not impact on the description for local roads from the EA VIA, reproduced as follows:

> *"The main roads in the south east sector are the Manilla Road and to a lesser extent Goonbri Road. Both roads would continue to have low sensitivity ratings at distances greater than 2.5 km."*

View Point (VP) 3 and 4 provide a contemporary representation of the views toward the BCM and Tarrawonga Mine OEAs from Manilla Road (see **Plate 1** and **Plate 2**). Rehabilitation can be seen from the view. Up to year 2024 ongoing emplacement and shaping will be visible across Tarrawonga Mine from this location and have a moderate visual effect. However, after 2026 the rehabilitated slopes will have a low visual effect when compared to pre-rehabilitation areas.

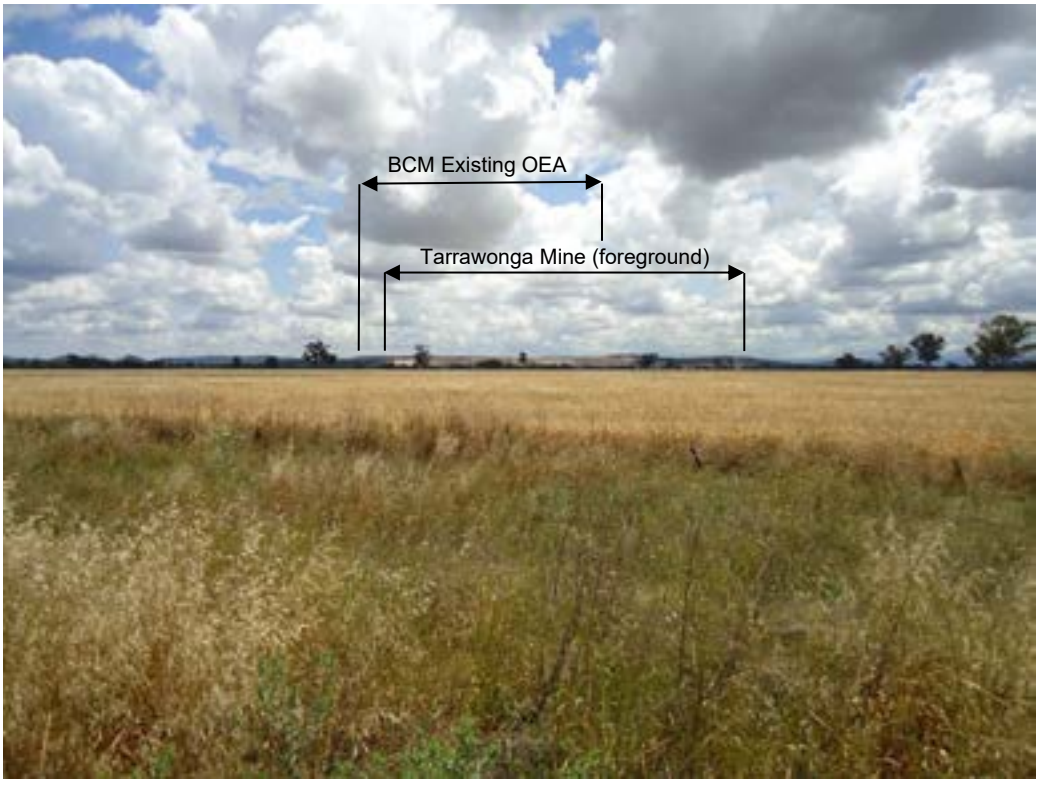


Plate 1
Visual Assessment Viewing Point 3

Plate 2
Visual Assessment Viewing Point 4

3.3.4 South West Sector

Residences

OEA

The EA VIA stated that

> *"Micro-topographic features of the foothills south of the Leard State Forest, in addition to the major features of Merriown Mountain and Barbers Pinnacle, vegetation in the foreground or near middle ground of many residences as well as general homestead orientation in directions other than the Project Boundary minimise views to the mining area.*
>
> *There are potential views based on topography in some locations so that if there are not any foreground trees there may be some views to the Project Boundary, especially when the OEA achieves RL 395. Also above this elevation there may be potential views to small sections of the high wall of the pit in the latter years of the mine life. However, if seen these will be isolated elevated pockets of disturbance contained within the framework of surrounding forest and rehabilitated OEAs.*
>
> *Private residences within a 7.5 km radius of the Project Boundary may have a high sensitivity, dependant on visibility and view orientation. Residences beyond this distance would have a moderate sensitivity if they have views of the southern OEA".*

There are two private residences remaining in this sector (ID 44 and 48) which are both within the BCM ZOA and are located within 7.5 km of the Project Boundary at its closest point. However, both houses are located over 8 km from the highest point of the OEA.

“Glenhope” (or ID 44) continues to be screened by topographic features associated with Barbers Pinnacle. Barbers Pinnacle can be seen in **Plate 3**. The EA VIA did not provide a sensitivity level at this location, therefore, this VIA considers its sensitivity to be low due to the intervening topography screening views towards the BCM.

ID 48 will have views toward the OEA which will be partially screened by the northern emplacement of Tarrawonga Mine (370 m AHD). A representative photo was taken from Manilla Road toward BCM at location (VP1) and is shown in **Plate 3**. The viewing point continues to illustrate the screening potential of trees in the foreground, even if they are not immediately adjacent to the road. It can be seen that even trees in a semi-open woodland configuration assist in screening mining activity.

Residences on Therribri Road would continue to have a moderate to low sensitivity to activities within the Project Boundary. However, these residences are now mine owned excepting ID44 which has been discussed previously in this section.

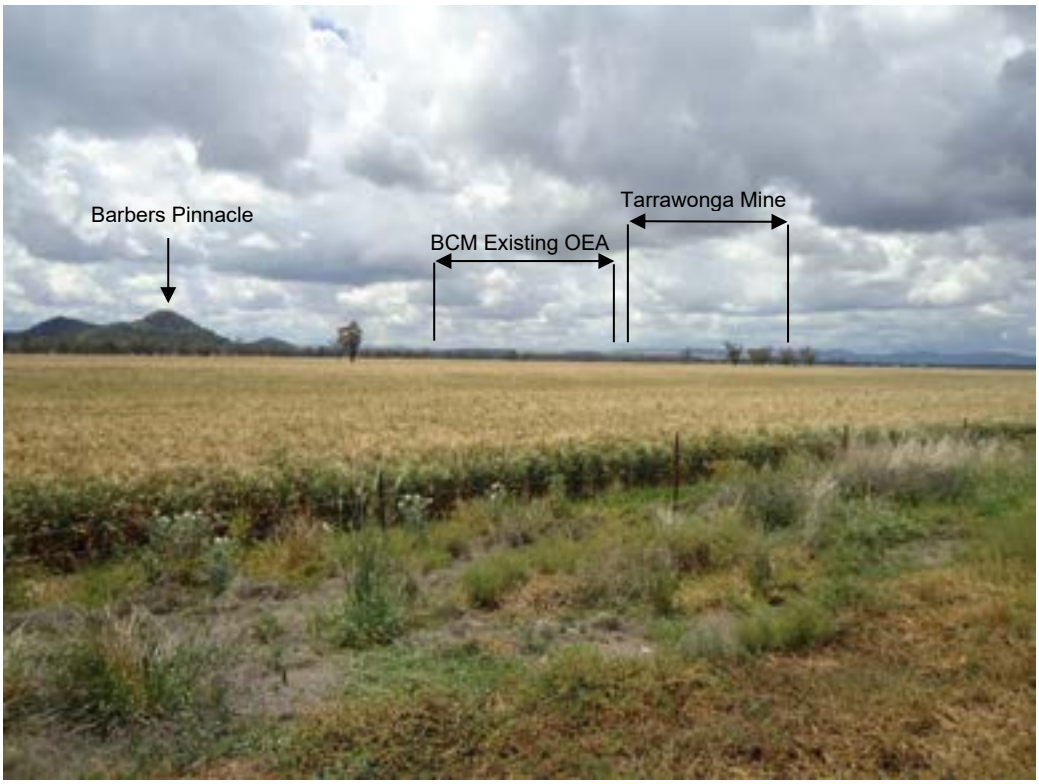


Plate 3
Visual Assessment Viewing Point 1

A cross section at VP1 was also created for this VIA comparing the currently approved operations with the Proposed view (**Figure 3**).

MOD8 2024 Mine Plan

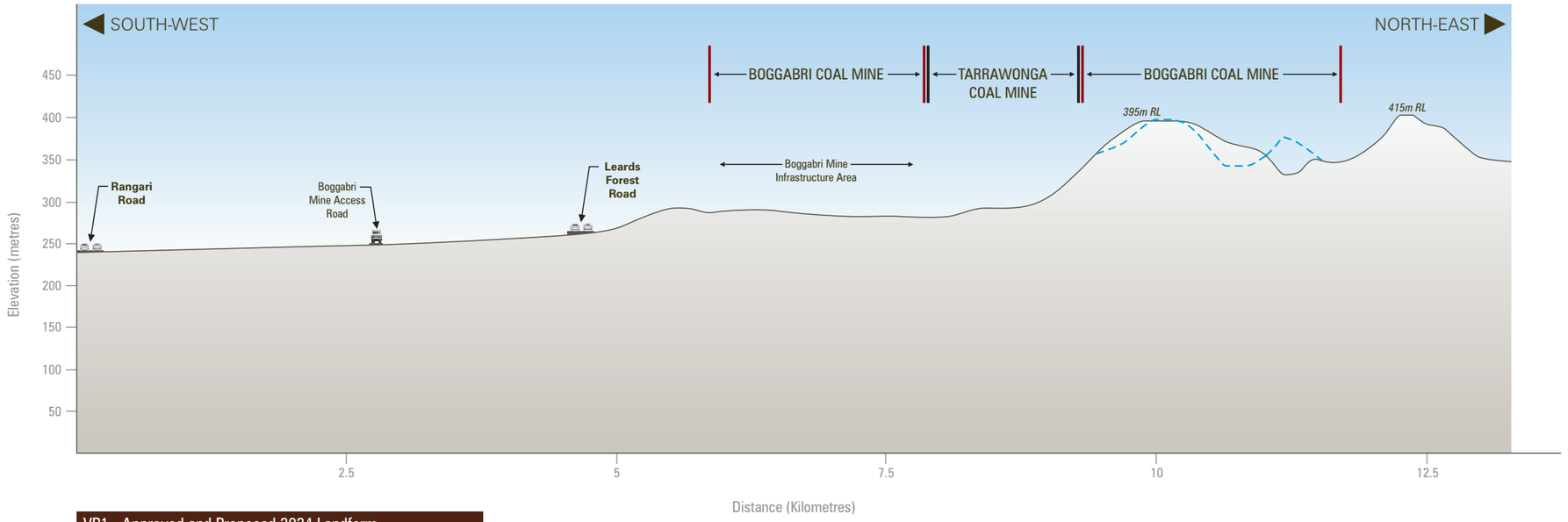
For MOD8 Year 24, the cross section shows a 1-2 m RL difference at its highest point between the proposed MOD8 landform in year 2024 compared to what is currently approved for BCM. This cross section also indicates that views from the opposite direction (i.e. from the north–east) will continue to be screened by the elevated topography of the Willow Tree Range located immediately to the north-east of the BCM mining operations (at 415 m RL).

Differences in existing views from the south – west towards the revised landform will be negligible to none given the distance of the view locations towards the BCM and the small proportion of view taken by the proposed increase in landform heights.

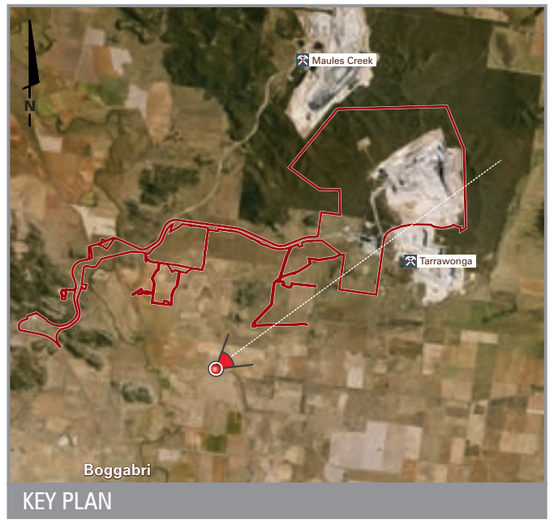
MOD8 2029 Mine Plan

For MOD8 Year 29, the cross section shows that in 2029 the MOD8 landform will be 5 m higher at its highest point to the north - east than what is currently approved.

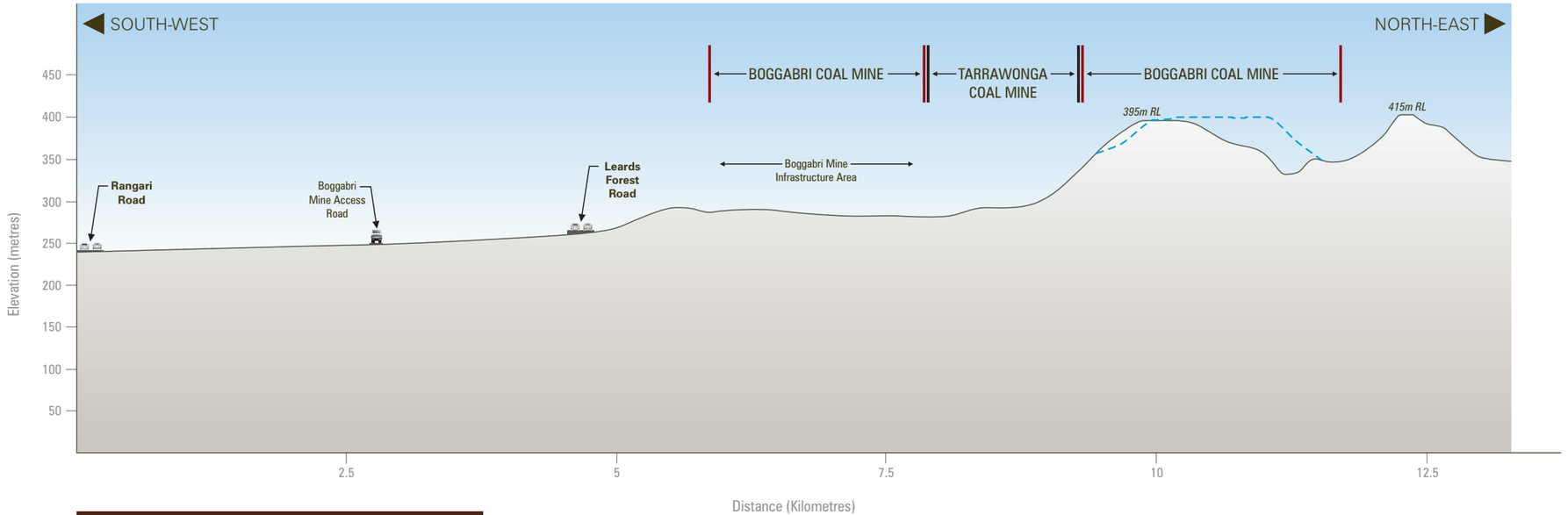
Differences in existing views from the south – west towards the revised landform will be negligible to none as rehabilitation progresses to completion.



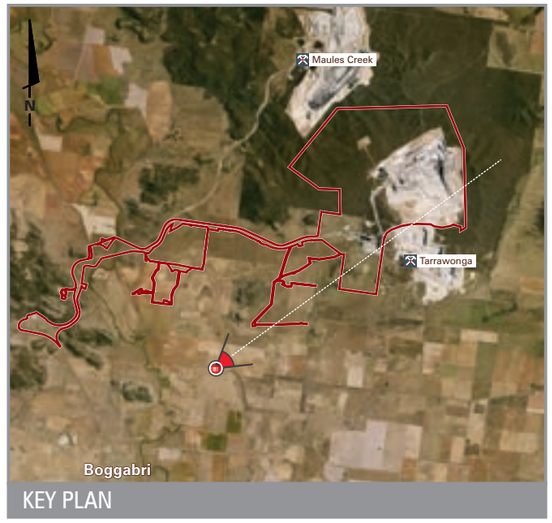
VP1 - Approved and Proposed 2024 Landform



KEY PLAN



VP1 - Approved and Proposed 2029 Landform



KEY PLAN

Legend

Project Boundary

Approved Landform (Continuation of Boggabri Coal Mine EA, Hansen Bailey 2010)

MOD8

HB BOGGABRI 1974 F3 Visual Cross Section VP1 20 11 2020 Rev B

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

IDEMITSU
BOGGABRI COAL

BOGGABRI COAL MINE

Visual Cross Section VP1

FIGURE 3

Boggabri Town

The north eastern corner of the Boggabri township will continue to have distant views of the BCM. The views from over 15 km generally means that even the Willow Tree Range is obscured by foreground and middle ground trees, similarly rendering the mine area out of view. Sensitivity would continue to be low, as the MOD8 visible components are greater than 15 km distance.

A View from Braymont Road (VP2) is provided in **Plate 4**. Distance and foreground trees continue to screen views to the Willow Tree Range and BCM.

Plate 4
Visual Assessment Viewing Point 2

Kamilaroi Highway

On leaving the Boggabri township to the north, potential views to the south west of Robertson's Mount to the distant hills of the Willow Tree Range continue to be obtained. Similarly, immediately before the Rail Spur overpass of the Kamilaroi Highway, fleeting views of the Project Boundary are still available between Barbers Pinnacle and Merriown Mountain.

At a distance of 10 km, the Kamilaroi Highway would continue to have a low sensitivity to distant views of the BCM and MOD8 components. Similarly, there would continue to be a low sensitivity from the road side rest area due to distance. However, travel direction is north-south which is perpendicular to the location of BCM. Therefore, views from the Kamilaroi Highway are not directed towards BCM.

A representative photo of the rest area was taken from Kamilaroi Highway toward BCM at location (VP5) and is shown in **Plate 5**. The viewing point shows that views from the Kamilaroi Highway continue to be restricted by topographic elements such as foreground vegetation on the Namoi River, Barbers Pinnacle, Merriown Mountain, associated ridges and the foothills adjacent to the Project Boundary.

Plate 5
Visual Assessment Viewing Point 5

Local Roads

There have been no changes to the local road network in this sector since the EA VIA. The sector continues to support a number of local roads including Manilla Road (also called Rangari Road), Therribri Road and Leard Forest Road (which has been closed at BCM).

BCM continues to be visible from parts of Leard Forest Road within the Project Boundary, however it is not visible from this road at more distant locations due to roadside forest cover.

Views from Manilla Road are previously discussed in this section and in **Section 3.3.3**.

3.3.5 West Sector

This sector remains totally screened by the Willow Tree Range and elevated sections of the Leard State Forest. Accordingly, no impacts are anticipated as illustrated in **Figure 1**. The West Sector is not considered further in this VIA.

3.4 VISUAL SENSITIVITY

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different land use areas in the vicinity of a development. Visual sensitivity is a combination of the sensitivity of the land use and the visibility of the project as a measure of distance.

Land uses that use the scenic amenity values of the surrounding landscape as part of a leisure experience and over extended viewing periods, generally have a higher visual sensitivity (e.g. residential, tourist and/or recreation areas).

Other factors affecting visual sensitivity of individual areas include:

- Screening effects of existing topography, infrastructure or vegetation. For example, receivers whose views are screened from the project by hills or trees will have a lower visual sensitivity than those with open views; and
- Orientation to the project. For example, areas with strong visual orientation towards the project (i.e. those with areas such as the property entrance or client accommodation orientated towards it) will have a higher visual sensitivity than those not orientated towards the project.

3.4.1 Visual Impact

Assessing the visual impact of project involves qualifying the change to the existing environment that the construction and operation of the project will have. The magnitude of the impact will depend on the visual effect of the project (how much it contrasts with the existing environment) and the visual sensitivity of any viewers.

The visual impact level of the project is determined by considering together the visual sensitivity and visual effect. **Table 3** Illustrates the interaction between the parameters of visual sensitivity and visual effect.

Table 3
Visual Impact Methodology

		Visibility Sensitivity		
		High	Moderate	Low
Visual Effect	High	High	High/Moderate	Moderate/Low
	Moderate	High/Moderate	Moderate	Moderate/Low
	Low	Moderate/Low	Moderate/Low	Low
	Very Low	Low	Very Low	Very Low

4 IMPACT ASSESSMENT

This section considers each sector and describes the visual impact at representative locations as a result of MOD8 in the contemporary environment surrounding BCM. It also provides an overall summary where impacts have changed as a result of MOD8.

4.1 NORTH SECTOR

Residences and roads in this sector will continue to be screened from view by the Willow Tree Range and will not experience any material visual impacts from MOD8.

4.2 EAST SECTOR

There will not be any material visual impacts from MOD8 on residences in the eastern sector as views will continue to be screened by the Willow Tree Range.

4.3 SOUTH EAST SECTOR

4.3.1 Residences

Views of BCM from the two private residences in this sector within 7.5 km of the proposed OEA are screened by intervening topography and landforms created by Tarrawonga. This coupled with continued moderate to low visual effects from the OEA creates moderate to low visual impacts.

The EA VIA stated that

> *"a high impact would only occur if a high visual effect is experienced due to excessive exposure of pre-rehabilitated OEA. It is considered that areas of the high-wall potentially exposed to view will be limited, small scale and fragmented. Such an impact would reduce to moderate and low following rehabilitation of the exposed OEA.*
>
> *In all, any high to moderate impact would only occur in the first five years of the mine life as the constant maturing of tree cover on the outer slopes of the southern OEA reduce effects and impact levels to very low and insignificant."*

This VIA considers that this impact would only occur from ID 147, and that the impact summary from the EA VIA is still relevant in this case as the mine plan in 2024 extends visible overburden emplacement and shaping and slightly delays rehabilitation finalisation until 2024.

4.3.2 Local Roads

The visual impact on Manilla Road would remain consistent with what was predicted in the EA VIA, as follows:

> *"The visual impact on Manilla Road would remain low reflecting moderate to low visual effects and a low visual sensitivity. This would continue to reduce to very low and become insignificant and barely perceivable when rehabilitation of the outer face of the OEA is completed. "*

Goonbri Road

This road will continue to have exposure to the outer face of the OEA and the upper parts of the high-wall, but visual effects will continue to be generally be moderate to low. At this distance (i.e. greater than 2.5 km) the visual sensitivity will continue to be defined as low. Visual impact levels will therefore continue to be low and will reduce to very low when rehabilitation is complete.

4.4 SOUTH WEST SECTOR

4.4.1 Residences

The two private receivers located within 7.5 km of the proposed OEA (and within the BCM ZOA) are more than 8 km away from OEA. These residences would continue to have a moderate visual sensitivity if views were available. However, fieldwork and aerial photography analysis has demonstrated that views continue to be screened (see **Section 3.3.4**).

The visual impact to residences would remain consistent with what was predicted in the EA VIA, as follows:

> *"Given that visual effects are likely to be low to moderate if seen, low impacts would be experienced in this sector. If high visual effects do occur due to excessive exposure of pre-rehabilitated OEA, a high impact could occur until the OEA is rehabilitated."*

4.4.2 Boggabri Town

Although parts of BCM continue to be visible from Boggabri, to the west of Barbers Pinnacle, foreground screening within the town by houses, buildings, street and garden planting will continue to eliminate this view.

Further, outside the town the adjoining woodlands along the Namoi River will continue to screen views from the edges of town. In keeping with this, the township will continue to have a low sensitivity with no visual effect or impact.

4.4.3 Kamilaroi Highway

The greatest potential impact on this road will continue to occur north of the township of Boggabri on the journey north for up to 5 km. Potential views onto the southern face of the OEA may still occur. However, the visual effect will continue to be limited at this distance and the visual sensitivity will continue to be low.

The impact on the highway will still be a low if any part of BCM is seen.

4.4.4 Therribri Road

Potential views from Therribri Road will continue toward the OEA. The visual effect at this distance will continue to be moderate reducing to low following rehabilitation. At this distance, visual sensitivity will continue to be low creating a low visual impact level and would continue to reduce to very low becoming insignificant and barely perceivable following rehabilitation.

4.4.5 Tourist Localities

With the exception of Boggabri township and the Kamilaroi Highway, there continues to be no significant tourist destinations in the primary visual catchment, with the possible exception of the roadside rest area on the highway below Mount Boggabri. The mining area is over 10 km from this location.

As stated in the EA VIA "*Visual effects of the OEA before rehabilitation will be small in area and will continue to create a moderate to low visual effect at this distance. Also given the distance, visual sensitivity would be low.*"

Given that the MOD8 OEA will not result in any additional significant visual effects (representing 1.3% bulk increase in height), visual impacts will continue to be low and would be further reduced and become insignificant following rehabilitation.

4.5 WEST SECTOR

This sector will continue to be screened from view of BCM by the Willow Tree Range, so there is no visual impact on residences.

4.6 NIGHT LIGHT

4.6.1 General

The EA VIA described the following lighting sources:

> *"The visual effect of lighting surrounding the Project Boundary will vary. It will be influenced by the locality of operations on-site, the relative level at which the viewing location is situated and the presence of any off-site barriers such as topographic features and / or vegetation.*
>
> *There are two types of lighting effects that could be experienced from the Project. The first effect is where the light source is directly visible, and will be experienced if there is a direct line of sight between a viewing location and the light source.*
>
> *The second effect relates to the general night-glow (diffuse light) that results from light of sufficient strength being reflected into the atmosphere. This type of effect will create a strong local focal point and the effect will vary with distance and atmospheric conditions such as fog, low cloud and / or dust particles which all reflect light.*

Both of these light effects already exist in the locality of BCM, Tarrawonga and Maules Creek. MOD8 will not exacerbate the predicted lighting conclusions from the EA VIA, apart from continuing impacts for a further 6 years beyond those currently approved.

BCOPL has advised that there have been no community complaints regarding lighting impacts since 2014.

4.6.2 Direct Light Effects

Direct light effects are generally restricted to vehicles and mine void lighting, as other operational light would be hooded.

Generally, BCM truck and vehicle lighting will continue to be screened by topography, vegetation and eventually by the OEA itself. During the first 4-5 years of the MOD8 mine life as the OEA is constructed, night lighting from dump trucks and other machinery working on the outer faces of the OEA will continue to project lighting effects outside the Project Boundary.

4.6.3 Diffuse Light Effects

BCM, Tarrawonga and Maules Creek Mine already contribute diffuse light effects into the night sky. As stated in the EA VIA "depending on the proximity of the viewing zone, this glow will not create a significant visual effect."

The influence of surrounding mining operations and associated lighting activities will continue to reduce the visual impact of diffuse light associated with BCM.

The diffuse night lighting effect of BCM will continue to be similar to that which is currently experienced.

4.6.4 Night Light Impact Summary

The visual effect of lighting associated with BCM would be at a similar level to that currently approved and experienced. The main light effects will be from diffuse light.

The major mitigation elements against night light effects from BCM are topography, vegetation and distance to sensitive receivers.

4.7 SUMMARY

BCM will integrate with the existing landscape based on scale, position in the landscape and contrast. High visual integration is achieved if BCM is dominated by the existing landscape.

The visual properties of MOD8 interact with the proportion of the view that is occupied by a development to produce the level of visual effect. For any type of visual properties, the lower the proportion of the view that is occupied by BCM, the lower will be the level of visual effect.

The assessed visual impacts of BCM are summarised in **Table 4**.

The North, East and West Sectors will continue to not experience any visibility to the BCM as a result of MOD8, due to screening from the Willow Tree Range.

In the South East Sector, VP3 and VP4 are anticipated to continue to experience moderate to low impacts with the inclusion of MOD8.

A higher impact may continue at VP3 for representative private receivers (7 km from the highest point of the OEA from MOD8), however all receivers in the vicinity are now mine owned.

Higher impacts at VP4 (8 km from the highest point of the OEA) were also predicted for private receivers in the EA VIA which stated:

> *"a high impact would only occur if a high visual effect is experienced due to excessive exposure of pre-rehabilitated OEA. It is considered that areas of the high-wall*

> *potentially exposed to view will be limited, small scale and fragmented. Such an impact would reduce to moderate and low following rehabilitation of the exposed OEA."*

However, the closest private receiver to VP4 is now receiver ID 147 which is partially screened by the Willow Tree Range, with Tarrawonga in the foreground and BCM further north. Therefore, a moderate to low impact from MOD8 is predicted at this location, reducing to low after 2026 when rehabilitation of the exposed faces of the OEA is completed.

In the South West Sector, VP1 is anticipated to continue to experience moderate to low impacts from MOD8. VP2 and VP5 are predicted to continue to experience low visual impacts.

Whilst impacts from the proposed changes for MOD8 are likely to be much lower with the existing rehabilitation, high visual effects could continue to occur at VP1 (representative of the south west sector) as predicted in the EA VIA, as follows:

> *If high visual effects do occur due to excessive exposure of pre-rehabilitated OEA, a high impact could occur until the OEA is rehabilitated."*

A large portion of the exposed face of the OEA has already been rehabilitated and the visual effect will be caused by the additional overburden resulting from MOD8.

The rehabilitation of the OEA will be undertaken generally in accordance with the mine plans presented within the Modification Report with further detail provided in the Mining Operations Plan (or equivalent). The OEA will be progressively formed and rehabilitated in a manner consistent with achieving the final landform design.

A key focus of the rehabilitation program is to progressively rehabilitate the OEA. Therefore, the ongoing rehabilitation practices undertaken at BCM when undertaken generally in accordance with the proposed mine plans in the Modification Report will mitigate the potential high visual effect at VP1.

Table 4
Visual Impact Assessment Summary

Viewing Point	Visual Sensitivity	Visual Effect	Visual Impact
VP1	Moderate	High	Moderate to Low
VP2	Moderate	Low	Low
VP3	Low	Moderate	Moderate to Low
VP4	Low	Moderate	Moderate to Low
VP5	Low	Low	Low

5 MITIGATION

This section describes proposed mitigation measures resulting from MOD8 impacts.

As MOD8 will not result in any additional impact on the surrounding visual landscape at any private receiver, no additional mitigation or management measures beyond that outlined in the BCM EA and SSD 09_0182 are proposed.

* * *

for
HANSEN BAILEY

Theresa Folpp
Environmental Scientist

Dianne Munro
Principal Environmental Scientist

6 ABBREVIATIONS

Abbreviation	Description
AHD	Australian Height Datum
BCM	Boggabri Coal Mine
BCOPL	Boggabri Coal Operations Pty Limited
BTM Complex	Collective term for BCM, Tarrawonga and Maules Creek mines
EA	Boggabri Coal Mine Environmental Assessment' (Hansen Bailey, 2010)
EA VIA	'Continuation of Boggabri Coal Mine Visual Impact Assessment' (Integral, 2010)
EPL	Environment Protection Licence
FTE	Full Time Employee
ha	Hectares
IAR	Idemitsu Australia Resources
ID	Property Identification
Km	Kilometres
LGA	Local Government Area
Maules Creek	Maules Creek Coal Mine
MDB	Murray Darling Basin
ML/year	Megalitres per year
OEA	Overburden Emplacement Area
PA	Project Approval
PVC	Primary Visual Catchment
RL	Reduced Level
Tarrawonga	Tarrawonga Coal Mine
VCU	Visual Character Units
VIA	Visual Impact Assessment
VP	View Point
ZOA	Zone of Affectation

7 REFERENCES

- Halcrow (2011), *Tarrawonga Coal Project Road Transport Assessment*
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