JAMES BAILEY & ASSOCIATES
Environmental and Planning Consultants

RIX'S CREEK NORTH MODIFICATION 10

MODIFICATION REPORT

for Bloomfield Collieries Pty Ltd

21 June 2024

DOCUMENT CONTROL

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Author	James Bailey & Associates Pty Ltd
Author Address	6/127-129 John Street, Singleton NSW 2330
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EXECUTIVE SUMMARY

Introduction

Bloomfield Collieries Pty Ltd owns and operates Rix's Creek Mine, which is located in the Hunter Valley of New South Wales approximately 5 kilometres north of Singleton. Rix's Creek Mine encompasses both Rix's Creek North (previously Integra Open Cut) and Rix's Creek South (the original Rix's Creek Mine).

Rix's Creek North operates in accordance with Project Approval 08_0102 which was granted on 26 November 2010 under the *Environmental Planning and Assessment Act 1979*. Project Approval 08_0102 has been modified on nine occasions. Under Project Approval 08_0102 (as modified), the Proponent can conduct open cut mining operations until 31 December 2035.

Project Approval 08_0102 (as modified) facilitates the extraction of approximately 30 Million tonnes of Run of Mine coal from the 'Camberwell Pit' and the 'Falbrook Pit'. Project Approval 08_0102 also enables the processing of up to 8.7 Mt per annum of ROM coal from Rix's Creek North, Rix's Creek South, and the neighbouring Integra Underground Mine (now owned and operated by Glencore) at the Rix's Creek North Coal Handling and Preparation Plant.

The Modification

Bloomfield Collieries Pty Ltd is seeking to modify Project Approval 08_0102 under Section 4.55(1A) of the *Environmental Planning and Assessment Act 1979*.

The key elements of the Modification include:

- Coal handling and process changes, including installation of new processing equipment on the Run of Mine coal stockpile areas and the Rix's Creek North Coal Handling and Preparation Plant;
- Upgrade to the Rix's Creek North Coal Handling and Preparation Plant to include tailings dewatering facilities and thickener capacity;
- Additional Run of Mine stockpiles within the approved area of disturbance;
- Workshop extension;
- In pit mobile crusher;
- Substation replacement and switching station;
- Disposal of heavy vehicle waste tyres (as is approved for Rix's Creek South) and concrete in-pit; and
- Administrative changes to conditions to Project Approval 08_0102 which will have minimal environmental impacts.

The proposed infrastructure changes exist wholly within previously approved disturbance areas and operations following the proposed infrastructure changes will be consistent with current activities.

The proposed changes associated with the Modification will be of minimal environmental impact and a modification under Section 4.55(1A) of the *Environmental Planning and Assessment Act 1979* is considered to be the applicable approvals pathway.

Stakeholder Engagement

Bloomfield Collieries Pty Ltd has consulted with regulatory and community stakeholders throughout the preparation of this Modification Report to ensure that their issues and/or concerns are addressed.

Consultation was undertaken with the New South Wales Department of Planning, Housing, and Infrastructure to discuss the proposed modification and the intended approvals pathway. The relevant environmental considerations to be addressed within this Modification Report were also confirmed.

Bloomfield Collieries Pty Ltd held a Community Consultative Committee meeting on 18 October 2023 and provided an overview of the proposed changes and the intention to seek approval by way of a minor Modification application. A briefing over the environmental assessment findings was provided at the recent Community Consultative Committee meeting held on the 22 May 2024.

Bloomfield Collieries Pty Ltd will continue to consult with key stakeholders throughout the Government assessment and approvals process.

Impacts, Management and Mitigation

This Modification Report includes an assessment of the potential environmental impacts of the Modification in accordance with applicable legislative requirements and relevant Government guidelines and policies.

The Modification does not seek any changes to mining operations or the currently approved Disturbance Area Boundary at Rix's Creek North.

The Modification will result in minor alterations to the existing facilities at the Rix's Creek North Mine and remain entirely within the approved Disturbance Area Boundary. As such, there will be no additional impacts to biodiversity, Aboriginal Cultural heritage, European heritage, soils and land capability or agricultural resources as a result of the Modification.

Air Quality and Greenhouse Gas

Todoroski Air Sciences completed an air quality and greenhouse gas (GHG) emissions assessment to assess the potential air quality and greenhouse gas impacts from the Modification.

The net total incremental annual dust emissions associated with the Modification will be minor and unlikely to be discernible relative to the existing dust emissions from Rix's Creek North. The Modification is expected to generate approximately less than one percent more dust relative to the currently approved Rix's Creek North which is within the natural variation.

Scope 1 greenhouse gas emissions will be relatively minor and unlikely to be distinguishable relative to the approved operations. The changes in Scope 2 greenhouse gas emissions are expected to be lower than the greenhouse gas emissions that would otherwise be generated from the construction, operation, and eventual rehabilitation of future tailings facilities, which would be required if the Coal Handling and Preparation Plant upgrades are not undertaken. Therefore, the relative change in total greenhouse gas emissions from the Modification is expected to decrease.

Noise

EMM Consulting Pty Limited completed a Noise Impact Assessment to consider the potential noise impacts of the Modification.

The assessment demonstrated that the Modification may result in minor increases in noise (1 decibel) at some receivers during periods of meteorological enhancement and when assuming that the existing approved activities were operating at the noise criteria. Noise levels of this magnitude would not be discernible to the average listener and do not warrant receiver-based treatment controls. As such, the Modification is not expected to exacerbate noise generated at Rix's Creek North and operations can continue in accordance with the approved criteria specified in Project Approval 08_0102.

Surface Water

HydroBalance completed a surface water impact assessment to consider the potential surface water impacts associated with the Modification.

The proposed Run of Mine coal pad works are located within the existing Disturbance Area Boundary areas and therefore will not result in additional impacts on downstream flows or water quality.

The construction of the new Run of Mine coal pad to the west of the Coal Handling and Preparation Plant is within the existing dirty water catchment area which drains to a dirty water dam at the western extent of the park-up area, south of the haul road. This dam will be sized to capture runoff from the new Run of Mine pad and adjacent to the haul road for a 1% Annual Exceedance Probability 24-hour storm event. The captured water will be returned to the mine water management system.

The tailings dewatering facility upgrades within the Coal Handling and Preparation Plant will reduce the short-term water consumption on-site. The savings to water consumption and associated excess water will continue to be managed within the current mine water management system. Bloomfield Collieries Pty Ltd currently have a number of measures in place to manage excess water within the mine water management system including evaporator technology and water transfers to and from nearby mines.

Waste Off-the-Road Tyre & Concrete Materials Disposal

The Modification seeks to incorporate the disposal of waste off-the-road tyres within the mining area at Rix's Creek North, consistent with that currently undertaken at the Rix's Creek South mine.

To consider the potential impacts of waste off-the-road tyres, a series of articles and industry specific Modifications seeking similar approvals were reviewed. Bloomfield Collieries Pty Ltd similarly communicated the outcomes of its investigations in relation to the limited availability of recycling opportunities for these off-the-road waste tyres. The review demonstrated that there is a lack of available alternatives for the processing and/or recycling waste off-the-road tyres proximate to the Rix's Creek North mine. On-site disposal has been the most reasonable and feasible approach to mitigate risks and storage hazards on-site. The assessment further demonstrated that there are negligible environmental risks and impacts associated with the disposal of waste off-the-road tyres at Rix's Creek North. Notwithstanding, Bloomfield Collieries Pty Ltd will continue to investigate reasonable and feasible options for the processing and recycling of the waste off-the-road tyres.

Further to the disposal of waste off-the-road tyres, Bloomfield proposes to dispose concrete materials within the mining area at RCN. This includes only the concrete materials generated from activities at RCM and which are no longer required for operations. This disposal of inert concrete materials within the mining area at RCN is not expected to result in additional material environmental impacts.

Other Impacts

The Modification will not result in any additional surface disturbance beyond that currently approved. As such, there will be no new impacts to biodiversity, cultural heritage and erosion and sedimentation. Other environmental impacts including visual and lighting, contamination and hazards, and bushfire are considered minor and will continue to be appropriately managed in accordance with Rix's Creek North environmental management system.

Evaluation of Merits

The Modification will facilitate the following improvements:

- Upgrades to the Rix's Creek North Coal Handling and Preparation Plant to improve the efficiency of processing Run of Mine coal extracted from Rix's Creek North and Rix's Creek South mines;
- The installation of a larger thickener and a Solid Bowl Centrifuge Plant to dewater tailings reducing the reliance on tailings storage facilities in the future through co-disposal of these materials with other reject material within the Overburden Emplacement Area;
- Additional Run of Mine coal stockpile capacity to ensure uninterrupted mining and Coal Handling and Preparation Plant operations;

- Additional workshop bays to improve maintenance efficiencies for the current fleet of Heavy Mobile Equipment. An underground hydrocarbon piping system will also further increase maintenance efficiency and reduce the potential for spills entering the environment;
- The introduction of a mobile rock crushing plant to process rock materials for use in road construction, hardstand areas and mine rehabilitation drainage channel, and reduce the reliance on imported materials;
- The replacement of the existing substation (that has reached its end-of-life) to support current and future operations at Rix's Creek North; and
- The disposal of waste off-the-road tyres and concrete materials in-pit to reduce waste clutter and the associated off-site disposal.

These improvements will increase the operational efficiency and competitiveness of the existing business and reduce the need for the construction of additional tailings storage facilities into the future.

The environmental assessments conducted for the Modification have determined that any impacts will be minor and not result in any additional impacts beyond those currently approved for Rix's Creek North.

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FIGURES

APPENDICES

1. INTRODUCTION

This section introduces the Modification, the proponent and the development sought to be modified.

1.1 BACKGROUND – APPROVED PROJECT

Bloomfield Collieries Pty Ltd (Bloomfield) owns and operates Rix's Creek Mine (RCM) located in the Hunter Valley of New South Wales (NSW). RCM is a coal mining operation located approximately 5 kilometres (km) north of Singleton at its closest point and both east and west of the New England Highway (NEH) (see **Figure 1**).

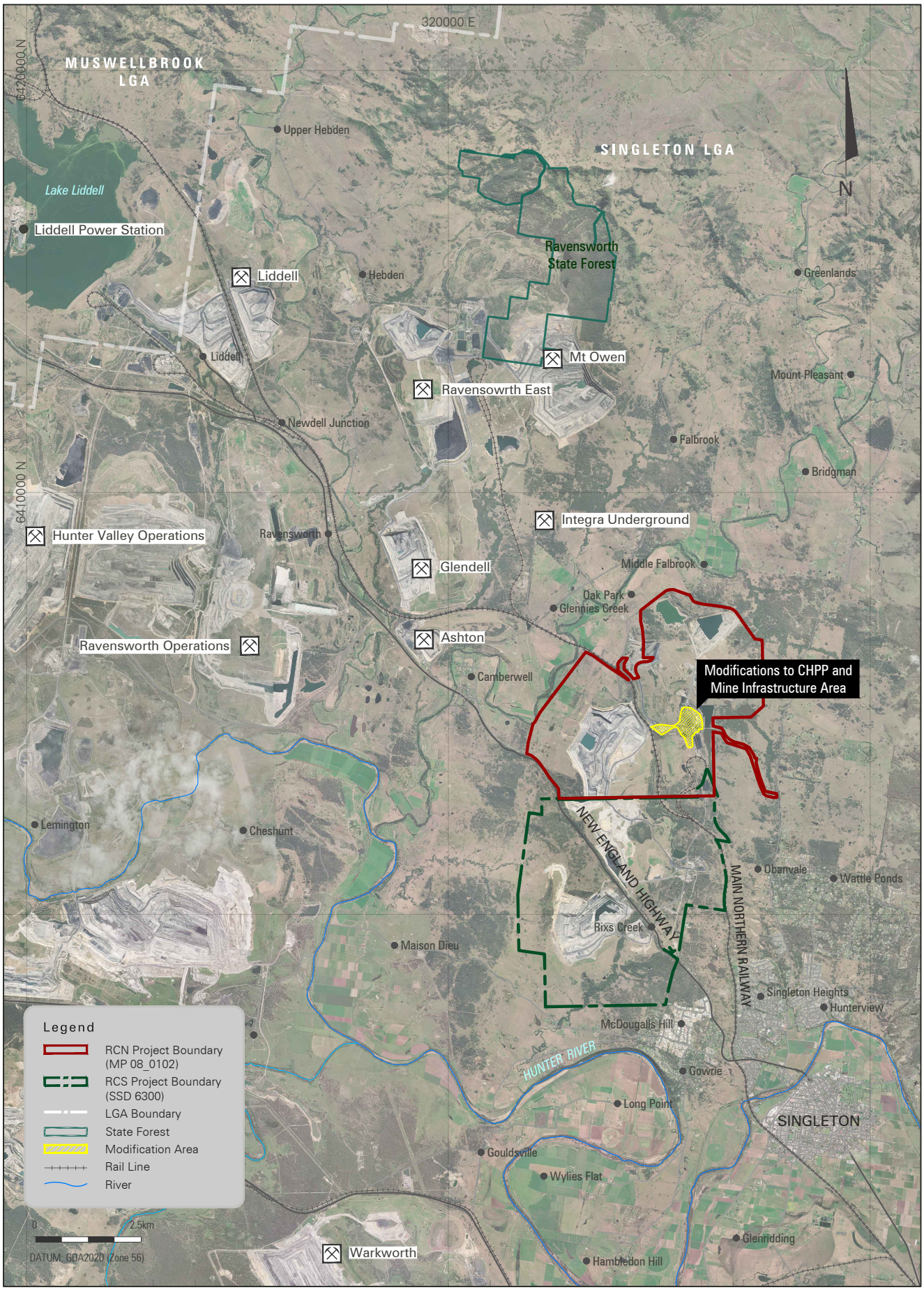
RCM is the collective name for Rix's Creek North (RCN) (previously Integra Open Cut) and Rix's Creek South (RCS) (the original Rix's Creek Mine).

RCN operates in accordance with Project Approval (PA) 08_0102 granted 26 November 2010 under the *Environmental Planning and Assessment Act 1979* (EP&A Act). PA 08_0102 has been modified on nine occasions to date. Under PA 08_0102 (as modified), the Proponent can conduct open cut mining operations on-site until 31 December 2035.

PA 08_0102 (as modified) facilitates the extraction of approximately 30 Million tonnes (Mt) of Run of Mine (ROM) coal from the 'Camberwell Pit' and the 'Falbrook Pit'. PA 08_0102 also enables the processing of up to 8.7 Mt per annum (Mtpa) of ROM coal from the RCN and the neighbouring Integra Underground Mine (now owned and operated by Glencore) at the RCN Coal Handling and Preparation Plant (CHPP).

PA 08_0102 (as modified) authorises the following:

- Extraction of up to 1.5 Mtpa of ROM coal from the Falbrook Pit;
- Extraction of up to 4.5 Mtpa of ROM coal concurrently from the Camberwell Pit;
- Open cut mining using shovel and excavator methods down to the base of the Hebden Seam;
- Extraction of additional ROM coal through highwall or auger mining methods;
- Extension of the South Pit (Camberwell Pit) further to the west of the mining extent approved under DA 86/2889;
- Emplacement of overburden within the Camberwell and Falbrook Pits;
- Construction of an Overburden Emplacement Area (OEA) adjacent to the Falbrook Pit;
- Processing of ROM coal in the RCN CHPP;
- Transport of coal from RCN to RCS for processing and rail transport (MOD 5);
- Receival of coal for processing and rail transport from RCS (MOD 5);
- Receival of up to 5 million bank cubic metres (Mbcm) per annum overburden and 0.5 Mbcm of partially dried tailings from RCS (MOD 7);
- A temporary height increase of the Camberwell Pit OEA by 25 m to Reduced Level (RL) 175 m with final landform reduced to RL 165 m (MOD 9);
- Up to 3 blast events per day (MOD 9);
- Rail transportation of up to 7.3 Mtpa of product coal from the site; and



JBA 2341 - RCN (CHPP Mod) - Regional Locality (26/05/2024)

RIXS CREEK NORTH MODIFICATION

Regional Locality

FIGURE 1

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- Ancillary activities including construction and use of access road and site facilities area and to conduct exploration activities within the mining leases (MOD 9).

The approved project layout for PA 08_0102 (as modified) is illustrated in **Figure 2**.

1.2 OVERVIEW OF THE MODIFICATION

Bloomfield is seeking to modify PA 08_0102 by way of an application under Section 4.55(1A) of the EP&A Act for an upgrade to the CHPP facilities, additional ROM stockpiles, continued disposal of waste tyres in pit, in pit rock crushing facility and a number of other minor infrastructure changes including a workshop extension, and substation replacement (the Modification).

The Modification is comprised of the following key elements as conceptually illustrated in **Figure 3**:

- Coal handling and process changes, including installation of new processing equipment on the ROM stockpiles areas and RCN CHPP;
- Additional ROM stockpiles to provide increased capacity within the approved area of disturbance at RCN;
- Upgrade to the RCN CHPP to include tailings dewatering facilities and thickener capacity to enable the co-disposal of partially dried tailings materials with overburden within the mining area;
- Workshop extension;
- In pit crusher for the processing of rock materials for internal road base and other onsite purposes;
- Substation replacement and installation of a switching station;
- Disposal of heavy vehicle waste tyres and concrete materials in-pit; and
- Administrative changes to conditions to PA 08_0102 which have minimal environmental impacts.

Further details of the activities proposed as part of the Modification are provided in **Section 3**.

1.3 THE PROPONENT

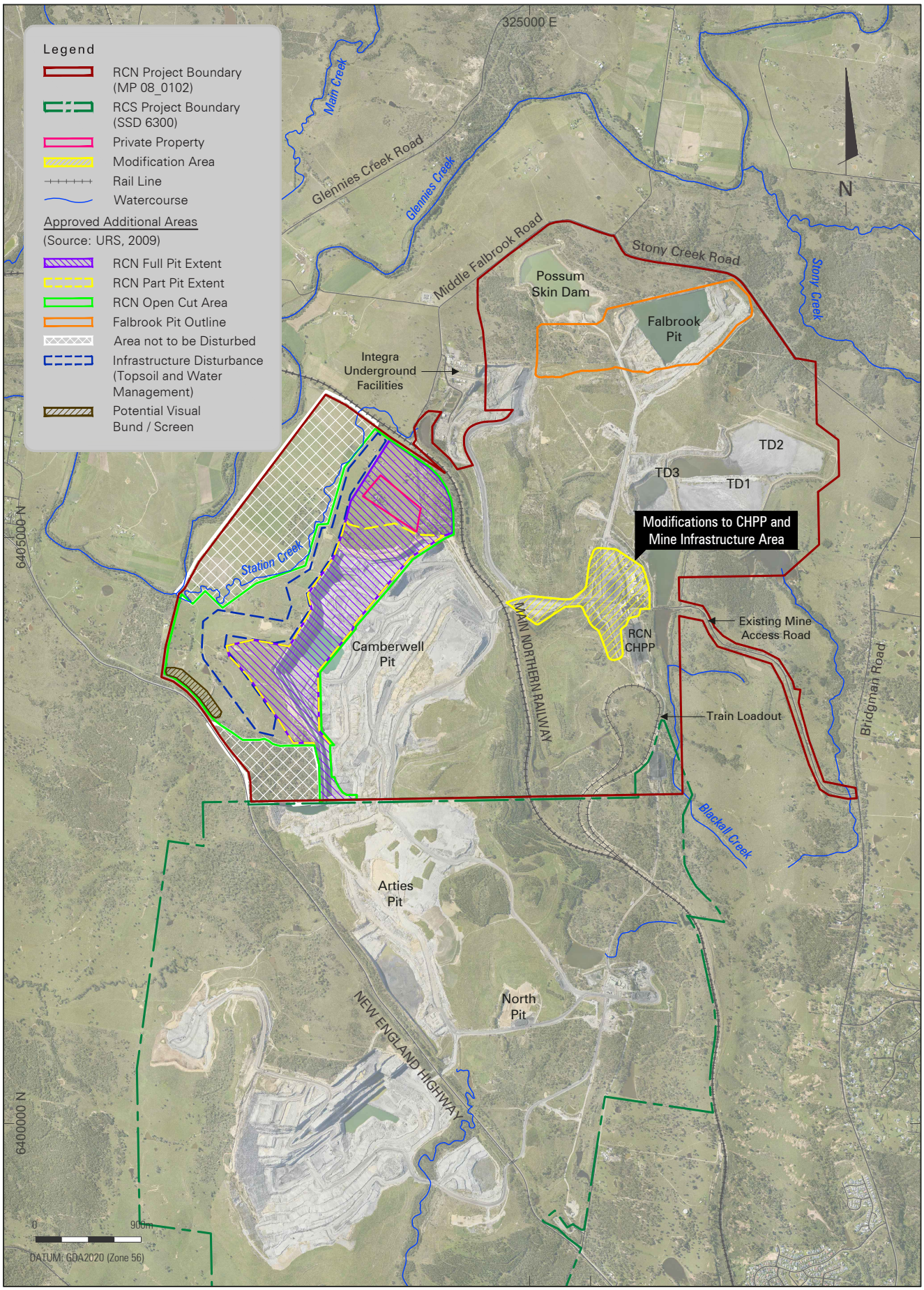
The proponent for the Modification is Bloomfield. The contact details for the proponent are:

Bloomfield Collieries Pty Ltd
PO Box 4
East Maitland NSW 2323
Phone: (02) 4930 2600
Email: info@bloomcoll.com.au

1.4 DOCUMENT PURPOSE

James Bailey and Associates Pty Ltd (JBA) has prepared this Modification Report on behalf of Bloomfield to support a Modification Application under Section 4.55(1A) of the EP&A Act. This Modification Report has been prepared with regard to the '*State Significant Development Guidelines – Preparing a Modification Report*' (Department of Planning, Infrastructure and Environment, 2022).

This Modification Report provides a description of the Modification, assesses the potential environmental impacts, proposes mitigation and management measures (where required), and provides a justification for the Modification.

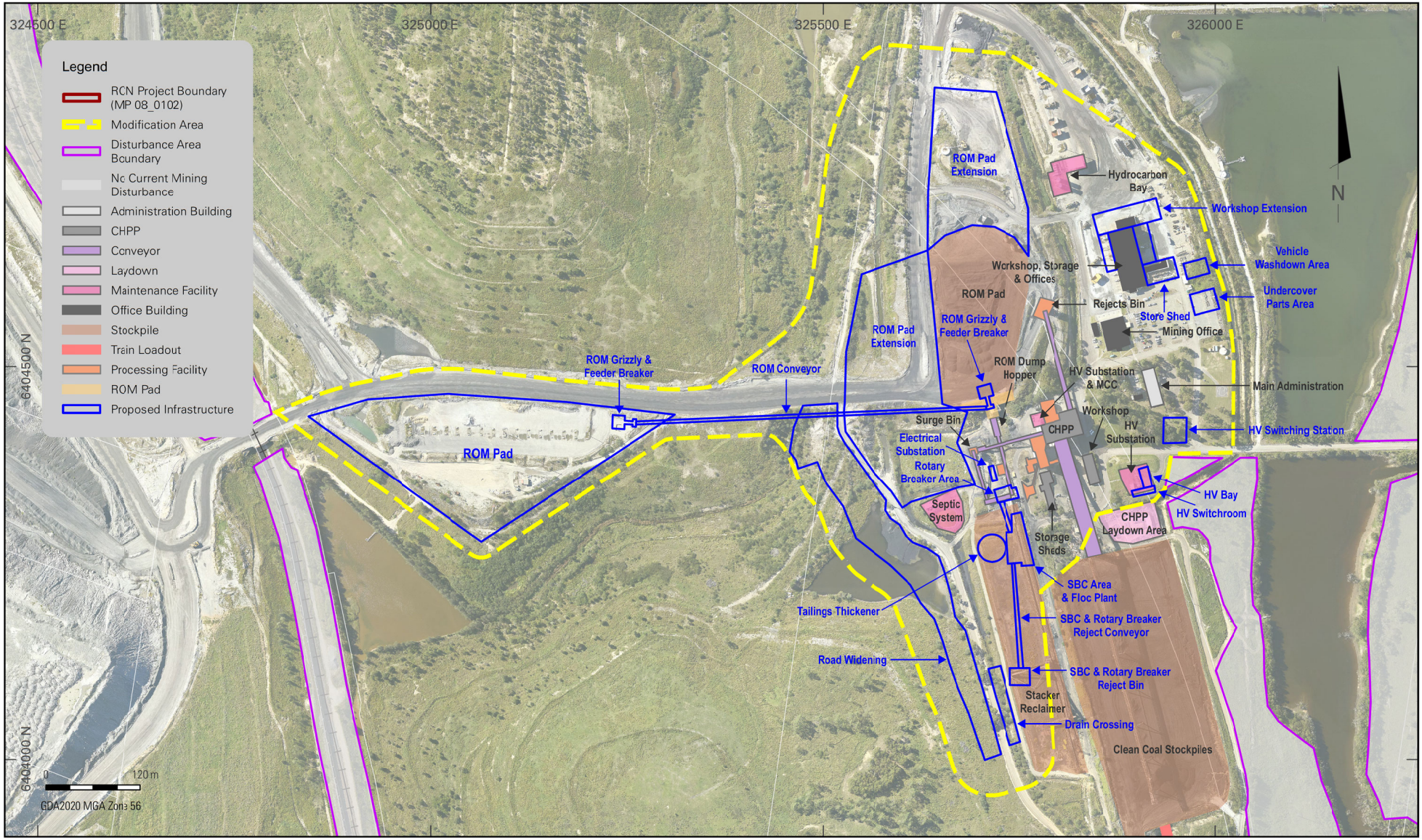


JBA 2341 - RCN (CHPP Mod) - Approved Project Layout (27/05/2024)

RIXS CREEK NORTH MODIFICATION

Existing Project Layout

FIGURE 2



JBA 2341 - RCN (CHPP Mod) - Conceptual Layout.aprx

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Conceptual Infrastructure Layout

FIGURE 3

1.5 DOCUMENT STRUCTURE

This Modification Report is structured as follows:

- **Section 2** provides an overview of the environmental and planning context that is relevant to the Modification;
- **Section 3** describes the Modification;
- **Section 4** provides a summary of the statutory context;
- **Section 5** provides a summary of the stakeholder engagement;
- **Section 6** assesses the environmental impacts and recommends mitigation measures; and
- **Section 7** provides a justification and evaluation of the merits of the Modification.

2. STRATEGIC CONTEXT

This section outlines the environmental and planning context that is relevant to the Modification. It identifies the surrounding environmental features, key planning considerations and relevant government policies. It also discusses the alternatives considered for the Modification.

2.1 ENVIRONMENTAL CONTEXT

2.1.1 Natural Features

Key natural features within the locality relate to water catchments. In the RCN Project Boundary, the eastern portion of the Northern Mining Area intercepts runoff from the Reedy Creek and Stony Creek catchments. Martins Creek is located to the south-east of the RCN Tailings Dam 2 (TD2). Station Creek is located to the west of the existing Camberwell Pit which flows to Glennies Creek.

Glennies Creek is a regulated river system under the *Hunter Regulated River Water Source* and is a major tributary of the Hunter River. Glennies Creek is a sixth order stream with permanent, regulated flows from Glennies Creek Dam (also known as Lake St Clair).

2.1.2 Land Use

Land use in the Hunter region is historically characterised by agricultural and mining activities. Dominant land uses within and adjacent to the RCN Project Boundary include a mix of agricultural activities and open cut and underground mining operations. Urban development associated with the township of Singleton is located to the south and east of the site.

Coal Mining

The coal resources within the Hunter Valley region supports a number of underground and open cut coal mining operations in the vicinity of RCN.

Operations within the immediate locality (~5 km) include:

- Integra Underground immediately north and west;
- Mount Owen Complex (MOC) (Glendell, Mt Owen and Ravensworth East) to the north-west;
- Ashton Mine (Ashton) to the west; and
- Ravensworth Open Cut Operations (Ravensworth) to the west.

Operational coal mines within the vicinity (within an approximate 10 km radius) of the RCM are shown on **Figure 1**.

Agriculture

The Hunter Valley region has a long history of agricultural activities. The land adjacent to RCN supports a variety of agricultural activities that predominantly includes grazing and cropping supported by the Hunter River and its floodplains.

Rural and Residential Developments

RCN is located in the Singleton Local Government Area (LGA), with an approximate total population of 24,500 people (ABS, 2021). RCN is surrounded by several rural villages including Mason Dieu, Camberwell, Rix's Creek, Glennies Creek, Obanvale and Bridgman, all of which having a population of less than 250 people.

2.1.3 Land Ownership

Land ownership within and surrounding the approved RCN Project Boundary is shown on **Figure 4**. Most of the land within the Project Boundary is owned by Bloomfield and its subsidiaries.

Privately-owned parcels of land are located immediately to the east, west and north of the RCN Project Boundary. Glencore owned land in the northern portion of the Project Boundary is associated with its neighbouring Integra Underground operation.

Camberwell Village is located to the west of RCN's Camberwell Pit. Singleton Heights and the centre of Singleton are located to the south-east of RCN. Five privately-owned receptors remain within Camberwell Village. These privately owned receptors currently hold rights for acquisition from other adjacent mining operations as indicated in **Figure 4**.

2.1.4 Road and Rail

The NEH travels in a north-west to south-east direction on the western boundary of the RCN Project Boundary. It is the primary road corridor servicing the Hunter Valley. The NEH is currently protected by a buffer of 100 m in which no mining operations can take place.

The Main Northern Rail Line bisects the RCN Project Boundary travelling in a north-west to south-east direction. The RCN Rail Loop joins the Main Northern Rail Line to the south of the RCN CHPP. Middle Falbrook Road and Stoney Creek Road are located to the north and north-west of the RCN Project Boundary.

Access to the RCN Project Boundary is predominantly from the Bridgman Road and the Mine Access Road from the east. Access to RCN is also via Rix's Creek Lane from the NEH and internal access roads.

2.1.5 Hazards

The RCM is mapped as bushfire prone land. RCN is managed under the existing bushfire management procedures implemented across the RCM and in accordance with the recommendations of '*Planning for Bush Fire Protection*' (Rural Fire Service, 2019).

RCN is located within a mine subsidence district. Subsidence is monitored and managed in accordance with the current subsidence management procedures implemented across the RCM.

2.2 GOVERNMENT STRATEGIES, POLICIES AND PLANS

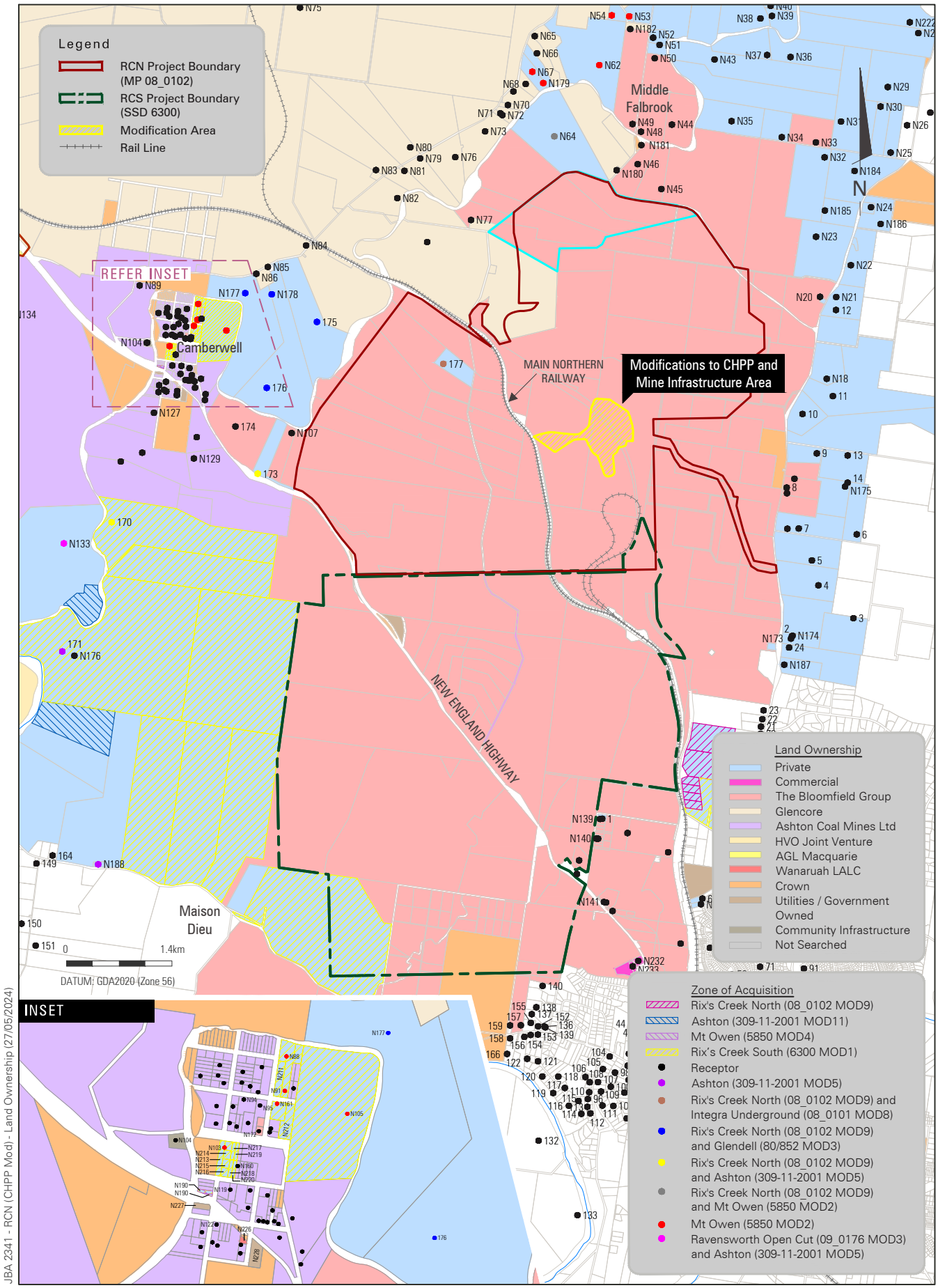
2.2.1 Hunter Regional Plan 2041

The '*Hunter Regional Plan 2041'* (2022) (HRP) aims to guide the NSW Government's land use planning priorities and decisions over the next 20 years in the Hunter Region.

The HRP sets the strategic land use framework for continued economic growth and diversification in the region. The plan aims to unlock sustainable growth opportunities and investments, as well as housing choice and lifestyle opportunities to retain the Hunter's position as a leading regional economy in Australia.

The HRP includes nine objectives, each with actions or initiative and strategies to help achieve the objectives. The strategies within each objective aim to set the policy positions and provide a preferred pathway for achieving the objective.

If a planning proposal is not consistent with a strategy, performance outcomes listed with each objective provide the assessment framework that determines whether an alternative approach still achieves the objectives and vision of the HRP.



JBA 2341 - RCN (CHPP Mod) - Land Ownership (27/05/2024)

RIXS CREEK NORTH MODIFICATION

Land Ownership

FIGURE 4

Objective 1 of the HRP is to diversify the Hunter's mining, energy, and industrial capacity. Strategies within this objective include alternate land uses for former mine and power station sites, renewable energy production, advanced manufacturing, logistics and warehouses and circular economy.

This Modification seeks to continue operations at RCM with improved efficiencies. So, whilst not seeking to diversify, the Modification will continue to meet the following performance outcomes:

> '1 *Power stations and coal mines facilitate diverse job opportunities on their land either during operation or following closure, with land uses responsive to the characteristics of the locality.'*

RCM will continue to provide employment for up to 300 employees and contribute to economic development in the region.

2.2.2 Singleton Local Strategic Planning Statement 2041

The *Singleton Local Strategic Planning Statement 2041* (Singleton Council, 2020) (SLSPS) is a local land use strategy that applies to the Singleton LGA, guiding land use policies and principles to 2041. The SLSPS was adopted by the Singleton Council in July 2020. The SLSPS aims to provide clear direction for the Singleton Council and NSW Government agencies to guide decisions relating to future use of land within the Singleton LGA. It establishes a policy framework to facilitate opportunities as they emerge in the future.

The SLSPS recognises coal mining as significant land use and economic driver of the Singleton LGA for the foreseeable future. The Modification is aligned with the SLSPS as it aims to support continual economic development in the Singleton LGA.

2.2.3 Environment Protection Authority Climate Change Policy

The NSW Environment Protection Authority has a critical role in protecting the environment from climate related threats and delivering appropriate actions to assist in achieving net zero emissions in NSW by 2050. The *Environment Protection Authority Climate Change Policy* (NSW EPA, 2023) (EPA CCP) outlines the statutory objectives to protect the environment and reduce risks to human health. The EPA CCP aims to provide clear objectives and guidelines to ensure environmental protection from climate change in NSW. The policy adopts, supports, and builds on the NSW Government's overarching climate change objectives.

The objectives of the EPA CCP are:

- To maximise the economic, social, and environmental wellbeing of NSW in the context of climate change;
- To reduce greenhouse gas emissions (GHG) in accordance with the NSW Governments net zero targets; and
- To make NSW more adaptable to a changing climate.

As part of this CCP, the EPA has recently released guidelines entitled *NSW EPA Guide for Large Emitters: Guidance on the greenhouse gas assessment and mitigation plan to be prepared for large emitting projects within environmental impact assessments; Draft for Consultation*. It is important to note that the emissions for the Modification (as described within **Section 6.1**) will remain below the threshold for being a large emitter and accordingly this draft guideline does not apply

2.2.4 The Climate Change (Net Zero Future) Act 2023

The *Climate (Net Zero Future) Act 2023* legislates the approach to addressing climate change, incorporating a whole-of-government approach to climate action to achieve net zero by 2050.

The objects of the Act are:

- To establish guiding principles for action to address climate change;
- To set targets for the reduction in net GHG emissions in New South Wales until 2050;

- To get an objective for New South Wales to be more resilient to changing climate; and
- To establish a Net Zero Commission to independently monitor, review and report on the progress in NSW towards the targets, the adaptation objective, and other matters.

2.2.5 The Climate Change Bill 2023

The NSW Government introduced its *Climate Change Bill in 2023* which enshrines emissions reduction targets in law and establishes an independent Net Zero Commission (NZC). The NZC has explicit power to provide advice/recommendations to Government agencies and the Independent Planning Commission (IPC), meaning that the independent NZC can give direct recommendation to the IPC without any government oversight.

The new independent body will:

- Advise the Government on progress towards the legislated targets as well as making recommendations on actions and policy required to meet such targets.
- Amendments to the role of the NZC supported by the Government added specific function to allow the NZC to provide direct advice to Departmental Secretaries and the IPC.

2.2.6 Safeguard Mechanism

The Australian Government employs numerous policies and legislative requirements that aim to achieve a reduction in GHG emissions. The Department of Climate Change, Energy, the Environment and Water Safeguard Mechanism is the Australian Government's scheme for reducing emissions from large industrial facilities within Australia. Established under the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), the policy requires facilities that emit upwards of 100,000 tonnes CO_2-e of Scope 1 emissions (in a financial year), to keep their net emission levels at or below its baseline. RCN does not produce in excess of 100,000 tonnes CO_2-e of Scope 1 emissions (in a financial year) and is therefore not considered a Safeguard Mechanism Facility.

2.3 CUMULATIVE IMPACTS

The RCM which comprises RCN and RCS mines is owned and operated by Bloomfield. The cumulative impacts of RCN and RCS have most recently been assessed as part of the *Rix's Creek Mine – Continuation of Mining Project* (AECOM, 2015) for RCS and the latest modification to PA 08_0102 for RCN.

The air quality, noise and surface water impacts associated with this Modification will not be significant when compared to the existing mining operations at RCM. Therefore, the contribution of this Modification to cumulative impacts is expected to be minimal.

2.4 PLANNING AGREEMENTS

Bloomfield has entered into Voluntary Planning Agreements (VPAs) in accordance with the conditions of the relevant planning approvals for RCN and RCS. The Modification will not result in any additional impacts on public infrastructure or services. As such, variations to the existing VPA are not required.

3. MODIFICATION DESCRIPTION

This section describes the changes to the approved development that are sought by the Modification.

3.1 OVERVIEW

The Modification is comprised of the following elements:

- Coal handling and process changes; including installation of new processing equipment on the ROM stockpiles areas and within the CHPP;
- Additional ROM stockpiles to provide increased stockpiling capacity within the approved area of disturbance at RCN;
- Upgrade to the RCN CHPP to include tailings dewatering facilities and an increased capacity of the thickener to enable the co-disposal of partially dried tailings materials with overburden;
- Extension to the RCN Workshop;
- In pit crusher for the processing of rock materials for internal road base and other onsite purposes;
- Replacement of the Substation and installation of a switching station;
- Disposal of heavy vehicle waste tyres and concrete materials in-pit; and
- Administrative changes to conditions to PA 08_0102 which have minimal environmental impacts.

Table 1 provides a summary of RCN's approved operations under PA 08_0102 and provides a comparison of the changes to be sought by the Modification against the approved operations for RCN as at MOD 8. MOD 8 is the latest modification approved under the former Section 75W of Part 3A of the EP&A Act and is therefore considered the original development consent, as discussed in **Section 4.2.1**.

Table 1 Approved Project (MOD 8) Compared with the Modification Proposed Changes (with changes approved for MOD 9)

Aspect	Currently Approved Operations (PA 08_0102 (as per MOD 8))	Previous Changes to Approved Operations (MOD 9)	Proposed Changes to Approved Operations (The Modification)
Project Boundary	As shown on **Figure 2** and Appendix 1 Schedule of Land of PA 08_0102	No change	No change
Surface Disturbance	167.2 ha pit, including additional 7.2 ha from MOD 8 62 ha in 'open cut' area to remain undisturbed. Approximately 90 ha at Falbrook Pit	No change	No change
Project Duration	31 December 2035	No change	No change
Mining Method	Open cut mining (truck and excavator)	No change	No change

Aspect	Currently Approved Operations (PA 08_0102 (as per MOD 8))	Previous Changes to Approved Operations (MOD 9)	Proposed Changes to Approved Operations (The Modification)
ROM Coal Handling	Capability of processing at RCN CHPP of up to 8.7 Mt per annum of ROM coal	No change	Changes to the ROM circuit, including, new: • In-ground hopper and grizzly (x 2 locations), • Feeder-breaker (x 2 locations), • Raw coal screen; • Rotary breaker; • Feed and reject conveyors; Overland conveyor from new western ROM coal stockpile; and • Associated buildings, sumps, pumps and pipelines and ancillary equipment for the above upgrades
CHPP	Dense media cyclones, spirals, teetered bed separators and froth flotations	No change	Installation of a new tailings dewatering plant, including: • 6 x large Solid Bowl Centrifuges (SBC's); • Thickener (35m) • Conveyor; • Reject bin; and • Flocculant batching plant. Capacity of 360 tonnes per hour (tph) of dry solids
Mine Plan	Two open cut mining areas (Camberwell Pit and Falbrook Pit) Highwall or auger mining where feasible in either pit Minor extension to the south-western portion of the Camberwell Pit to include the 7.2 ha of additional mining which has been undertaken (MOD 8)	No changes to mine plan	No change
Overburden Emplacement	OEA within Camberwell Pit to RL 150 m	Temporary height increase of the Camberwell Pit OEA to RL 175 m with final landform reduced to RL 165 m (MOD 9)	Co-disposal of partially dried tailings with overburden within the OEA
Blasting	Max one blast/day in the Falbrook Pit	Increase in number of blast events to 3 events per day	No change

Aspect	Currently Approved Operations (PA 08_0102 (as per MOD 8))	Previous Changes to Approved Operations (MOD 9)	Proposed Changes to Approved Operations (The Modification)
	Max one blast/day in the Camberwell Pit Up to 10 total blasts per week (averaged over a year)	across all mining areas (MOD 9) No change to total blasts per week	
Surface Infrastructure	CHPP and ROM coal stockpiles and handling infrastructure Train loading facility and rail loop Coal product stockpiles Water management infrastructure Continued use of administration, office buildings and workshop complex	No change	Replacement of substation New switching station Mobile rock crusher facility, to crush rock materials for internal road base materials and other onsite construction purposes. RCN workshop extension
Water Management	Mine water dams (Possum Skin Dam, Vent Shaft Dam, Process Dams, D1, D3 and D4) Sediment dams Clean water dams Water transfer to and from neighbouring mines including Integra Underground and the GRAWTS) Integration with RCS water management system	No change	No change
Management of Reject Materials and Waste Disposal.	Coarse reject material co-disposed with overburden in the Camberwell Pit Tailings dams (TD1, TD2 and TD3) Reject transfer from RCS to RCN at 0.5 million m^3 (PA 08_0102 MOD 7) RCS dried tailings refuse to be emplaced in RCN overburden areas (MOD 7)	No change	Co-disposal of RCN CHPP tailings and fine reject materials with overburden to be primary disposal method as tailings dams are phased out. Disposal of heavy vehicle waste tyres and concrete materials within the mining areas
ROM Stockpile	Consent conditions for; 60,000 t ROM capacity, and 70,000 t Stacker Reclaimer Capacity. Temporary stockpiling up to 10,000 t	No change	Extension to existing and additional ROM stockpiles to provide additional stockpiling capacity within the approved disturbance area; increase ROM stockpiling to 500,000 t

Aspect	Currently Approved Operations (PA 08_0102 (as per MOD 8))	Previous Changes to Approved Operations (MOD 9)	Proposed Changes to Approved Operations (The Modification)
Coal Transportation	Rail transportation of product coal to Port of Newcastle Transportation of up to 7.3 Mtpa of product coal	No change	No change
Employment	Operational workforce of 250 personnel	No change	No change
Operational Hours	24 hours a day, 7 days per week in the Camberwell Pit 7am to 10pm, 7 days per week in Falbrook Pit	No change	No change
Exploration Activities	Exploration activities added to approved activities	No change	No change
Administrative Changes	Rehabilitation Management Plan (RMP) to the satisfaction of the Department of Regional NSW - Resources Regulator (Resources Regulator)	No change	New wording of the rehabilitation management and reporting conditions to align with the conditions of a Mining Lease associated with the RCN under the Mining Act.

3.2 COAL HANDLING AND PROCESSING

Bloomfield has identified the need for the following changes to the CHPP process and infrastructure to optimise the processing of ROM coal at the RCN CHPP.

- Installation of grizzly and feeder-breaker ahead of the ROM bin to reduce oversize blockages of the ROM processing facilities. Inclusion of a second grizzly, feeder-breaker and conveyor at the Western ROM pad. Only one grizzly and feeder-breaker will be operational at a time;
- Addition of a double deck wet screen to reduce fine/clay blockages;
- Installation of a rotary breaker, following the wet screen, for the early removal of reject material;
- Installation of a larger thickener and SBC Plant to enable the partial drying of tailings materials for co-disposal with other rejects materials within the overburden emplacement area; and
- Reconfiguration of existing conveyors to suit the proposed changes and installation of three new conveyors to convey material into the ROM bin and the breaker reject and SBC materials (tailings) into the new reject bin.

Each of these changes to the existing CHPP process are described in further detail below.

3.2.1 Run of Mine Handling

The RCN CHPP currently utilises sizers with all ROM coal materials processed. Waste materials generated at the RCN CHPP comprises coarse reject (chitter) and fine reject (tailings), with chitter being transported for co-disposal with overburden and tailings being disposed within tailings dams.

The RCS CHPP currently utilised to process all coal from RCM includes a grizzly, wet screen, and rotary breaker to treat the ROM coal materials and reduce oversize and fine waste materials. Experience at the RCS CHPP has shown that this process results in less downtime and lower processing costs, than the current configuration of the RCN CHPP.

Bloomfield is proposing a similar approach to be adopted at the RCN CHPP to achieve improved efficiencies. The new grizzlies and feeder-breakers are proposed to be located on the existing ROM pad to reduce oversize blockages with the screen and rotary breaker located within the existing CHPP to reduce fines blockages and remove reject material.

An additional grizzly and feeder breaker is also proposed for the new ROM stockpile located to the west of the CHPP on the existing west haul road (as described further in **Section 3.3**). An overland conveyor will be installed passing below the haul road to convey ROM coal from the new stockpile area to the ROM Hopper at the CHPP.

3.2.2 CHPP Upgrades

The Modification seeks to reuse existing infrastructure from RCS and to incorporate process improvements to support the new design at the RCN CHPP. SBCs will be installed within the existing CHPP ROM coal stacker reclaimer area (decommissioned and no longer proposed to be used) to the south-west of the RCN CHPP. The SBCs will be used to substantially dewater tailings and fine reject materials for co-disposal with overburden. Bloomfield proposes to move away from the generation of additional tailings dams and will instead dispose of this waste with overburden within the mining voids.

At some point in the future, ROM coal from the Integra Underground will no longer need to be processed within the RCN CHPP. This provides the opportunity for Bloomfield to process all ROM coal recovered from the RCM at the RCN CHPP.

The proposed upgrades to the RCN CHPP are shown in the conceptual designs in **Figure 5** to **Figure 10** below.

Solid Bowl Centrifuge Plant

The proposed SBC plant is located to the south-west of the existing CHPP. Partially dried tailings materials from the SBC's and rotary breaker reject will be delivered onto a new reject conveyor and into a new reject bin located on the southern end of the former ROM coal stacker reclaimer area. The SBC plant is to be fed with materials from the new thickener underflow (which will maintain the existing provision to pump to the existing Tailings Dams). The SBC Plant will generally consist of; 6 x Alfa Laval P3-10070 decanters (SBCs), 6 x slurry pumps with a 6.6kV electrical supply from the proposed upgrade of nearby substation infrastructure (**Section 3.5**), local transformer(s) and Motor Control Centre(s) (MCC) as well as other ancillary infrastructure.

Thickener

The SBC plant requires a higher slurry density to maintain stable operation and dewatering performance than can be achieved by the existing 18m thickener. A new 35m high-rate thickener is therefore required to be installed and will ultimately replace the existing 18 m thickener to optimise the dewatering of tailings materials.

Reject Conveyor and Bin

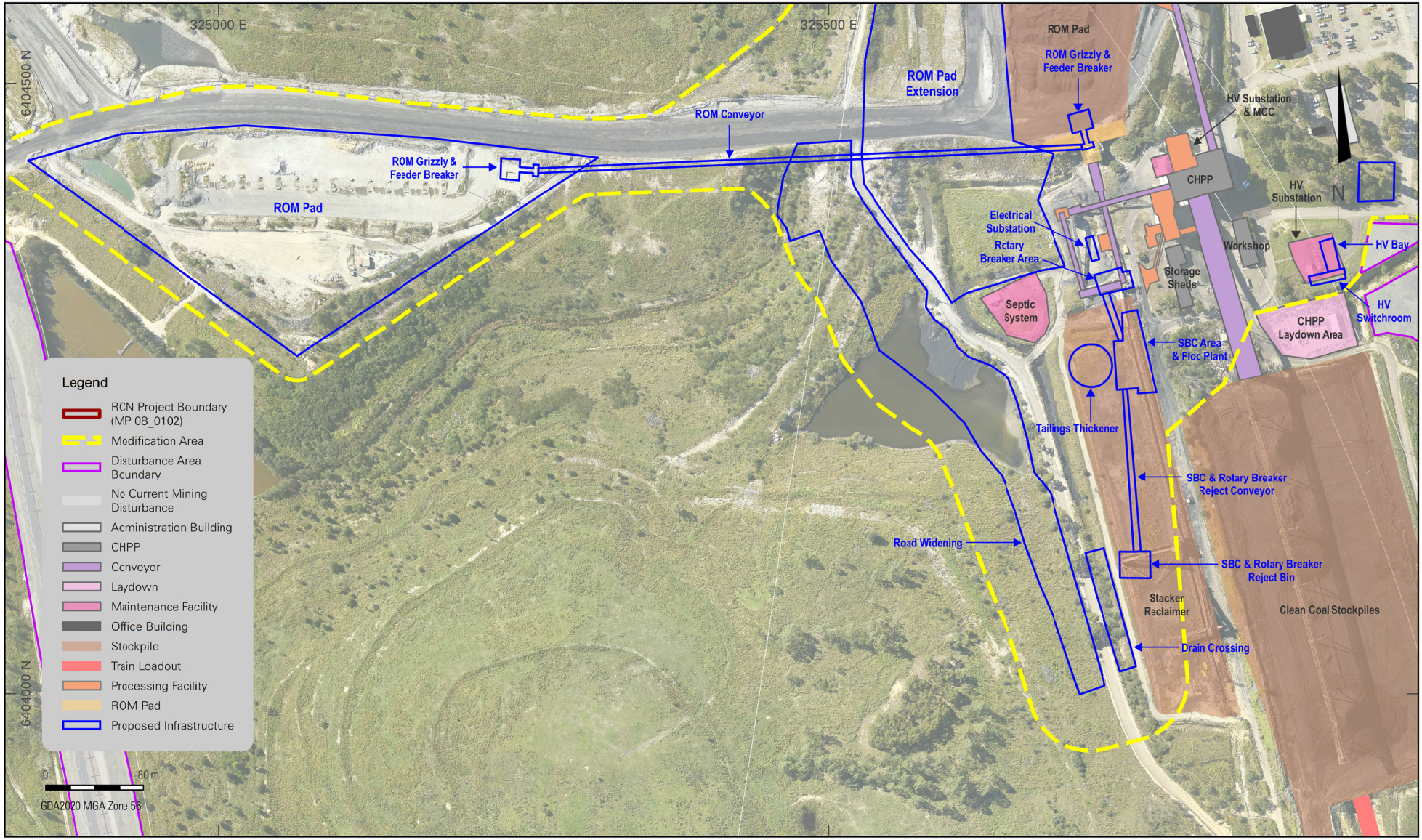
Dewatered tailings will be conveyed into a new reject bin to allow efficient loading of trucks and co-disposal of tailings with overburden. Rotary breaker reject material will also be conveyed into the new reject bin or stockpiled and loaded into trucks.

JBA 2341 - RCN (CHPP Mod) - Conceptual Layout.aprx

RIXS CREEK NORTH MODIFICATION

RCN CHPP New Infrastructure Layout - North

FIGURE 5



JBA 2341 - RCN (CHPP Mod) - Conceptual Layout.aprx

RIXS CREEK NORTH MODIFICATION

RCN CHPP New Infrastructure Layout - South

FIGURE 6

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Environmental and Planning Consultants

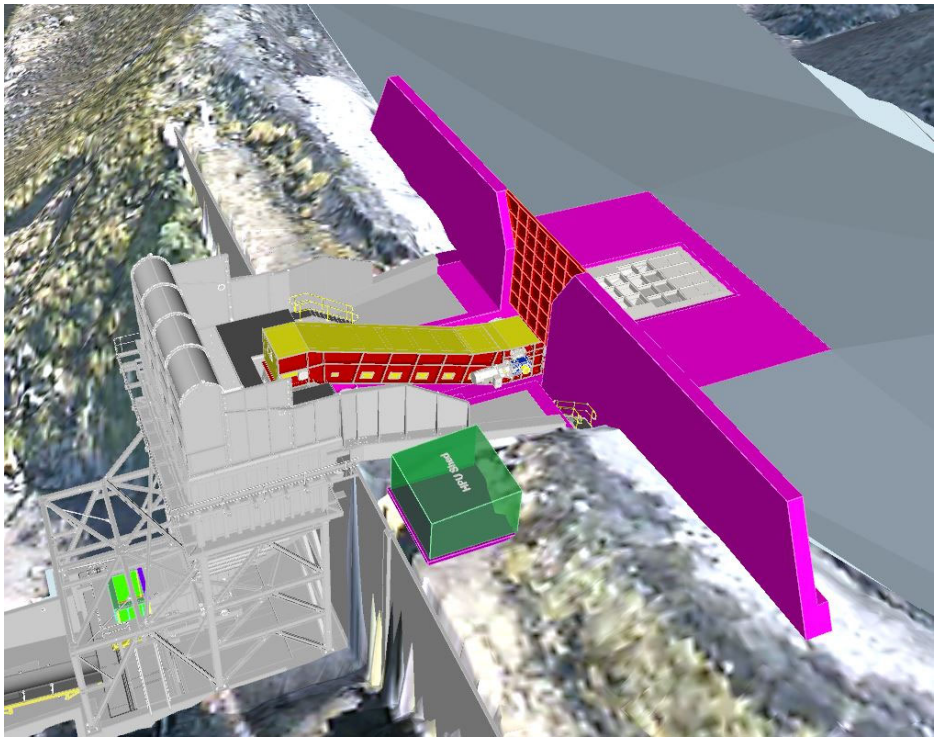

Figure 7 Schematic of Proposed ROM Grizzly and Feeder Breaker Plant Ahead of ROM Bin

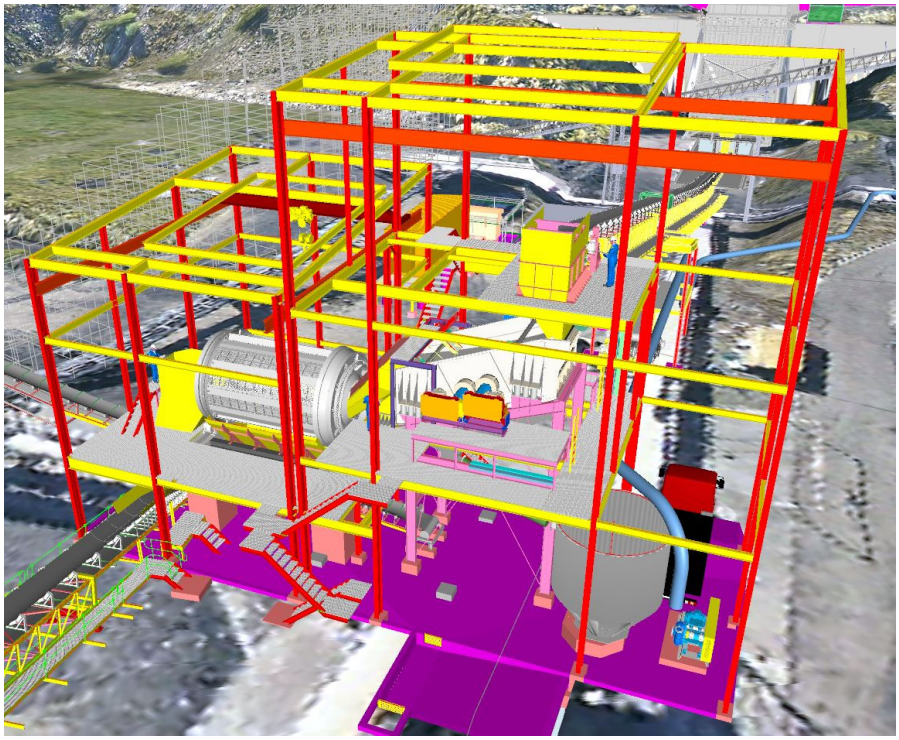

Figure 8 Rotary Breaker

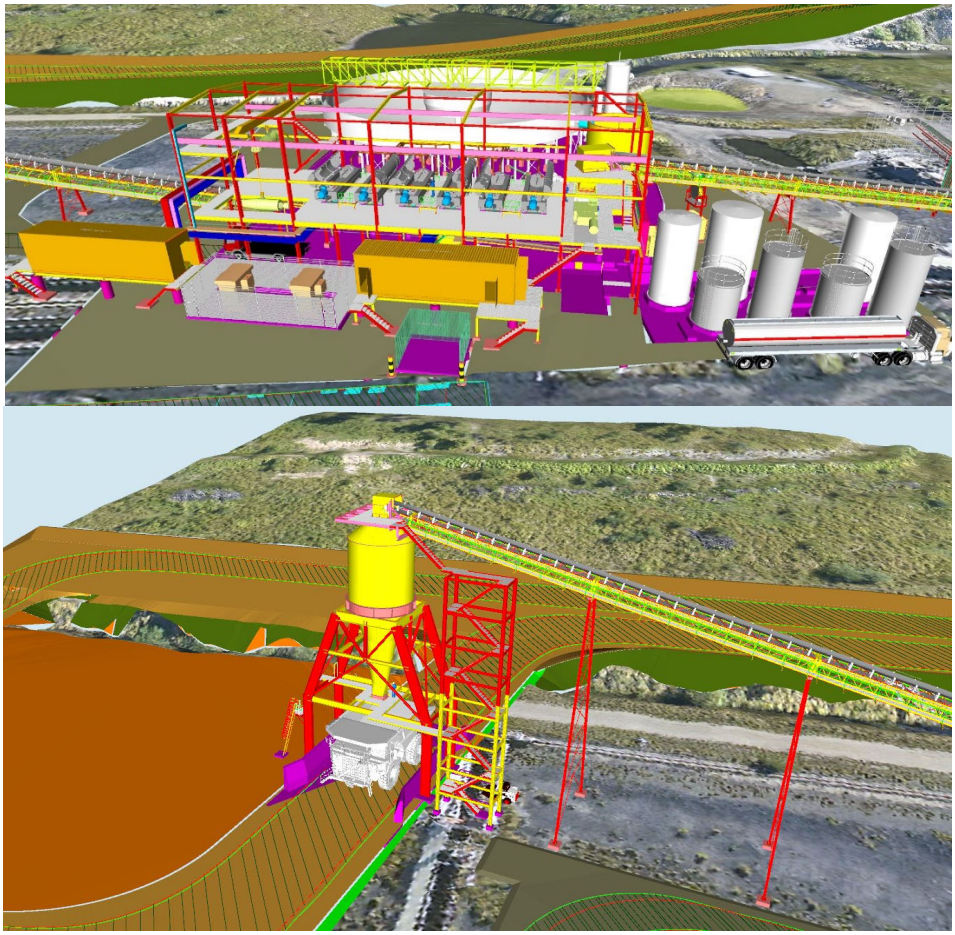

Figure 9 SBC Plant, Floc Plant and New Reject Bin

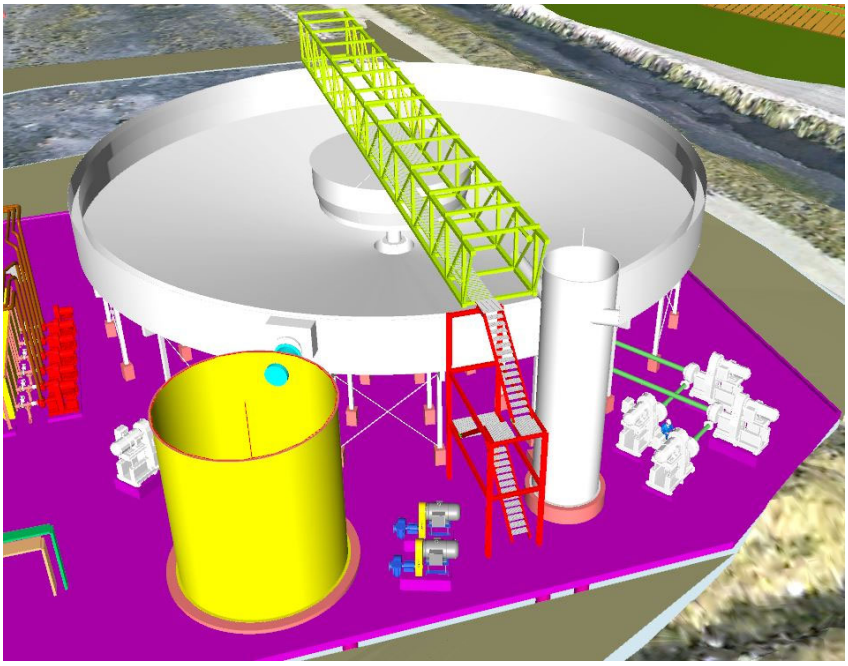

Figure 10 Thickener and Floc Plant

Dry Powder Flocculant Plant

A Dry Powder Flocculant Plant (floc plant) from the RCS CHPP is to be relocated to the RCN CHPP, with additional storage tanks and minor batching/pump upgrades to service the new SBC plant and thickener. A raw water tank and pump are to be installed to feed the flocculant plant.

3.3 ROM AND PRODUCT COAL STOCKPILES

RCN currently has two existing ROM coal stockpiles, including the main ROM pad to the north of the CHPP with approved capacity of 60,000 t and the former ROM coal stacker reclaimer area to the west and south-west of the existing ROM pad with an approved capacity of 70,000 t.

The total ROM capacity is required to maintain uninterrupted operations is approximately 10% of the annual coal production across RCM, i.e. up to 500,000 t of ROM coal capacity.

The former ROM coal stacker reclaimer area is no longer intended to be utilised for this purpose and will accommodate some new infrastructure proposed by this Modification. Bloomfield proposes an extension to the existing ROM coal stockpile as well as one additional ROM coal stockpile area to provide sufficient capacity for optimum operations. The extension to the existing ROM pad will be towards the north, west and south-west of the current stockpile area. A new ROM coal stockpile area will be established to the west of the existing CHPP on the southern side of the existing west haul road.

The additional ROM pads are expected to provide the capacity for the desired 500,000 t of ROM coal and are entirely within the approved Disturbance Area Boundary (i.e. no additional disturbance from that approved).

The location of the additional stockpile areas is illustrated on **Figure 3**.

The existing RCN CHPP is approved for a 350,000 t product stockpile to cater for product coal from both the open cut (both RCN and RCS) and the Integra Underground operations. A 500,000t stockpile is also approved within the north-west portion of RCN to temporarily store ROM coal from the neighbouring Integra Underground prior to transport to the RCN CHPP. On closure of the Integra Underground operations, RCN is proposing to maintain this currently approved stockpiling capacity for all coal extracted from the RCM.

Temporary in-pit stockpiles

The Integra EA identifies that some in-pit coal would be temporarily stockpiled in stockpiles of up to 10,000 t in size with locations varying according to mining operations. This flexibility for temporary stockpiles will be continued for the Modification.

3.4 INFRASTRUCTURE UPGRADES

3.4.1 RCN Workshop Extension

The existing RCN infrastructure facilities are located adjacent to the CHPP, which include offices, meeting rooms, stores, fuel storage, a workshop and car parking areas. Extensions are proposed to the existing workshop to accommodate the CAT 793 haul trucks (which have been introduced at RCM over several years as a more efficient haulage truck fleet), increase the total workshop bays, and provide improved vehicle washing and storage facilities. This will also include underground piping for the delivery of hydrocarbons (grease and oils) to the workshop from the existing fuel farm area.

The workshop extension is proposed entirely in an existing disturbed area within the Disturbance Area Boundary, as illustrated in **Figure 3**.

3.4.2 Mobile Rock Crushing Plant

Bloomfield is proposing to utilise a mobile rock crushing facility to process rock materials encountered during mining operations to various size fractions for use within the RCM. Crushed rock will be reused onsite at the RCM in the construction of haul roads, hardstand areas or in mine rehabilitation areas for armouring drainage lines or sections of the final landform design.

The mobile rock crushing facility will comprise moveable infrastructure components including a jaw crusher, cone crusher, screens, and conveyors. The mobile rock crushing facility will be sited within the approved mining area and entirely within the approved Disturbance Area Boundary (i.e. no additional disturbance from that approved).

The rock crushing facility site will conceptually entail a designated area with bunding utilised as required to safely separate the operations within this area. The area will include both raw rock and crushed rock stockpiles. The mobile rock crushing facility will be relocated within the Disturbance Area Boundary from time to time as required to accommodate the progression of mining. The locations used for the mobile rock crushing facility will consider the potential environmental impacts, including noise, dust, and visual impacts.

Dust suppression sprays will be installed to minimise the generation of dust. A water tank and pump and pipe network will be in place to deliver up to 20,000 litres per day to the dust suppression sprays.

Production rates are anticipated to be around 1,800 tonnes per day and around 25,000 tonnes of gravel production per month (at various size grades). The mobile rock crushing facility will be operated during the day period only, seven days a week for the life of the RCM.

3.5 SUBSTATION REPLACEMENT AND PROPOSED SWITCHING STATION

The Modification proposes the replacement of the existing substation, hardstand substation and installation of a new switching station as conceptually illustrated in **Figure 11** and **Figure 12**. The new switching station is located in an area which has previously been disturbed and entirely within the approved Disturbance Area Boundary.

Figure 11 Conceptual Location for Proposed Switching Station

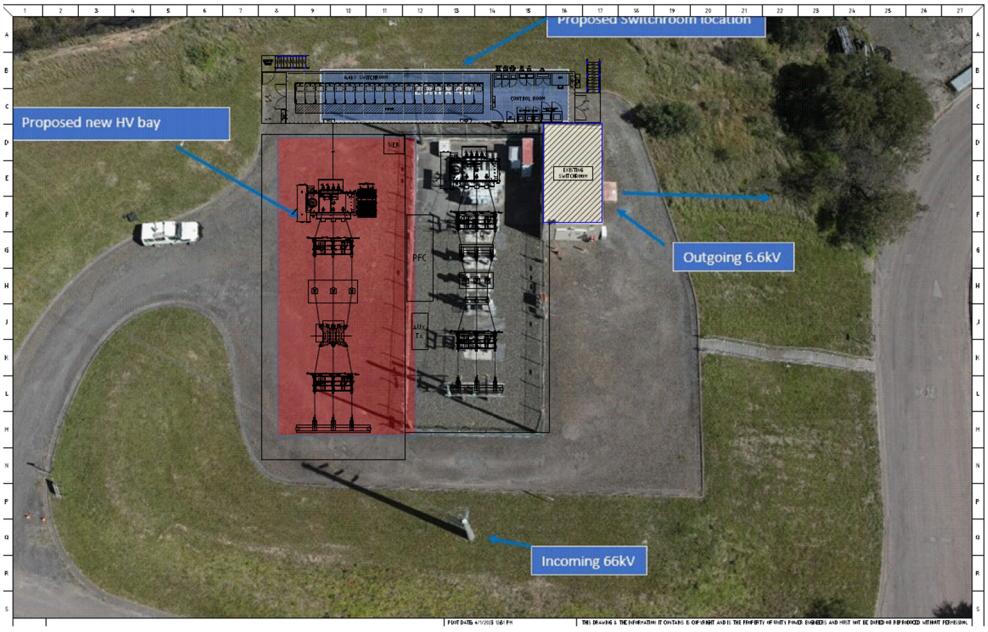

Figure 12 Existing and Proposed Upgrades to Switchroom and Substation

3.6 HEAVY VEHICLE TYRE AND CONCRETE MATERIALS DISPOSAL

Bloomfield is seeking to include the onsite disposal of end-of-life heavy plant tyres, otherwise known as off-the-road (OTR) tyres into the approval for RCN under the EP&A Act as has historically been implemented at RCN and as is currently approved at the RCS. Bloomfield also seeks approval to dispose concrete materials from activities at RCM into the mining area at RCN.

End-of-life, or 'waste' OTR tyres that can no longer be utilised at the mine would be buried within the mine's OEAs, subject to appropriate environmental controls. The Modification does not include the disposal of road tyres typically used by trucks and/or passenger vehicles on registered roads.

The practice of on-site disposal of heavy vehicle OTR waste tyres is a widespread practice across Australia, including within both the mining and agricultural industries. This existing practice approved for the RCS mine is proposed at the RCN mine. The disposal of OTR tyres on-site will be conducted using environmentally responsible methods and in accordance with existing RCM procedures where applicable.

Waste concrete materials would be generated by the proposed upgrade works to be undertaken with this Modification and other day-to-day activities at the RCM. Bloomfield operate in accordance with a total waste management system which incorporates the recycling of waste materials, where this is reasonable and feasible.

Building wastes from the infrastructure upgrade works proposed by this Modification that is unable to be recycled will generally be managed in accordance with the current total waste management system and be disposed to a licenced facility. Concrete materials will be separated and buried in-pit within the mining areas. The suitability of concrete material disposal in-pit will be determined by sampling and assessment in accordance with *The recovered aggregate order 2014 (RA Order)*. Waste concrete materials will be buried in overburden material and at least 2 m above the groundwater and 2 m below the Final Landform Design levels.

3.7 ADMINISTRATIVE CHANGES

Schedule 3, Condition 71 of PA 08_0102 currently requires RCN to prepare a Rehabilitation Management Plan (RMP) to the satisfaction of the Department of Regional NSW - Resources Regulator (Resources Regulator). The Rehabilitation Reforms which commenced under the *Mining Act 1992* (Mining Act) on 2 July 2021 (with a 12 month transition for large mines) have resulted in the removal of the regulatory ability for the Resources Regulator to approve a RMP as was previously provided by its authority to approve a Mining Operations Plan (MOP) under the Mining Act.

RCN therefore seeks to amend the wording of these rehabilitation management and reporting conditions to align with the conditions of a Mining Lease associated with the RCN under the Mining Act.

3.8 REASONS FOR THE MODIFICATION

3.8.1 CHPP Upgrades

The RCN CHPP was originally developed for the Camberwell Coal Project. The RCN CHPP has historically and most recently been used to process ROM coal from the adjacent Glennies Creek Underground (now known as the Integra Underground). The CHPP has been designed and constructed in a way to increase the efficiency of processing underground coal, and in turn, has restricted the efficiency of processing open cut ROM coal.

The RCN CHPP currently processes ROM coal from Integra Underground; however, coal production is set to cease in the near future. The proposed upgrades to the RCN CHPP will incorporate infrastructure that will improve the efficiency of processing ROM coal extracted from the RCN and RCS mines.

The current tailings storage facilities at RCN have a limited storage capacity and alternative tailings storage and disposal methods are required to be implemented. The installation of the thickener and the SBC Plant will reduce the water content of the tailings allowing for the dewatered tailings to be conveyed with reject material to the new reject bin for co-disposal with overburden. The implementation of this process will lead to a reduced reliance on the requirement to dispose tailing within tailings storage facilities in the future.

3.8.2 ROM Coal Stockpiles

To minimise the potential for interruptions to operations, Bloomfield requires a ROM coal stockpile with a capacity of approximately 10% of the annual coal production is required. RCN is currently approved to stockpile 130,000 t of ROM coal within the existing stockpiles, which represents approximately 3% of the annual coal production. This Modification seeks approval to extend an existing ROM coal stockpile and to construct an additional ROM coal stockpile which are expected to provide the desired capacities (i.e. up to 500,000 t of ROM coal storage).

3.8.3 Infrastructure Upgrades

The existing RCN workshop infrastructure does not currently accommodate the maintenance of Caterpillar 793 haul trucks within an enclosed area. The existing fleet of Caterpillar 793 haul trucks have been gradually introduced in recent years as a more efficient haulage option. Bloomfield aim to cater for the maintenance of these haul trucks within the upgraded workshop facilities to further improve efficiencies and conditions on-site. Additional workshop bays are proposed to allow a greater number of plant and machinery to be maintained within the workshop. The underground hydrocarbon piping system will increase maintenance efficiency and reduce the potential for spills into the environment.

3.8.4 Mobile Rock Crushing Facility

RCM currently import crushed rock materials, when required, for use in haul roads, hardstand areas and rehabilitation of disturbed areas. The introduction of a mobile rock crushing plant as part of this Modification will allow RCM to process the rock materials uncovered during mining activities into various sizes for various uses on-site.

3.8.5 Substation Replacement and Proposed Switching Station

The existing substation has reached the end of its usable life and warrants appropriate replacement and upgrades. Bloomfield has identified the need for replacement to support the current and future operations at the RCN mine.

3.8.6 Heavy Vehicle Tyre and Concrete Materials Disposal

Disposal of waste OTR tyres by burying in pit is an activity that has historically been undertaken across the RCM. The addition of this activity in this Modification is to align with the current approvals in place at the RCS. Recycling of waste OTR tyres is not a feasible alternative which is currently available for operations at the RCN mine, as discussed in **Section 6.4**.

Waste concrete materials will be generated during the operation of the RCM, including in the construction works associated with this Modification. Suitable concrete materials encountered during this process will be disposed of within the open cut mining areas as the most feasible, cost effective and environmentally responsible solution for the management of this waste stream.

3.9 ALTERNATIVES TO THE MODIFICATION

3.9.1 Alternative Locations

All CHPP upgrades and additional infrastructure have been designed to remain within previously disturbed areas with the aim of increasing the efficiency of coal processing and materials handling.

Alternate locations have been considered for the ROM coal stockpiles and new thickener. The preferred alternatives for these have been identified to result in improved efficiencies whilst not resulting in any increase to the previously disturbed land. Alternate locations and arrangement for the ROM coal processing facilities were also considered. The preferred alternative for the ROM coal processing provides the optimum solution with the least risk in relation to additional noise generation.

4. STATUTORY CONTEXT

This section provides a summary of the legislative provisions that are relevant to the Modification.

4.1 OVERVIEW

The regulatory framework that is relevant to the Modification is summarised in **Table 2**. The aspects of the regulatory framework that warrant further explanation are discussed in **Section 4.2**.

Table 2 Relevant Legislative Provisions

Aspect	Relevant Provisions	Applicability to Modification
Power to modify approval	Section 4.55 of the EP&A Act	If the Modification is granted, the modified development would be of a minimal environmental impact and will remain substantially the same development (as explained in **Section 4.2.1**).
Permissibility	*Singleton Local Environmental Plan 2013* (Singleton LEP) Land Use Table in the Singleton LEP Clause 2.9 of *State Environmental Planning Policy (Resources and Energy) 2021* (Resources & Energy SEPP)	RCN is located on land zoned as RU1 (Primary Production) and SP2 (Infrastructure). Mining on this land is permissible pursuant to Clause 2.9 of the Resources and Energy SEPP (as explained in **Section 4.2.2**).
Gateway process	Clause 103 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) Clause 2.24 of the Resources & Energy SEPP	The Modification does not fall within the definition of 'mining or petroleum development' as no new mining leases are required. Accordingly, the Gateway process does not apply to the Modification.
Matters for consideration	Section 4.55(3) of the EP&A Act Part 2.3 of the Resources & Energy SEPP	The consent authority must consider the matters under Section 4.15(1) of the EP&A Act that are relevant to the Modification. Part 2.3 of the Resources & Energy SEPP prescribes additional matters that must be considered for mining proposals. The Modification is not expected to exceed the non-discretionary mining standards, nor any thresholds provided by the Voluntary Land Acquisition and Mitigation Policy. At mine closure, the infrastructure to be constructed as a result of this Modification will be demolished and landform rehabilitated as previously approved for the RCN CHPP.

Aspect	Relevant Provisions	Applicability to Modification
Other approvals	Section 5 of the *Mining Act 1992* (Mining Act)	The Modification falls within existing operational areas with no disturbance of previously undisturbed land. These changes will occur entirely on land within the existing Mining Leases held for RCN.
	Part 2 of *Water Management Act 2000* (WM Act)	The surface water and groundwater sources in the vicinity of RCN are all the subject of Water Sharing Plans. There are no additional water requirements associated with the Modification.
	Sections 89, 90 & 91 of WM Act Section 4.41 of EP&A Act	Water use approvals, water management work approvals and activity approvals under the WM Act are not required for the Modification.
	Section 48 of the POEO Act and Schedule 1	Bloomfield holds EPL 3391 in respect of its operations at RCM (including RCN) which permits an annual coal handling capacity of >2,000,000 – 5,000,000 t and an annual production capacity of >3,500,000 – 5,000,000 t. The processing and production activities will remain within these limits. EPL 3391 will be varied (as required) to include the activities proposed by the Modification.
	Section 68 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act)	The Modification is not likely to have a significant impact on any protected matters of national environmental significance. Accordingly, a referral under Section 68 of the EPBC Act is not required.

4.2 KEY REGULATORY MATTERS

4.2.1 Power to Modify

The consent authority is given the power to modify a development consent pursuant to Section 4.55(1A) of the EP&A Act. The power to modify is limited by the requirement to be of 'minimal environmental impact' to that of the previous modification.

PA 08_0102 was granted under the former Part 3A of the EP&A Act. Approved modifications to PA 08_0102 (up to Modification 8 to PA 08_0102) were made under the former Section 75W of the EP&A Act, which was the modification provision for Part 3A Projects. Modification of approvals under Section 75W has now been discontinued, however previously approved modifications are deemed to be part of the authorised development. After 1 March 2018, Section 4.55 applies to project approvals. Modification 9 to PA 08_0102 was granted on 16 February 2021 under section 4.55(2) of the EP&A Act.

Section 4.55(1A) relates to modifications that are demonstrated to be of minimal environmental impact and must be substantially the same development as the development for which consent was granted. Section 4.55(1A) of the EP&A Act states:

> *"(1A) **Modifications involving minimal environmental impact.***
>
> *A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if—*
>
> *(a) it is satisfied that the proposed modification is of minimal environmental impact, and*
>
> *(b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and*
>
> *(c) it has notified the application in accordance with—*
>
> *(i) the regulations, if the regulations so require, or*
>
> *(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*
>
> *(d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be."*

Ordinarily, the comparison for the substantially the same development test is made between the proposed development and the original development (i.e. prior to any modifications), as outlined in Section 4.55(1A)(b) of the EP&A Act.

Given that the declaration that PA 08_0102 (as modified) is considered a state significant development under the EP&A Act was given subsequent to the grant of Modification 8 (granted under the former Part 3A), the comparison for the "*substantially the same development*" test is between any new Modification proposal (along with any Modifications granted under Part 4) and the originally approved State Significant Development (i.e. as approved with Modification 8).

Clause 3BA(6) of Schedule 2 of the Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017 relevantly states:

> "*(6) In the application of section 4.55(1A) or (2) or 4.56(1) of the Act to the following development, the consent authority need only be satisfied that the development to which the consent as modified relates is substantially the same development as the development authorised by the consent (as last modified under section 75W):*
>
> *(a) development that was previously a transitional Part 3A project and whose approval was modified under section 75W*"

The aspects of the Modification entail minor changes to the CHPP and associated processing facilities, however, will not result in material changes to the key components of the RCN as approved under PA 08_0102.

The Modification is also considered to be of minimal environmental impact based on the assessment of impacts demonstrated in **Section 6**. As such, the Modification satisfies the criteria for modification under Section 4.55(1A) of the EP&A Act.

4.2.2 Permissibility

The Singleton LEP governs the permissibility of development in the Singleton LGA. RCN is located on land that is zoned as RU1 (Primary Production) and SP2 (Infrastructure). The land use table in the Singleton LEP states that open cut mining is permissible with consent within land zoned RU1.

The Singleton LEP identifies three classes of development that are permissible within land zoned SP2, namely extensive agriculture, aquaculture, and roads. As such, open cut mining is not specifically listed as permissible development in this zone. However, Clause 2.9 of the *State Environmental Planning Policy (Resources and Energy) 2021* (Resources & Energy SEPP) provides that mining is permitted on any land where agriculture or industry can be carried out. Given that agriculture is permissible within land zoned SP2, open cut mining is also permissible by virtue of Clause 2.9 of the Resources & Energy SEPP. Therefore, open cut mining (including the activities proposed by the Modification) is permissible on the land at RCN.

4.2.3 State Environmental Planning Policy (Resources and Energy) 2021

The Resources & Energy SEPP provides the planning provisions for the assessment and development of mining, petroleum production and extractive material resource proposals in NSW.

Section 2.15 (4)(b) of the Resources & Energy SEPP relates to mining related activities which can be undertaken as Complying Development and states:

> *"(4) Development for any of the following purposes is complying development if it is on the site of an approved mine—*
>
> *(b) an upgrade of processing equipment or expansion of processing equipment that does not result in the capacity of the equipment exceeding by more than 10% the original capacity for the mine as approved,"*

Although some of the works within the Modification application may potentially be considered to be complying development in accordance with the above, the Modification application has conservatively addressed these items as part of the Modification description.

5. STAKEHOLDER ENGAGEMENT

This section provides a summary of the stakeholder engagement undertaken for the Modification. The Modification does not propose any changes to any approved stakeholder engagement strategies or processes.

5.1 REGULATORY CONSULTATION

Bloomfield initially consulted with the NSW Department of Planning, Housing, and Infrastructure (DPHI) in November 2023 regarding the proposed changes to the CHPP and associated activities and the appropriate approvals pathway for the Modification. Bloomfield also confirmed with DPHI the relevant environmental considerations which would be addressed within this Modification Report.

Table 3 summarises the outcomes of the regulatory consultation undertaken for the Modification.

Table 3 Regulatory Consultation

Stakeholder	Methods of Consultation	Purpose
DPHI	Meeting on 7 November 2023	• Rix's Creek North DPE Briefing MOD 10 to PA 08_0102 CHPP Amendments
	Letter sent on 20 November 2023	• Scoping request for Modification 10
Singleton Council	Email on 21 June 2024	• Brief Council over the proposed Modification
EPA	Email on 21 June 2024	• Brief EPA over the proposed Modification

5.2 COMMUNITY CONSULTATION

A Community Consultative Committee (CCC) meeting was held on 18 October 2023. The CCC was provided with an overview of the proposed changes and the intention to seek approvals for this by way of a minor Modification application. Bloomfield provided further details over the Modification to the CCC meeting held on the 22 May 2024. No issues or concerns were identified during these meeting.

Various communication and engagement mechanisms will continue to be implemented to ensure the effective ongoing engagement with key stakeholders.

6. IMPACTS, MANAGEMENT AND MITIGATION

This section outlines the potential environmental impacts of the Modification and describes the measures that will be implemented to mitigate these impacts.

6.1 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

6.1.1 Background

Todoroski Air Sciences completed an Air Quality and GHG Assessment for the Modification. The assessment investigated the likely changes in dust and GHG emissions associated with the Modification relative to the approved levels for RCN.

The key constituents attributed to the Modification associated with dust generation included the additional ROM coal stockpiles at the CHPP, the in-pit crusher, and the co-disposal of partially dried tailings materials with overburden within the mining void.

The key constituents attributed to the Modification associated with GHG emissions include any additional fuel consumption with the in-pit rock crusher, the handling and hauling of processed rock material, the hauling of additional reject material, and electricity usage from the CHPP upgrades.

A copy of the Air Quality and Greenhouse Gas Assessment is included in **Appendix A**.

6.1.2 Assessment of Impacts

Assessment of Potential Air Quality Impacts

Analysis of the changes in dust levels attributed to in-pit crushing activities, hauling of additional reject material and additional ROM coal stockpiles was carried out relative to the dust levels associated with the approved '*RCN Modification 9 Air Quality Impact Assessment*' (Todoroski Air Sciences, 2020).

The net total incremental annual dust emissions were calculated to increase by approximately 0.8% relative to the approved RCN (as assessed within Todoroski Air Sciences, 2020). The increase in total annual dust emissions primarily arises from the in-pit rock crushing facility and the hauling of reject material. This increase is considered minor and therefore unlikely to be discernible relative to the existing contributions from site.

Greenhouse Gas Emissions Calculations

The Modification is expected to generate approximately 2,378 tCO_2-e Scope 1 emissions and 16,771 tCO_2-e Scope 2 emissions. This represents an approximate 0.8% change for Scope 1 GHG emissions relative to the business-as-usual (BAU) scenario, and an approximate 6% change for total Scope 1 and 2 GHG emissions relative to the BAU. The estimated increase to Scope 1 emissions was identified as being relatively minor and unlikely to be distinguishable to the approved operations. These results are considered a conservative worst-case for the Modification, and therefore it is expected that the existing measures to manage GHG emissions from operations at RCN will mitigate these minor changes to emissions.

Changes to the Scope 2 emissions are attributed to the electricity usage for the CHPP upgrades required to dewater tailings materials for co-disposal with overburden in the mining void. These upgrades are sought to enhance operational efficiencies and to remove the requirement for constructing additional facilities for the storage of tailings material.

The assessment described that the incorporation of the CHPP upgrades would see a significant reduction in overall GHG emissions associated with avoiding the need for the construction, operation, and eventual rehabilitation of additional tailings dams.

Considering this, the relative changes in total GHG emissions for RCN is expected to decrease despite the calculated increase in annual emissions for the Modification. That is, the increase in annual GHG emissions for the Modification will effectively result in a reduction of total emissions from the RCN by avoiding emissions which would otherwise be generated by the construction, operation, and rehabilitation of additional tailings dam(s) in the future.

6.1.3 Mitigation and Management

RCN currently manages dust and GHG emissions in accordance with the RCM Air Quality and Greenhouse Gas Management Plan (AQGGMP) (Bloomfield,2021). The AQGGMP details the dust management practices and the air quality monitoring network utilised to monitor and mitigate operational air quality impacts to surrounding receivers at RCM. The AQGGMP was previously reviewed and updated following the approval of Modification 9 in 2021.

Bloomfield is committed to reducing dust and GHG emissions from RCM. Bloomfield implement all reasonable and feasible measures to minimise the release of GHG emissions from its mining operations. The various mitigation measures employed by Bloomfield to reduce GHG emissions at RCN are included in the AQGGMP and encompass the following:

- Monitoring of equipment fuel efficiencies and the regularly maintenance of diesel equipment;
- Reduced diesel usage by scheduling operations in a manner that maximises efficiencies of operations and reduce vehicle kilometres travelled;
- Turning vehicle engines off when not in use;
- Adequate pollution reduction devices installed on the mine fleet;
- Monitoring of the total site electricity consumption and the investigation of avenues to minimise electricity usage;
- The review of alternative renewable energy sources;
- The development of GHG and energy use targets, and monitoring and reporting against developed targets;
- The use of high efficiency electric motors;
- Completing investigations into the efficiency of transformers;
- Conducting energy awareness programs for staff;
- Reducing the production of waste generated on-site; and
- The use of efficient outdoor lighting systems with lux sensors and timers.

Furthermore, Section 5.3 of the AQGGMP provides a comprehensive outline of the air quality mitigation measures which are implemented to minimise the generation of particulate matter emissions and their impacts. Some measures relevant to the Modification include:

- The use of trees and shrubs as windbreaks around permanent areas that have potential for wind generated dust;
- The application of water on dusty areas;
- Ceasing operations when visible dust is generated during drilling;
- Imposed speed limits on all roads;
- Fleet optimisation to reduce vehicle kilometres travelled;

- Rehabilitation of roads as soon as practical;
- Watering of access tracks;
- Use automatic water sprays on ROM hopper when unloading ROM coal;
- Minimise drop heights as far as practicable;
- Slow tipping at ROM hopper during adverse weather conditions;
- Use visual triggers for implementation of further dust mitigation;
- Enclosed facility with internal water sprays at feeder, crusher, conveyor, and transfer points as necessary;
- Enclosed conveyors and transfer points;
- Conveyors fitted with appropriate cleaning and collection devices;
- Regularly clean areas where spilt material can build up, e.g. under transfer chutes and conveyors;
- Minimise drop heights when stacking;
- Manual implementation of water sprays and/or water cart during dusty periods;
- Visual surveillance of dust plumes during activity; and
- Minimisation of stockpiling and recovery of coal on ROM.

6.2 NOISE

6.2.1 Background

EMM Consulting Pty Limited (EMM) completed a Noise Impact Assessment (NIA) for the Modification. A copy of the NIA is included in **Appendix B**.

This assessment considered the potential noise impacts associated with the proposed changes to operations sought by the Modification. The purpose of this assessment was to determine whether the RCN can continue to operate in accordance with the approved noise criteria as specified in PA 08_0102.

The key constituents attributed the Modification from a noise perspective relates to the proposed upgrade of the ROM process and CHPP, and the operation of an in-pit mobile crusher.

6.2.2 Assessment of Impacts

Operational Noise Predictions

Table 5.1 in the NIA presents the predictions for the key components of the Modification under noise enhancing meteorological conditions. The noise levels were added to the existing intrusiveness noise criteria for RCN which has been conservatively assumed to represent existing operations producing noise at existing noise limits. The results retrieved were then compared against RCN project approval limits.

Noise levels attributed only to the Modification are predicted to be below intrusive criteria at all assessment locations. For the purpose of this assessment, existing operations were assumed to be operating at the noise limit. Using this conservative assumption, nine private receptors were predicted to receive mining noise levels higher than an intrusive noise criterion.

Minor 1 dB exceedances during the night period were predicted at N35, N67 and N173. Similarly, 1 dB exceedances were predicted for the evening and night time periods at receptors 10, 11, 12, N18, N21 and N30 under noise enhancing meteorological conditions. No exceedances of the existing intrusive noise criteria were predicted during the day period. Further, no exceedance of the acquisition or mitigation criteria was predicted.

Exceedances of 0 to 2 dB are considered negligible in accordance with the Voluntary Land Acquisition and Mitigation Policy (VLAMP) (NSW Government, 2018), as increased levels of this magnitude would not be discernible to the average listener and do not warrant receiver-based treatments or controls.

Considering the conservative assessment methodology that was adopted for this exercise, it is considered that Bloomfield will be able to manage its noise emissions from the operations (including components for the Modification) to remain within the existing intrusive noise criterion for RCN.

Private Land Area Assessment

In accordance with the VLAMP, an assessment is required for privately owned land. This assessment states that voluntary land acquisition rights may apply where noise generated by a development contributes to exceedances of acceptable noise amenity outlined in the *Noise Policy for Industry* (NPfI) (EPA, 2017), plus an additional 5 dB on more than 25% of any privately owned land. Acceptable noise amenity levels, plus 5 dB for the day, evening, and night periods for receptors in a rural environment, are $L_{Aeq,\ period}$ 55, 50 and 45 dB, respectively. This corresponds to an $L_{Aeq,15minute}$ of 58, 53 and 48 dB respectively to allow for assessment against $L_{Aeq,15minute}$ predictions.

The previous private land area assessment carried out as part of the NIA for Modification 9 (MOD 9) demonstrated that no private landholdings have more than 25% of the land area predicted to exceed criteria specified in the VLAMP in any time period. As the Modification is not predicted to significantly change noise impacts at RCN, no further private land area assessments were necessary.

Maximum Noise Level Assessment

The assessment investigated potential sleep disturbance impacts by assessing impact noise resulting from material falling onto the grizzly feeder (identified as the noisiest activity proposed by the Modification). A subsequent sound power level (SPL) of L_{max}/L_{Amax} 136/130 dB was modelled at the grizzly to represent the impact event. To estimate the possible short term maximum noise emissions, the model included the combination of impact noise at the ROM and the result of other operational noise sources for the Modification.

The model concluded that the sleep disturbance predictions for all receptors were less than the relevant $L_{A1,1\ minute}$ criterion specified in PA 08_0102. Additionally, the proposed configuration of the grizzly feeder underground in the ROM pad may further reduce the potential of sleep disturbance impacts compared to the current configuration. Therefore, the results indicate that no sleep disturbance impacts are predicted for the Modification.

Low Frequency Noise Assessment

To obtain one-third octave model predictions for the Modification, the assessment utilised one-third octave sound power inputs to quantitatively assess the low-frequency noise modifying factor adjustment applicability. The resulting one-third octave L_{Aeq} spectra for each prevailing meteorological condition were evaluated directly against the NPfI low frequency threshold. The assessment indicated that all results were below NPfI thresholds for privately owned receptors. As such, low frequency noise modifying factor adjustment applicability is not predicted for the Modification.

Cumulative Noise Assessment

Cumulative noise levels for RCM and other neighbouring industrial sources have previously been quantitatively assessed in the RCS NIA and further discussed in the NIA carried out for Modification 9. The result of this assessment demonstrated that cumulative noise impacts from the combined operations and other neighbouring industrial sources were in compliance with cumulative criteria as specified in PA 08_0102.

The Modification does not propose any changes to the open cut operation. As such, no significant increases in noise levels are predicted as a result of the Modification. Noise levels will be managed to comply with the approved intrusive noise criteria, and compliance with cumulative noise criteria in PA 08_0102.

6.2.3 Mitigation and Management

Bloomfield manages noise impacts from its operations at RCN in accordance with the '*RCM Noise Management Plan'* (NMP) (Bloomfield, 2023). The primary objectives of the NMP are to manage and monitor noise emissions attributed to mining operations and to minimise offsite impacts to receivers whilst maintaining general compliance to all relevant regulatory requirements and the criteria as specified in PA 08_0102. Procedures for managing and monitoring noise are specified in Section 7 of the NMP which includes proactive measures which aim to prevent noise incidents and reactive measures that aim to minimise environmental impact in the event of noise exceedance occurring. In addition to these measures, RCM operates a comprehensive noise management system that uses a combination of predicted meteorological forecasting, real-time noise monitoring, and attended noise management monitoring to guide the day-to-day planning of exploration activities and mining operations. The measures outlined in the NMP will continue to be employed for the Modification.

Bloomfield considered several operational noise mitigation measures during the design of infrastructure associated with the Modification. This includes the design of the upgraded ROM crushing facilities including the grizzly and feeder breaker which have been located to ensure the majority of noise emissions are located below natural ground surface. This ultimately provides shielding to nearby receivers from loading and/or impact noise at the ROM.

Furthermore, Bloomfield has determined following investigations that noise from the mobile crusher when operated during the day at levels at or below RL15 m within the Falbrook and Camberwell pits will remain below the relevant criterion as a result of topography providing adequate shielding to nearby receivers. As such, no additional noise mitigation and management measures will be required for this aspect of the Modification beyond the measures currently in place.

6.3 SURFACE WATER

6.3.1 Background

HydroBalance completed a surface water impact assessment for the Modification. The assessment considered the potential surface water impacts associated with the additional infrastructure and footprints of the Modification. A copy of the assessment is included in **Appendix B**.

The key aspects of the Modification which may result in surface water impacts are the increased footprints associated with the expanded and additional ROM coal stockpiles and changes to the approach taken to manage tailings (i.e. using dewatering facilities within the CHPP) on the overall site water balance. Other components of the Modification will remain within the existing disturbance footprints and runoff from these areas will continue to be managed in accordance with the existing surface water management system.

6.3.2 Assessment of Impacts

Stream Flow Impacts

As part of the Modification, two additional ROM coal stockpile areas are proposed.

The proposed extension of the existing northern ROM pad will extend to the north, west and south-west into existing rehabilitation/regeneration areas. This extension is within the existing approved disturbance area and will be developed to ensure runoff continues to be captured within the existing mine water management system.

The new ROM pad which is proposed to the west of the CHPP is within the existing park-up area to the southern extent of the haul road. This catchment area currently drains to a dirty water dam located at the western extent of the park-up area, south of the haul road. Upgrades to the dirty water dam in the north-west corner of the proposed western ROM pad area are planned to capture runoff from the 1% Annual Exceedance Probability 24-hour storm event, and any coal contacted runoff from the new ROM pad and adjacent haul road. This captured water will be returned to the mine water management system. Accordingly, runoff from the ROM pad areas will continue to be managed in accordance with the existing mine water management system.

There will be no additional impacts of the Modification on existing clean water catchments which remain unaffected by the Modification.

The proposed upgrades sought by the Modification are situated within the existing Disturbance Area Boundary and therefore within the area captured by the mine water management system and/or sediment dams. These upgrades will have no impact on downstream stream flows. As such, there no loss of catchment flow in receiving waters are expected for the Modification.

Water Quality Impacts

All changes proposed by the Modification will remain within the catchment of the mine water management system which is operated to contain potentially contaminated runoff water from operations. The Modification does not seek changes likely to result in surface water runoff being released from the site and accordingly, the potential impacts to water quality downstream of site would be negligible.

Site Water Balance Impacts

The introduction of the tailings dewatering facility to the CHPP process will enable the co-disposal of partially dried tailings materials with coarse reject materials for co-disposal with overburden within the mining area as opposed to pumping of the wet tailings materials to a tailings dam for later decant of water. The primary difference in relation to water management is the evaporation which is lost from the system by evaporation from the tailings dam.

Changes to the site water balance for the Modification were assessed to potentially result in a reduction in water usage of approximately 185 megalitres per annum (ML/a). As such, there is a potential 185 ML/a of additional water required to be managed within the mine water management system. Bloomfield has previously proposed a conceptual design for a fan evaporator network with a capacity to lose approximately 3,000 ML/a of water, with the ability to be scaled up to approximately 7,000 ML/a. Additionally, other options are available including the Greater Ravensworth Water and Tailings Strategy (GRAWTS) to reduce regional water abstraction and improve storage capacity at RCM. Such measures have been assessed to be sufficient in mitigating losses associated with the proposed CHPP upgrades.

6.3.3 Mitigation and Management

Water management at RCN is undertaken in accordance with the approved *RCM Water Management Plan'* (WMP) (Bloomfield, 2021). The WMP relates to the overall management of water across the RCM, including RCS and RCN. The key objectives of the WMP are:

- Comply with legislative requirements;
- Describe procedures to manage and monitor surface water and groundwater within the mine site;
- Encourage water reuse and recycling;
- Minimise the potential for offsite impacts and ensure clean water is diverted around active mining areas where possible;
- Minimise the potential for impacts on hydraulic and chemical properties of the groundwater within the coal measures and alluvium proximate to operational areas;

- Capture and treat sediment laden water for reuse within the mine water system or treated prior to release downstream; and
- Ensure water within the mine water management system is managed efficiently and appropriately.

The Modification will not result in any measurable impacts to stream flow or water quality impacts within Station Creek and Glennies Creek. Accordingly, no additional mitigation measures are proposed as part of this Modification.

The Modification will remove additional water from the tailings materials through the CHPP process which will be managed within the mine water management system. The removal of this water earlier in the process will effectively reduce the evaporation effects which are experienced by pumping wet tailings materials to tailings dams. Bloomfield currently has in place measures to decrease the quantity of mine water currently held within the mine water management system including evaporator technology and water transfers to neighbouring mines. These measures will be used as required to manage the additional water which is recycled from the CHPP process.

6.4 HEAVY VEHICLE TYRE AND CONCRETE MATERIAL DISPOSAL

6.4.1 Background

The management of waste OTR tyres is an industry wide issue due to a lack of real alternatives for the processing, recycling, and reuse of this waste stream. In NSW, it has been broadly accepted that the onsite disposal of waste OTR tyres is the only viable solution currently available to adequately mitigate risks and hazards associated with storage. The disposal of waste OTR tyres by methods of burying in pit has historically been undertaken across numerous mining operations, including that of RCM. The inclusion of OTR tyre disposal within the mining areas at RCN as outlined within this Modification Report aims to align with the current approvals in place at RCS.

Bloomfield has previously investigated alternative methods for this waste stream and determined that this is currently not feasible for RCN. As such, waste OTR tyres that no longer have a suitable use across the mining operation are proposed to be buried within the mine's OEA, consistent with that currently undertaken at RCS and permitted under Environment Protection Licence (EPL) 3391 for the RCM. This activity would be subject to the appropriate environmental controls and carried out in accordance with procedures currently in place for RCS.

The feasibility of OTR waste tyre disposal has been further assessed for this Modification. Various articles outlining processing alternatives for waste OTR tyres have been reviewed including studies from the Tyre Stewardship Australia (2020) and previous industry related Modifications with the findings discussed in **Section 6.4.2**.

Bloomfield will encounter concrete materials during operations at RCM, including during the construction works associated with the Modification. Bloomfield has identified the preferred option to dispose these water materials is to incorporate into the overburden emplacement areas.

6.4.2 Assessment of Impacts

Processing and Recycling Alternatives

Tyres are made from desired products, including oil, steel, and carbon black. The processing of waste OTR tyres back to their core elements is deemed beneficial for re-use purposes. As such, methods to adequately process tyres have been investigated widely by others to effectively reduce tyres back into the desired elements. However, these methods being investigated are in their infancy and the recycling of materials from the waste OTR tyres is currently unavailable within NSW. Therefore, this process is not currently reasonable nor feasible for implementation at RCN.

Studies commissioned by the Tyre Stewardship Australia confirm that the processing of large mining tyres into the core elements is not a current operation readily available across Australia. This further highlights that there is no feasible option available to achieve this outcome to recycle the OTR tyres for alternate purposes.

An alternate method relates to the processing of waste tyres on-site for the purpose of later transporting to licensed landfill facilities for disposal. However, such processing on-site is considered not feasible due to cost, energy consumption and associated risks of storage (i.e. spontaneous combustion). Based on the lack of current facilities in proximity to RCN to process OTR heavy vehicle tyres, the associated environmental impacts and costs attributed to processing, transport, and recycling of these tyres is significant in comparison to disposal on-site where there are negligible risks to the surrounding environment and optimal conditions for managing overburden. Furthermore, the process of transporting processed waste tyres to external facilities, in principle, is not significantly different to that of on-site disposal. Instead, it requires additional transportation and logistics, and landfill facilities may be required to seek upgrades to accommodate for significantly larger tyres. This would ultimately require increased costs and time to achieve essentially the same outcome. This further reiterates that this option is not reasonable nor feasible for operations at RCN.

Current recycling technologies are more directed at passenger tyres, with the majority of facilities within NSW primarily accepting tyres from light vehicles. As waste OTR tyres are not accepted in these facilities, suitable facilities that accept OTR tyres do not exist proximal to RCN. A proposed recycling and energy recovery facility in Queensland (if built) will likely accept waste OTR tyres from nearby mine sites. However, there is significant distance between the proposed facility and RCN. Despite the potential acceptance of waste OTR tyres, this option is unlikely to be a viable option to RCN due to distance.

Potential markets for waste OTR tyres including recycling, pyrolysis and energy recovery facilities have been outlined in the 'Mining Industry – Off the Road Used Tyre Analysis '(Randell,2020). However, the 'Used Tyres Supply Chain and Fate Analysis' (Randell, 2020) confirmed that these markets are in their infancy within Australia and would therefore not be a reasonable nor feasible alternative for RCN. The limited facilities currently in place within Australia hinder effective transportation and increase associated costs. As such, these processes are not feasible given the alternative disposal in pit which is unlikely to exacerbate any material additional environmental risks.

Given the size and weight of OTR tyres, the transport of these to off-site locations has potential complexities and issues which need to be managed. Processing plants, shears and mobile shredders can potentially be utilised on-site for the purpose of reducing OTR tyre size prior to transporting to external processing and recycling facilities. However, the 'Best Practice Guidelines for Tyre Storage and Fire and Emergency Preparedness,' (Tyre Stewardship Australia, 2022) confirm that the stockpiling and storage of shredded tyres raises additional safety risks, including increasing the potential for spontaneous combustion. As such the storage of shredded OTR tyres for subsequent transportation is therefore not reasonable nor feasible.

Waste concrete materials will be generated during the completion of the construction works associated with this Modification. The recovery and transport of this waste material stream to other offsite waste disposal facilities will result in considerable additional environmental impacts than what is proposed by disposing of this material within the mining areas. These additional environmental impacts in addition to the additional cost to dispose of these materials makes this option unviable to Bloomfield. Accordingly, the disposal in the OEA is the preferred option.

Disposal in the OEA

Waste tyres are chemically inert, however there are associated risks with storage. *Australian Mining (2023)* highlighted that the storage of waste OTR tyres can promote water-borne pests and disease. As such, their movement may pose significant risk to the health and safety of employees. The surface storage of waste OTR tyres on-site is necessary to be addressed in regard to limiting on-site risks associated with the stockpiling of waste tyre material.

A previous short-term study into the leachability of tyre derived aggregate illustrated that once disposed of in soil below the groundwater table, the migration of contaminants was limited to less than 0.6 metres surrounding the emplaced material.

An additional study also identified that following disposal in an open water saline environment, no harmful leachates were present after 10 years. Whilst the above highlights the minor extension of leachates during the initial instance of disposal, it further suggests that the leachability of waste tyre aggregate is unlikely to persist over an extensive period of time. As such, it is likely that the ratio of overburden volume to tyres within the OEA will dilute and prevent/slow the migration of potential contaminants to the external environment, significantly reducing any environmental impacts.

The disposal of waste OTR tyres in emplacement areas has previously been an acceptable approach provided they are placed as deep as practical (however, not directly on the pit or emplacement floor) and do not impede saturated aquifers nor compromise the stability of the consolidated final landform.

It has been previously raised that the disposal of tyres in landfill would likely drift upwards overtime to the surface. These notions are unsubstantiated with evidence illustrating that movement of waste OTR tyres is unlikely due to weight, rigidity, and the depth at which they are buried.

The in-pit disposal of waste OTR tyres at RCN is necessary to mitigate the potential risks and hazards associated with the storage of tyres onsite. Based on the articles reviewed, the disposal of waste OTR tyres in the OEA at RCN would be in line with industry practice and can be undertaken with minimal environmental harm. The review of literature demonstrates negligible risks and impacts to surrounding surface water and groundwater conditions at RCN, with no significant leachate related environmental issues likely to occur. Disposal within the OEA would also not result in any noticeable impacts to the intended final land use or landform stability, and therefore is unlikely to negatively influence any mining rehabilitation objectives.

Concrete materials generated during the operation of RCM, including the construction works associated with this Modification, will be separated and loaded onto trucks for delivery to the overburden emplacement areas. This represents the preferred alternative given the minimal environmental impacts and material cost reductions.

6.4.3 Mitigation and Management

The RCM Environment Protection Licence (EPL) 3391 outlines the waste management practices for heavy plant tyre disposal.

The Modification seeks approval to allow the disposal of waste OTR tyres at RCN in accordance with the conditions of EPL 3391, as amended. Bloomfield will regularly review all feasible recycling and recovery options to identify potential avenues to avoid the disposal of waste OTR tyres as they become readily available.

As demonstrated, the disposal of waste OTR tyres on-site is not considered to result in material environmental risks beyond those currently approved for RCN, with disposal of waste OTR tyres in the emplacement area being the safest and most reasonable option available and in accordance with current industry practice. Notwithstanding, RCN will operate in a manner to avoid and/or reduce the number of waste tyres requiring disposal (where practical) consistent with the EPA Waste Hierarchy (principles for managing waste establishment under the Waste Avoidance and Resource Recovery Act 2001). Bloomfield will also address the potential risks associated with the proposed burial of tyres in-pit and ensure that appropriate management actions are implemented in accordance with the conditions of EPL 3391.

The concrete materials will be tested in accordance with the requirements under *The recovered aggregate order 2014* (RA Order) which will ensure that these materials are appropriate for the disposal within the approved mining areas. Waste concrete materials will be buried in overburden material and at least 2 m above the groundwater and 2 m below the Final Landform Design levels.

6.5 OTHER ENVIRONMENTAL ASPECTS

6.5.1 Visual and Lighting

The Modifications to the CHPP and associated facilities are proposed within areas that have been or are approved for disturbance. Accordingly, the visual impacts associated with the new infrastructure will be minimal as any potential views from external locations will be in the context of previous disturbances and/or existing infrastructure in place. Views towards the new facilities from external viewing locations will be limited with shielding generally being provided from these areas by intervening topography (natural and mine landforms) and vegetation. Notwithstanding, new infrastructure will be constructed with cladding shaded in natural colours to minimise visual effects towards any views.

The Modifications will require the installation of some additional lighting to ensure the safe and efficient operation of the new infrastructure and ROM pad areas during night time operations. This will include lighting for the ROM pads, overland conveyors, and new rejects bin. Existing lighting facilities will be utilised where this is feasible. New lighting will be installed to comply with Condition 46 of PA 08_0102, including all lighting to comply with Australian Standard 4282: 2019 – Control of Obtrusive Effects of Outdoor Lighting'.

Given the limited visual and lighting impacts expected as a result of the Modification, no additional mitigation or management measures are required.

6.5.2 Contamination and Hazards

Bloomfield employ comprehensive WH&S policies to ensure ongoing compliance to safe work practices to mitigate and manage potential health and safety risks during mining operations. These policies will continue to be implemented for the Modification.

RCN operates in accordance with the required measures outlined in the RCN Waste Management Plan (Bloomfield, 2016) which outlines the necessary monitoring procedures of all waste generated on-site including that of the requirements for tracking hazardous waste. Bloomfield will continue to implement the necessary mitigation measures to ensure that all waste generated from the operation (as modified) continues to be managed in accordance with the requirements specified in the relevant management plans and under PA 08_0102.

6.5.3 Bushfire

RCM is located on land which is mapped as bushfire prone land. As such, Bloomfield implements relevant procedures to effectively mitigate the risk of bushfire in and around the operation. As per Section 63(2) of the *Rural Fires Act 1997* (RF Act), Bloomfield (being the owner/occupier of the land) has the duty to, and ensures that, measures are employed to prevent the occurrence of bushfires and to minimise the spread of bushfires on Rix's Creek land.

Bloomfield operates in accordance with the '*RCM Bushfire Management Plan'* (Bloomfield, 2021) (BFMP) which outlines the required preventative and procedural actions for adequate preparation in bushfire events. The BFMP further identifies that, where possible, Asset Protection Zones (APZs) will be formulated to ensure all significant assets are protected. These APZs encompass appropriate fire breaks and vegetation maintenance to effectively mitigate risks to assets in the event of bushfire occurrence. Furthermore, slashing and fuel reduction programs (as required) are operated in conjunction with the RFS and local landholders, as well as other proactive management strategies are employed to further reduce fuel loads and effectively assists in the mitigation of bushfire risk on-site. The components of the Modification are all located on previously disturbed land and are all proposed within areas where vegetation has previously been disturbed. Accordingly, it is envisaged no additional APZs will need to be established as a result of the Modification.

Bloomfield will continue to operate RCN in accordance with the relevant bushfire management procedures to ensure that the operation, employees and surrounding local residents are effectively prepared in the event of bushfires. Bloomfield will also continue to operate as per the requirements set out in PA 08_0102 and ensure that the project is suitably equipped to respond to fires and assist the RFS and emergency services where possible.

6.5.4 Other

The Modification does not seek approval for any additional surface disturbance with the proposed changes sought by the Modification existing wholly within the currently approved disturbance boundaries. As such, the Modification will not result in any significant implications to biodiversity or Cultural Heritage. Notwithstanding, RCN will continue to operate in accordance with all relevant plans and procedures to mitigate any risks and impacts arising from the Modification.

RCN operates in accordance the '*RCN Biodiversity Management Plan'* (BMP) (AECOM, 2017). The objectives of the BMP are to rehabilitate, revegetate and manage land for biodiversity within the biodiversity offset areas (BOA's) and the mine site during and post mining. The BMP outlines the actions required and personnel responsible for effective management of biodiversity at RCM. Bloomfield will continue to operate in accordance with the RCN BMP for the Modification.

RCN operates under the measures outlined in the '*RCN Aboriginal Heritage Management Plan'* (AHMP) (Bloomfield, 2016) which aims to provide the protection and appreciation of Aboriginal Heritage values. The AHMP sets out the necessary procedures required for the protection and salvation of Aboriginal sites and artefacts found within the mining operation. To ensure adequate understanding of cultural heritage on-site, all staff and contractors are required to participate in a site induction process whereby information is provided to aid in the identification of artifacts and the necessary procedures following identification. Despite the Modification not disturbing any additional land and no heritage sites will be impacted, RCN will continue to operate as per the procedures set out in the AHMP and actively monitor and review the AHMP as a result of the Modification.

7. JUSTIFICATION AND EVALUATION

The Modification will facilitate the following improvements to operations at RCN:

- Upgrades to the RCN CHPP to improve the efficiency of processing ROM coal extracted from RCN and RCS mines;
- The installation of a thickener and an SBC Plant to reduce the water content of the tailings materials allowing for tailings to be conveyed with reject material to the new reject bin for co-disposal with overburden. The implementation of this process will lead to a reduced reliance on the requirement to dispose tailing within tailings storage facilities in the future;
- The extension of an existing ROM coal stockpile and the further construction of an additional ROM coal stockpile to maintain uninterrupted CHPP operations and provide desired capacities;
- Additional workshop bays to allow greater numbers of plant and machinery to be maintained within the workshop. The underground hydrocarbon piping system will also further increase maintenance efficiency and reduce the potential for spills entering the environment;
- The introduction of a mobile rock crushing plant to allow RCM to process rock materials gathered during mining activities into various sizes for various uses around site;
- The replacement of the existing substation (that has reached its end-of-life) to support current and future operations at RCN;
- The disposal of waste OTR tyres in-pit to reduce waste clutter and the associated risks and hazards attributed to the storage of OTR tyres on-site;
- The disposal of concrete materials in-pit which has been identified as the preferred option from an environmental and efficiency perspective; and
- Administrative changes to conditions to PA 08_0102 which will have minimal environmental impact.

The changes sought by the Modification have the potential of increasing operational efficiency at RCN, whilst staying within approved criterion specified in PA 08_0102. As such greater benefits can be achieved from improved efficiency of operations.

The potential environmental impacts of the Modification are summarised in **Section 6**. The environmental impact assessments conducted for the Modification have determined that any impacts resulting from the Modification will be minor and not have additional material impacts beyond those currently approved for RCN under PA 08_0102. All CHPP upgrades and additional infrastructure have been designed to remain within previously disturbed areas and therefore are not expected to have any significant impacts to surrounding biodiversity.

Bloomfield has consulted with the relevant regulatory authorities during the preparation of this Modification Application and has considered their feedback and comments during the preparation of this Modification Report. The findings presented confirm that the Modification will involve minimal environmental impacts and therefore can appropriately be granted under Section 4.55(1A) of the EP&A Act.

The following aspects of RCN will remain unchanged by the Modification:

- Fleet numbers;
- Size of the workforce;
- Project Boundary and Disturbance Area Boundary;
- Mining methods and hours of operation; and

- Duration of Mining.

Given the Modification will not significantly increase the environmental impacts of the approved development, the potential benefits of the Modification therefore outweigh its environmental costs. Furthermore, as the key aspects of the approved development are unaffected by the Modification, the Modification can therefore be acknowledged as being in the public interest and will not affect the merits of the approved development.

REFERENCES

- AECOM (2015). *Rix's Creek Mine – Continuation of Mining Project*.
- AECOM (2016). *Heritage Management Plan Rix's Creek North Rix's Creek Pty Limited.*
- AECOM (2017). *Rix's Creek North Biodiversity Management Plan.*
- AECOM on behalf of the Bloomfield Group (2015). *Rix's Creek Mine Rehabilitation Management Strategy*.
- AECOM on behalf of The Bloomfield Group (2017). *Rix's Creek North Biodiversity Management Plan.*
- Australian Coal Association Research Program (2000). *Management of Waste Tyres in the Mining Industry.*
- Australian Mining (2022). *Turning tyres into a resource.*
- Australian Standard (2019). *4282 – Control of Obtrusive Effects of Outdoor Lighting.*
- Department of Energy and Climate Change (2008). *Managing Urban Stormwater: Volumes 2A – Installation of Services, 2C – Unsealed Roads, and 2E – Mines and Quarries (the Blue Book).*
- Department of Environment and Science (2014). *Mining Operational Policy – Disposal and storage of scrap tyres at mine sites.*
- Energy Transition Metals Summit (2024). *Building a business case for OTR recycling: Turning waste mining tyres into value.*
- Environment Protection Authority (2014). *The Recovered Aggregate Order.*
- Environment Protection Authority (2017). *Noise Policy for Industry.*
- James Bailey and Associates (2021). *Bengalla Mine Modification 5 Report.*
- Landcom (2004). *Managing Urban Stormwater: Soils and Construction Volume 1.*
- NSW Government (2018). *Voluntary Land Acquisition and Mitigation Policy.*
- The Bloomfield Group (2016). *Rix's Creek North Aboriginal Heritage Management Plan.*
- The Bloomfield Group (2016). *Rix's Creek North Waste Management Plan.*
- The Bloomfield Group (2021). *Rix's Creek Mine Air Quality and Greenhouse Gas Management Plan.*
- The Bloomfield Group (2021). *Rix's Creek Mine Bushfire Management Plan.*
- The Bloomfield Group (2021). *Rix's Creek Mine Exploration Activities Management Plan.*
- The Bloomfield Group (2021). *Rix's Creek Mine Water Management Plan.*
- The Bloomfield Group (2023). *Rix's Creek Mine Noise Management Plan.*
- The Bloomfield Group (2023). *Rix's Creek Mine Year Ending March 2023 Annual Review.*
- The NSW Department of Planning, Industry and Environment (2022). *State Significant Development Guidelines – Preparing a Modification Report.'*
- The NSW Environment Protection Authority (2023). *Environment Protection Authority Climate Change Policy.*
- The NSW Government (2022). *Hunter Regional Plan 2041.*

- The NSW Rural Fire Service (2019). *Planning for Bush Fire Protection.*
- The Singleton Council (2020). *Singleton Local Strategic Planning Statement 2041.*
- Todoroski Air Sciences (2020). *Rix's Creek North Modification 9 Air Quality Impact Assessment.*
- Tyre Stewardship Australia (2020). *Off the Road Use Tyre Analysis.*
- Whitehaven Coal (2021). *Maules Creek Coal Mine – Mobile Coal Sizing and Waste Tyre Disposal.*
- Whitehaven Coal (2021). *Tarrawonga Coal Mine – Waste Tyre Disposal Modification Report.*
- Tyre Stewardship Australia (2022). *Best Practice Guidelines for Tyre Storage and Fire and Emergency Preparedness.*
- Randell Environmental Consulting (2020). *Mining Industry – Off the Road Used Tyre Analysis.*
- Randell Environmental Consulting (2020). *Used Tyres Supply Chain and Fate Analysis.*

ABBREVIATIONS

Abbreviation	Meaning
AHMP	Aboriginal Heritage Management Plan
APZs	Asset Protection Zones
AQGGMP	Air Quality and Greenhouse Gas Management Plan
BAU	Business as usual
BFMP	Bushfire Management Plan
BMP	Biodiversity Management Plan
BOAs	Biodiversity offset areas
CCC	Community Consultative Committee
CHPP	Coal Handling and Preparation Plant
dB(A)	A-weighted decibels
DPHI	New South Wales Department of Planning, Housing, and Infrastructure
EAMP	Exploration Activities Management Plan
EP&A Act	*Environmental Planning & Assessment Act 1979*
EP&A Regulation	*Environmental Planning & Assessment Regulations 2021* (repealed EP&A Regulation 2000 on 1 Mach 2022)
EPA CCP	*Environment Protection Authority Climate Change Policy*
EPBC Act	Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
GHG	Greenhouse Gas
GRAWTS	Greater Ravensworth Area Water and Tailings Strategy
ha	Hectare
Heritage Act	*Heritage Act 1977*
HRP	*Hunter Regional Plan 2041*
Km	Kilometre
LEP	Local Environmental Plan
LGA	Local Government Area
M	metres
Mbcm	Million bank cubic metres
Mining Act	*Mining Act 1992*
Mt	Million tonnes
Mtpa	Million tonnes per annum
ML/a	Megalitres per annum

Abbreviation	Meaning
NEH	New England Highway
NGER Act	*National Greenhouse and Energy Reporting Act 2007*
NIA	Noise Impact Assessment
NMP	Noise Management Plan
NPFI	Noise Policy for Industry
NSW	New South Wales
NZC	Net Zero Commission
OEA	Overburden Emplacement Area
OTR	Off-the-road
PA	Project Approval
RCM	Rix's Creek Mine
RCN	Rix's Creek North
RCS	Rix's Creek South
Resources and Energy SEPP	*State Environmental Planning Policy (Resources and Energy) 2021*
Resources Regulator	Department of Regional NSW - Resources Regulator
RF Act	*Rural Fires Act 1997*
RFS	Rural Fire Service
RL	Reduced Level
RMP	Rehabilitation Management Plan
ROM	Run of Mine
SBC	Solid Bowl Centrifuge
SEPPs	State Environmental Planning Policies
Singleton LEP	*Singleton Local Environmental Plan 2013*
SLSPS	Singleton Local Strategic Planning Statement 2041
SMCs	Safeguard Mechanism Credits
SPLs	Sound Power Levels
SSD	State Significant Development
VLAMP	Voluntary Land Acquisition and Mitigation Policy
VPA	Voluntary Planning Agreements
WM Act	*Water Management Act 2000*

APPENDIX A

AIR QUALITY AND GREENHOUSE GAS EMISSIONS ASSESSMENT

TODOROSKI AIR SCIENCES
Suite 2B, 14 Glen Street Eastwood, NSW 2122
Phone: 02 9874 2123
Fax: 02 9874 2125
Email: info@airsciences.com.au
Web: www.airsciences.com.au
ACN: 151 202 765 | ABN: 74 955 076 914

20 May 2024

Nathan Cooper
Principal
James Bailey & Associates
Via email: ncooper@baileyassoicates.com.au

RE: Air Quality and Greenhouse Gas Assessment - Rix's Creek North Modification

Dear Nathan,
Todoroski Air Sciences has assessed the potential for air quality impacts to arise and greenhouse gas (GHG) emissions due to the proposed modifications to Rix's Creek North, hereafter referred to as the Modification. This report investigates the likely change in dust and GHG emissions associated with the Modification relative to the approved Rix's Creek North. This report has been prepared with consideration of the New South Wales (NSW) Environment Protection Authority (EPA) *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2022**) and the relevant guidance in relation to GHG emissions in the *EPA Climate Change Policy* (**NSW EPA, 2023**) and the Department of Climate Change, Energy, the Environment and Water (DCCEEW) *Australian National Greenhouse Accounts Factors* (NGA Factors) document (**DCCEEW, 2023**).

Overview
Bloomfield Collieries Pty Limited (Bloomfield) owns and operates Rix's Creek Mine (RCM) located in the Hunter Valley of NSW. RCM is a coal mining operation located approximately 5 kilometres (km) north of Singleton at its closest point and both east and west of the New England Highway (NEH).

RCM is the collective name for Rix's Creek North (RCN) (previously Integra Open Cut) and Rix's Creek South (RCS) (the original Rix's Creek Mine).

RCN operates under Project Approval (PA) 08_0102 granted under the *Environmental Planning and Assessment Act 1979* (EP&A Act) and permits open cut mining operations on site until 31 December 2035. PA 08_0102 has been modified on nine occasions to date.

This Modification (MOD 10) comprises the following elements:

- Coal handling and process changes; including installation of new processing equipment on the ROM stockpiles areas and RCN Coal Handling and Preparation Plant (CHPP);
- Additional ROM coal stockpiles to provide additional stockpiling capacity within the approved area of disturbance at RCN;

- Upgrade to the RCN CHPP to include tailings dewatering facilities and thickener capacity to enable the co-disposal of partially dried tailings materials with overburden within the mining area;
- Workshop extension;
- In pit crusher for the processing of rock materials for internal road base and other onsite purposes;
- Substation replacement and installation of a switching station;
- Disposal of heavy vehicle waste tyres in-pit; and,
- Administrative changes to conditions to MP 08_0102, which have minimal environmental impacts.

This letter provides an assessment conducted to determine the likely change in dust and GHG emissions associated with the Modification relative to the approved dust levels and GHG emissions for RCN.

Modification description

Key aspects of the Modification that affect the potential dust generation include the additional ROM coal stockpiles at the CHPP, the in-pit crusher for the processing of rock materials for use on-site, and the co-disposal of partially dried tailings materials with overburden within the mining void.

RCN currently has two existing ROM stockpiles, the main ROM coal pad to the north of the CHPP and the stacker reclaimer area to the west of the existing product stockpile. RCN is also approved to temporarily store coal within stockpiles within the disturbance area at nominal capacities of up to 10,000 tonnes (t). Further, a 500,000t stockpile is approved within the north western portion of the RCN to temporarily store ROM coal from the neighbouring Integra Underground prior to transport via truck to the RCN CHPP. The proposed additional ROM coal stockpiles are located to the north and west of the existing ROM coal pad and to the west of the CHPP on the existing west haul road with approximate areas of 5.4 hectares (ha) and 4.5ha, respectively. The additional ROM coal stockpile located on the existing west haul road will include a ROM grizzly & feeder breaker and conveyor to transport the material to the CHPP. This is a similar setup as the existing ROM pads. The additional ROM coal stockpiles are expected to provide the capacity for the desired 500,000t of ROM coal. The indicative location of the additional ROM coal stockpiles is shown in **Figure 1**.

The in-pit crusher activity would involve a mobile crusher and screen and associated handling and hauling activities. The suitable rock extracted within the mining area would be processed and stockpiled as needed and delivered to various locations on-site for use in mine haul road construction and the mine rehabilitation process. The maximum production rate for this activity is 1,800 tonnes per day (t/day) and around 25,000 tonnes per month (at various size grates). This represents an estimated maximum annual production rate of 300,000 tonnes per year (t/year). The proposed hours of operation for this activity are during the day period only, 7 days per week.

The co-disposal of partially dried tailings materials with overburden arises from upgrades proposed for the existing CHPP facilities. These upgrades include improving the screening processes to remove coarse reject materials early in the process and allowing for the substantial dewatering of tailings and fine reject materials. The outcome enables the co-disposal of more reject material with overburden and removes the requirement

for an additional tailings dam in the future. The co-disposal of reject material with overburden would predominantly occur using ROM haul trucks on the return haul to the pit, similar to what is currently occurring.

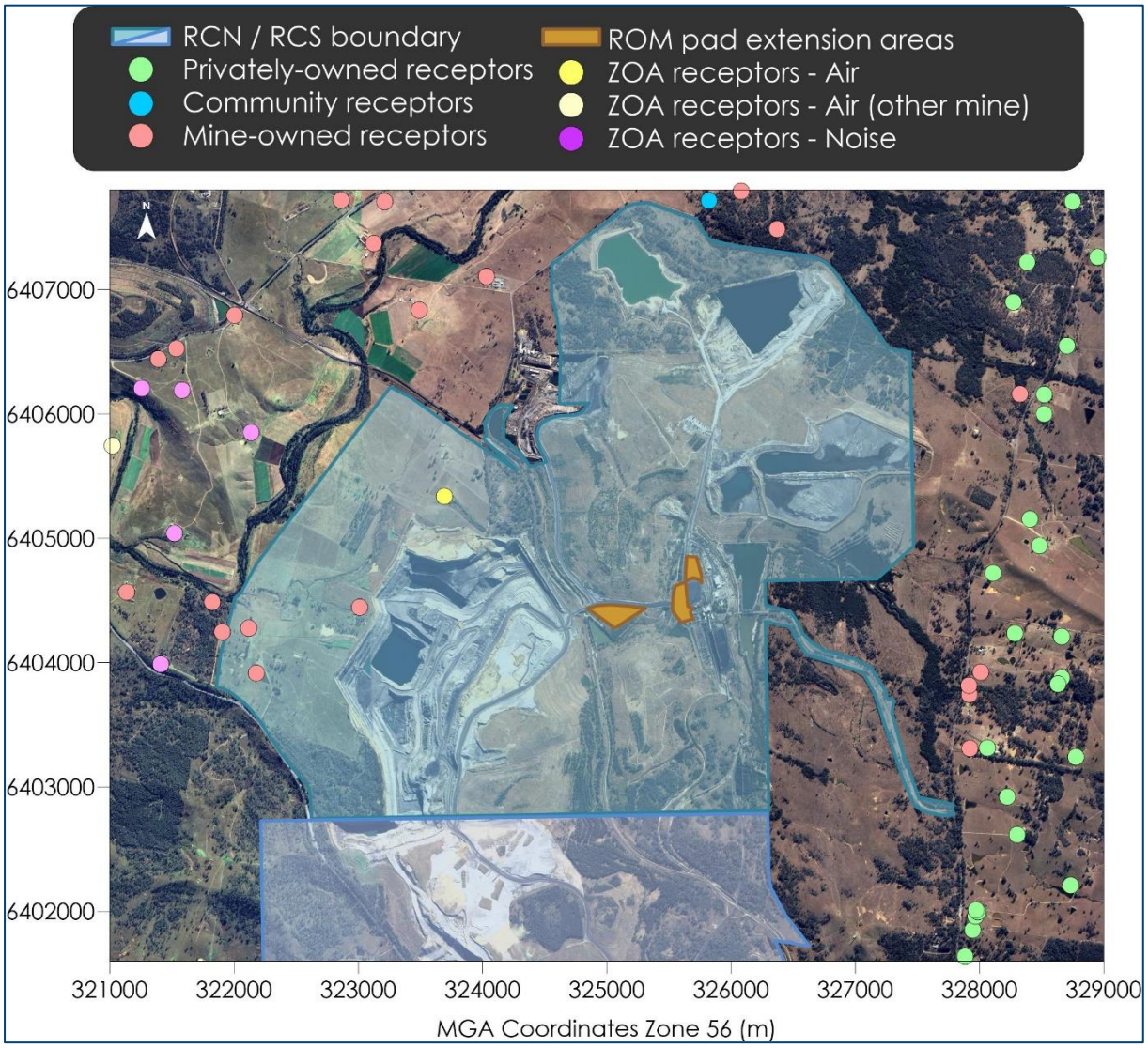

Figure 1: Modification setting and ROM pad extension areas

Assessment of potential air quality impacts

To investigate the potential effect the Modification may have on dust emissions, an analysis was undertaken for the proposed change in dust levels associated with the in-pit crushing, hauling of additional reject material and additional ROM coal stockpiles relative to the dust levels associated with the approved RCN Modification 9 (AQIA) (**Todoroski Air Sciences, 2020**).

A summary of the estimated total dust emissions from the Modification is presented in **Table 1**. A detailed dust emissions inventory for the Modification is presented in **Appendix A**.

Table 1: Summary of estimated dust emission rate for operational activities associated with the Modification

Aspect	Activity	TSP emission	PM_{10} emission	$PM_{2.5}$ emission
In-pit crushing	Loading rock material to crusher	406	192	29
	Crushing (jaw crusher)	180	81	15
	Screening	330	111	8
	Crushing (cone crusher)	180	81	15

Aspect	Activity	TSP emission	PM_{10} emission	$PM_{2.5}$ emission
	Unloading to stockpile	406	192	29
	Rehandle to stockpile	406	192	29
	Loading to haul truck	406	192	29
	Hauling material to work area	3,681	795	80
	Emplacing at work area	406	192	29
	Rehandling at work area	406	192	29
Reject material	Loading rejects to haul truck at CHPP	89	42	6
	Hauling rejects to emplacement area	9,912	2,141	214
	Emplacing rejects at emplacement area	89	42	6
ROM stockpiles	Wind erosion from ROM stockpiles	4,377	2,188	328
	Conveyor to CHPP	35	18	3
General	Diesel	292	292	283
Total emissions (kg/yr.)		**21,603**	**6,945**	**1,133**

A comparison of the estimated annual dust emissions for the approved mining operation and the Modification is presented in **Table 2**. The estimated total annual TSP emissions for both Year 21 and Year 24 of RCN (**Todoroski Air Sciences, 2020**) are compared with the total incremental annual dust emissions for the Modification.

Table 2: Comparison of estimated TSP emission rate for the Operations

Scenario	TSP emissions (kg/year)	Modification (kg/year)	Percent of approved total dust emissions
Year 2021	2,173,746	**21,603**	1.0%
Year 2024	2,179,742	**21,603**	1.0%

It is calculated that the net total incremental annual dust emissions associated with the Modification would increase dust emissions by approximately 1.0% relative to the approved RCN. This change is considered minor and is unlikely to be discernible relative to the existing contribution from the site.

The small increase in total annual dust emissions due to the Modification primarily arises from the in-pit rock crushing facility and the hauling of material reject material. To ensure dust emissions from the Modification activities are minimised where possible, appropriate operational and physical dust mitigation measures would be implemented such as maintaining sufficient levels of moisture on the surface of trafficked surfaces, limiting vehicle speeds and physical dust controls on the rock crushing equipment (e.g. water sprays).

Greenhouse gas emission calculations

The key Scope 1 and 2 GHG emissions sources for the Modification would arise from additional diesel consumption associated with the in-pit rock crusher, handling and hauling the processed rock material, hauling of the additional reject material, and electricity usage associated with the CHPP upgrades.

Table 3 summarises the annual quantities of materials estimated for the Modification. These estimates are based on a conservative upper limit for the Modification and would provide a reasonable worst-case approximation of the potential GHG emissions for the purpose of this assessment.

Table 3: Summary of annual quantities of materials estimated for the Modification

Type	Amount	Units
Diesel	877	kL
Electricity	24,663	MWh

Note: kL = kilolitres and MWh = megawatt hour

To quantify the amount of carbon dioxide equivalent (CO_2-e) material generated from the Modification, emission factors were obtained from latest NGA Factors document (**DEECCW, 2023**). These are summarised in **Table 4**.

Table 4: Summary of emission factors

Type	Energy content factor	Emission factor			Units	Scope
		CO_2	CH_4	N_2O		
Diesel	38.6 GJ/kL	69.9	0.1	0.1	kg CO_2-e/GJ	1
		17.3	-	-		3
Electricity	-	0.68	-	-	kg CO_2-e/kWh	2
		0.05	-	-		3

Note: GJ = gigajoule, GJ/kL = gigajoule per kilolitre, kg CO_2-e = kilograms of carbon dioxide equivalent, kWh = kilowatt hour, CO_2 = Carbon Dioxide, CH_4 = Methane and N_2O = Nitrous Oxide

Table 5 summarises the estimated annual CO_2-e emissions for the life of the Modification. The results indicate that the Modification would generate approximately 2,378 t CO_2-e for Scope 1 and 16,771 t CO_2-e for Scope 2. The estimated GHG emissions generated in all three scopes are based on approximated quantities of materials and generic emission factors. Therefore, the estimated emissions for the Modification are considered conservative.

Table 5: Summary of CO_2-e emissions for the Modification (t CO_2-e)

Type	Scope 1	Scope 2	Scope 3
Diesel	2,378	-	586
Electricity	-	16,771	1,233
Total	**2,378**	**16,771**	**1,819**

The Modification activities would occur over the remaining life for the mining activities at RCN, i.e. until 2035. Estimates for a business-as-usual (BAU) scenario are based on the current approved operations as presented in the *Air Quality Impact Assessment Integra Open Cut Project* (**Holmes Air Sciences, 2009**). The annual average CO_2 emissions for the approved operations have been taken to represent the BAU scenario. Incorporating the GHG estimates for the Modification with the BAU scenario results in the 'Modified business' scenario.

Table 6 presents a summary of the annual CO_2-e emissions for the BAU, Modification and Modified business scenarios.

Table 6: Summary of the estimated annual CO_2-e emissions for BAU, Modification and Modified business scenarios

Scenario	Scope 1	Scope 2	Scope 1 + 2
BAU*	285,423	29,633	315,056
Modification only	2,378	16,771	19,148
Modified business	287,800	46,404	334,204

*Source: **Holmes Air Sciences (2009)**

The results in **Table 6** indicate that the Modification would result in an approximate 0.8% change for Scope 1 relative to the BAU and an approximate 6% change for Scopes 1 and 2 relative to the BAU.

The estimated increase in Scope 1 emissions is relatively minor relative to the approved operations. We note that the estimates are conservative, and ongoing management of GHG emissions at RCN is expected to mitigate these changes.

The changes related to Scope 2 emissions stem from the CHPP upgrades associated with the Modification to dewater tailings material for co-disposal of these materials with overburden in the mining void. These upgrades are intended to enhance operational efficiency and remove the requirement for constructing additional tailings storage facilities by increasing the disposal of reject material with overburden within the mining void. It's noted that a significant reduction in GHG emissions would be associated with the reduced needs for construction, operation, and eventual rehabilitation of the tailings dam due to these upgrades which has not been factored into the above. Therefore, considering this factor, the relative change in overall emissions for RCN is expected to decrease overall despite the increase in annual emissions.

Summary and Conclusions

The Modification is predicted to generate approximately one per cent more dust relative to the approved RCN. This change is well within the normal variation which naturally occurs in background dust levels daily or between years. It is concluded the proposed Modification will not result in any discernible change in the dust impact relative to that presented in the **Todoroski Air Sciences (2020)** assessment at any receptor locations.

The GHG assessment indicates that the Modification would generate an approximate 0.8% increase for Scope 1 emissions which is considered minor and an approximate 6% increase in Scope 1 and 2 emissions combined. The increase in Scope 2 emissions is associated with additional electricity requirements for the CHPP upgrades to achieve the disposal of tailings material with overburden rather than the development of additional tailings dams. The increase in annual GHG emissions as a result of the Modification would however reduce the ultimate emissions which would be otherwise required for the construction and rehabilitation of additional tailings dam(s) in the future. It is noted that with the decarbonising of the NSW electricity grid, the expected Scope 2 emissions associated with the Modification would reduce over time. Bloomfield will continue to apply GHG mitigation measures such as monitoring total site electricity consumptions and investigating avenues to minimise its emissions.

Please feel free to contact us if you would like to clarify any aspect of this report.

Yours faithfully,
Todoroski Air Sciences

Philip Henschke

References

DCCEEW (2023)

"Australian National Greenhouse Accounts Factors – For individuals and organisations estimating greenhouse gas emissions", Department of Climate Change, Energy, the Environment and Water [DCCEEW], August 2023.

Holmes Air Science (2009)

"Air Quality Impact Assessment Integra Open Cut Project", prepared for URS Australia Pty Ltd by Holmes Air Sciences, June 2009.

NSW EPA (2022)

"Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales", NSW EPA, August 2022.

NSW EPA (2023)

"EPA Climate Change Policy", NSW EPA, January 2023.

Todoroski Air Sciences (2020)

"Air Quality Impact Assessment Rix's Creek North Modification 9", prepared for Hansen Bailey by Todoroski Air Sciences, April 2020.

Appendix A – Emission Calculation

Table A-1: Dust emissions inventory

	Activity	TSP emission	PM10 emission	PM25 emission	Intensity	Units	EF - TSP	EF - PM10	EF - PM25	Units	Var 1	Units	Var 2	Units	Var 3	Units	Var. 4 - TSP	PM10	PM25	Units	Var 5	Units	Var 6	Units
In-pit crushing	Loading rock material to crusher	406	192	29	300,000	t/y	0.001	0.00064	0.00010	kg/t	1.14	Ave(WS/2.2)^1.3 [	2	M.C. %										
	Crushing (jaw crusher)	180	81	15	300,000	t/y	0.00060	0.00027	0.00005	kg/t														
	Screening	330	111	8	300,000	t/y	0.0011	0.00037	0.000025	kg/t														
	Crushing (cone crusher)	180	81	15	300,000	t/y	0.00060	0.00027	0.00005	kg/t														
	Unloading to stockpile	406	192	29	300,000	t/y	0.001	0.00064	0.00010	kg/t	1.14	Ave(WS/2.2)^1.3 [	2	M.C. %										
	Rehandle to stockpile	406	192	29	300,000	t/y	0.001	0.00064	0.00010	kg/t	1.14	Ave(WS/2.2)^1.3 [	2	M.C. %										
	Loading to haul truck	406	192	29	300,000	t/y	0.001	0.00064	0.00010	kg/t	1.14	Ave(WS/2.2)^1.3 [	2	M.C. %										
	Hauling material to work area	3,681	795	80	300,000	t/y	0.082	0.0177	0.0018	kg/t	214	t/load	251	Ave. vehicle mass	5.6	km/return	3.1	0.7	0.1	kg/VKT	2.1	S.C. %	85	% C.
	Emplacing at work area	406	192	29	300,000	t/y	0.001	0.00064	0.00010	kg/t	1.14	Ave(WS/2.2)^1.3 [	2	M.C. %										
	Rehandling at work area	406	192	29	300,000	t/y	0.001	0.00064	0.00010	kg/t	1.14	Ave(WS/2.2)^1.3 [	2	M.C. %										
Reject material	Loading rejects to haul truck at CHPP	89	42	6	2,262,000	t/y	0.000	0.00002	0.00000	kg/t	1.14	Ave(WS/2.2)^1.3 [	25	M.C. %										
	Hauling rejects to emplacement area	9,912	2,141	214	2,262,000	t/y	0.029	0.0063	0.0006	kg/t	214	t/load	251	Ave. vehicle mass	2.0	km/return	3.1	0.7	0.1	kg/VKT	2.1	S.C. %	85	% C.
	Emplacing rejects at emplacement area	89	42	6	2,262,000	t/y	0.000	0.00002	0.00000	kg/t	1.14	Ave(WS/2.2)^1.3 [	25	M.C. %										
ROM stockpiles	Wind erosion from ROM stockpiles	4,377	2,188	328	10.0	ha	876	438.00	65.700	kg/ha/yr													50	% C.
	Conveyor to CHPP	35	18	3	0.1	ha	876	438.00	65.700	kg/ha/yr													70	% C.
	Diesel	292	292	283																				
	Total emissions (kg/yr.)	**21,603**	**6,945**	**1,133**																				

APPENDIX B

NOISE IMPACT ASSESSMENT

Rix's Creek North Modification 10

Noise impact assessment

Prepared for The Bloomfield Group Pty Ltd

May 2024

Rix's Creek North Modification 10

Noise impact assessment

The Bloomfield Group Pty Ltd

E231153 RP1

May 2024

Version	Date	Prepared by	Reviewed by	Comments
1	08/05/2024	Ryan Bruniges	Robert Kirwan	Draft
2	17/05/2024	Ryan Bruniges	Robert Kirwan	Draft
3	31/05/2024	Ryan Bruniges	Robert Kirwan	Final

Approved by

Robert Kirwan
Associate Acoustical Consultant
31 May 2024

Level 3 175 Scott Street
Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by The Bloomfield Group Pty Ltd and has relied upon the information collected at the time
and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of The Bloomfield Group Pty Ltd and no responsibility will be taken for its use by other parties. The Bloomfield Group Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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1 Introduction

EMM Consulting Pty Limited (EMM) was engaged James Bailey & Associates Pty Ltd (JBA) to undertake a Noise Impact Assessment (NIA) on behalf of The Bloomfield Group (Bloomfield) for the Rix's Creek North Open Cut Project.

Bloomfield operates the Rix's Creek Open Cut Mine (RCM), which is the combined operation of the Rix's Creek North Open Cut (RCN) and the Rix's Creek South Open Cut (RCS). The RCM is located approximately 5 kilometres north of Singleton, NSW.

RCN operates under Project Approval (PA) 08_0102 granted under the Environmental Planning and Assessment Act 1979 (EP&A Act). PA 08_0102 has been modified on nine occasions. Under PA 08_0102, the Proponent can carry out open cut mining operations on site until 31 December 2035. Bloomfield is seeking approval for a modification to PA 08_0102 for RCN. Modification 10 (MOD 10) is proposed to comprise the following elements:

- Coal handling and process changes; including installation of new processing equipment on the Run of Mine (ROM) stockpiles areas and Coal Handling and Preparation Plant (CHPP).
- Additional ROM stockpiles to provide additional stockpiling capacity within the approved area of disturbance at RCN.
- CHPP to be upgraded to include tailings dewatering facilities and an upgrade to the capacity of the thickener to enable the co-disposal of partially dried tailings materials with overburden.
- Workshop extension.
- In pit crusher for the processing of rock materials for internal road base and other onsite purposes.
- Substation replacement and switching station.
- Disposal of heavy vehicle waste tyres in-pit.
- Administrative changes to conditions to PA 08_0102 which have minimal environmental impacts.

There are no proposed changes to the project boundary, surface disturbance, project duration or mining method.

This NIA has been prepared by EMM to support the modification application for PA 08_0102 MOD 10 being prepared by JBA.

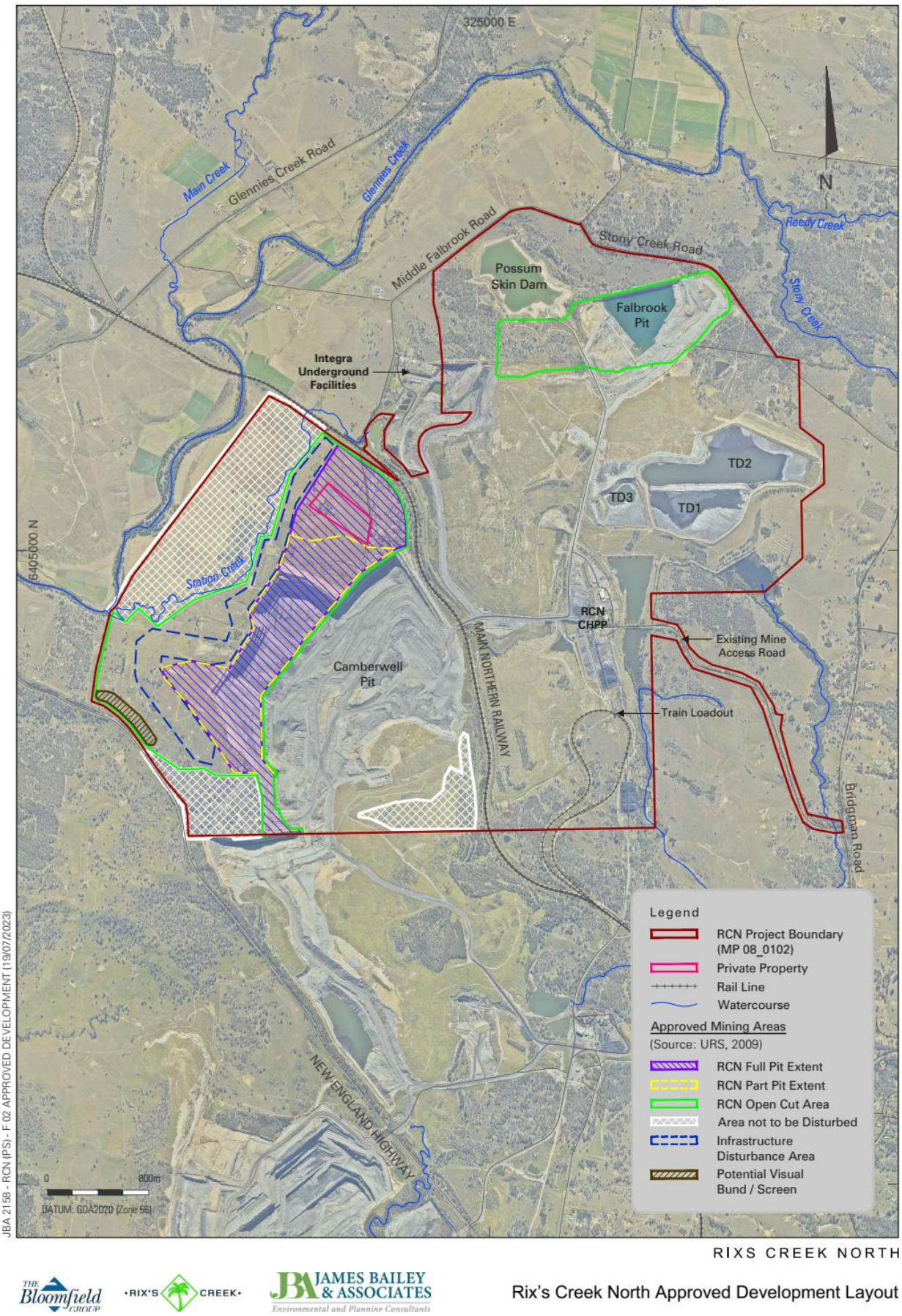


Figure 1.1 Development layout

2 Noise impact assessment overview

2.1 Policy and guidelines

Technical policy and guidelines relevant to assessment of industrial and transport noise in NSW include:

- Noise Policy for Industry (NPfI) (EPA, 2017)
- Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments (VLAMP) (NSW Government, 2018)
- Interim Construction Noise Guideline (ICNG) (DECCW – Now DPI 2009)
- Road Noise Policy (RNP) (DECCW – Now DPI, 2011)
- Rail Infrastructure Noise Guideline (RING) (EPA, 2013).

2.2 Assessment approach

The changes proposed by PA 08_0102 MOD 10 of significance to this assessment include upgrades to the ROM process and CHPP facilities and the operation of an in-pit mobile crusher. There are no proposed changes to the project boundary, surface disturbance, project duration or mining method. Figures showing the location of the proposed upgrades are shown in Appendix B.

The primary objective of this NIA is to evaluate whether RCN can continue to operate in accordance with approved noise criteria prescribed in PA 08_0102.

For the purpose of this assessment, it has been assumed that existing operations from RCN are already operating at the criterion at each assessment location. This assessment quantifies noise impacts from the new and upgraded infrastructure proposed by MOD 10 only. Model predictions from the MOD 10 upgrade will be added to the criterion at each assessment location. The cumulative result of existing criteria and MOD 10 upgrades was assessed, and any levels above criteria identify a noise risk due to the proposed upgrades.

MOD 10 does not seek to alter the approved road traffic or rail volumes and accordingly are not discussed further in this assessment.

2.3 Operational noise

2.3.1 Coal handling upgrades

The RCN CHPP utilises primary and secondary sizers with all ROM material processed and waste material disposed of as chitter or tailings. The proposed upgrades include installation of an in-ground hopper which includes a grizzly and feeder-breaker, and a double deck wet screen installed below the ROM. Conveyors will take ROM material to a rotary breaker located at the old stacker reclaimer pad. The rotary breaker will replace the existing sizers which are no longer required and will be removed.

There are two proposed locations for the grizzly and feeder-breaker including the current active ROM and the proposed additional ROM pad to the west of the CHPP at the former park-up area as shown in Figure 7.3. The proposed grizzly feeder location to the west will deliver ROM coal to the existing ROM bin via overland conveyor. Only one grizzly and feeder breaker will be operated at one time. Both locations have been modelled in this assessment with the highest result presented.

2.3.2 CHPP upgrades

New solid bowl centrifuge (SBC) plant is proposed as a stand-alone building to the south west of the CHPP on the former stacker reclaimer pad. Partially dried tailings material from the SBC and rotary breaker reject will be delivered onto a new reject conveyor and into a new reject bin.

Other CHPP upgrades including the tailings thickener replacement, flocculant plant and additional ROM coal stockpiles. However these upgrades are not expected to cause any noise impact and have not been considered further in this assessment.

2.3.3 Infrastructure upgrades

The existing RCN workshop and substation located adjacent to the CHPP will be upgraded as part of the modification. These new facilities are proposed to be entirely within the existing disturbance area and immediately adjacent to existing infrastructure. The ongoing use of these upgrades are not expected to cause any noise impact and have not been considered further in this assessment.

2.3.4 Mobile crusher

A mobile crusher was assessed operating with a front-end loader operating in either the Camberwell pit or the Falbrook pit. The predictions for each assessment location represent the average-energy noise level over a 15-minute period and assumes the mobile crusher and front-end loader are operating concurrently.

2.4 Construction noise

Construction activities associated with PA 08_0102 MOD 10 include upgrades to the ROM handling and CHPP facilities, extension of the workshop and substation replacement and switching station. These upgrade works will occur within the existing disturbance footprint and immediately adjacent to existing fixed plant at RCN.

The plant proposed for construction works includes typical items used on site for regular maintenance activities, including cranes, work platforms, hand tools. As such, it is considered highly unlikely that construction noise from minor onsite construction activities would be distinguishable from regular maintenance work or audible over and above the noise generated by the open cut mining and fixed plant operation; therefore construction noise has not been quantitatively assessed. Noise associated with minor construction activities will be managed to comply with project approval criteria and will therefore be treated as an operational noise source for compliance purposes. Construction noise is not discussed further in this report.

2.5 Road traffic noise

There is no change to road traffic volumes associated with PA 08_0102 MOD 10; therefore, no change in road traffic noise impact relative to the approved development should occur.

2.6 Rail noise

There is no change to rail volumes associated with PA 08_0102 MOD 10; therefore, no change in rail noise impact relative to the approved development should occur.

2.7 Assessment locations and criteria

Privately owned (non-mine owned) receptors (e.g. residences, schools, churches, community buildings etc.) have been assessed against criteria and requirements of PA 08_0102. Receptor locations and land ownership details have been adopted from the RCN Modification 9 (MOD 9) noise impact assessment with updated land ownership

details incorporated into the assessment. Assessment locations and land ownership details are shown on Figure 2.1.

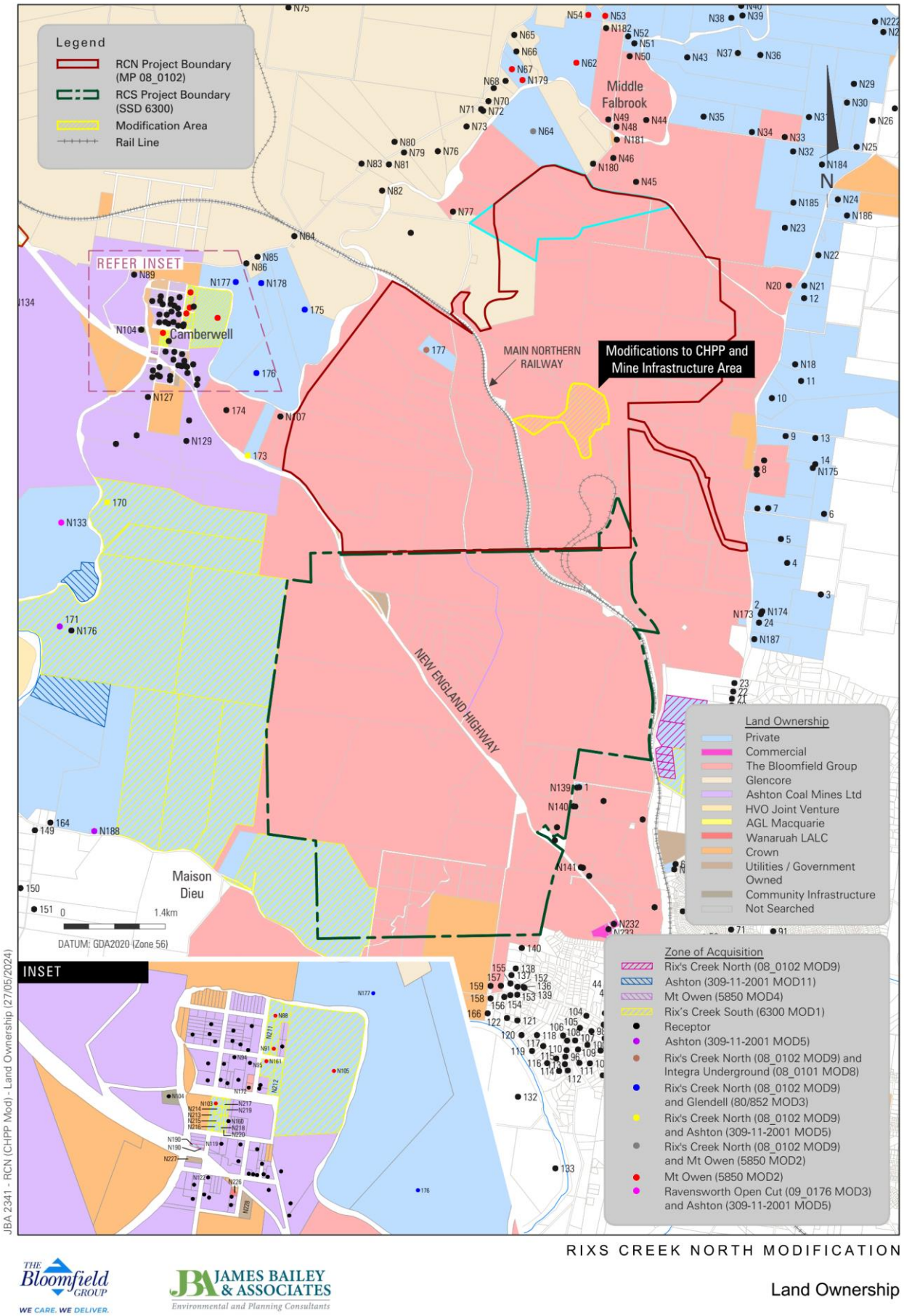


Figure 2.1 Assessment locations

3 Noise criteria

Bloomfield is committed to managing noise emissions from RCN to maintain compliance with the approved noise criteria. Noise criteria established in the RCN Project Approval (PA 08_0102 Modification 9) last modified in February 2021, have been adopted for assessment of noise impacts in this NIA.

3.1 Approved noise criteria (PA 08_0102)

Schedule 3, Conditions 1 to 10 of PA 08_0102 outline environmental performance conditions pertaining to noise. These are reproduced in the following sections.

3.1.1 Acquisition upon request

Table 1 within Condition 1 of Schedule 3 of PA 08_0102 lists private receptors entitled to acquisition upon written request from the owner of the land.

Residential Receiver No.	*Acquisition Basis*
64 – W & A Gardner	Noise
87 – B & R Richards	Noise
106 – B & R Richards	Noise
111 – T Burgess	Noise
153 – R & D Hall	Noise and Air Quality
N240 – N.A. Long	Air Quality
N234-239 – N.R. and J.M. Long	Air Quality
351 – WG Bowman	Noise
352 – AS Bowman	Noise

3.1.2 Intrusive noise criteria

Table 2 within Condition 2 of Schedule 3 of PA 08_0102 lists noise criteria applicable for residences on privately-owned land. This table is reproduced below.

Location		*Day*	*Evening*	*Night*	
		$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
NAG 3	All privately-owned land	40	40	39	49
NAG 4	99, 100	39	39	39	47
	88, 91, 95	40	40	40	47
	105, 161	41	41	41	47
	All other privately-owned land	42	42	37	47
NAG 5	104	35	35	35	52
	139	36	36	36	52
	103	37	37	37	52
	121	40	40	40	52
	All other privately-owned land	50	46	42	52

Location		Day	Evening	Night	
		$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
NAG 6	137	35	35	35	48
	133	37	37	37	48
	132	38	38	38	48
	All other privately-owned land	41	41	38	48
NAG 7	All privately-owned land	45	42	39	49
NAG 8	142	35	35	35	45
	All other privately-owned land	42	42	35	45
NAG 9	146, 148, 149	35	35	35	48
	143, 144, 145, 147, 150, 151, 152	36	36	36	48
	2	37	37	37	48
	3, 4	39	39	39	48
	All other privately-owned land	40	40	38	48
NAG 10	5	40	40	40	47
	6	41	41	41	47
	8	42	42	42	47
	All other privately-owned land	39	39	37	47
NAG 11	18	35	35	35	49
	20, 21	37	37	36	49
	19	37	37	37	49
	17	38	38	38	49
	7	39	39	39	49
	12, 15	40	40	40	49
	14, 16	42	42	42	49
	All other privately-owned land	41	41	39	49
NAG 12	52	35	35	35	45
	51	37	37	37	45
	53	38	38	38	45
	50, 54	39	39	39	45
	62	40	40	40	45
	All other privately-owned land	38	38	35	45
NAG A	24, 25, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 41	35	35	35	46
	31	36	36	35	46
	42, 43	36	36	36	46
	32	37	37	35	46
	22, 23	37	37	37	46
	34	39	39	36	46
	35	39	39	35	46
	All other privately-owned land	39	39	36	46
NAG C	All other privately-owned land	37	37	35	45
NAG D	44, 48	36	36	36	48
	49	39	39	39	48
	All other privately-owned land	40	40	38	48

Location		Day	Evening	Night	
		$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
NAG F	67	40	40	40	50
	All other privately-owned land	40	40	40	50
All other privately-owned land		35	35	35	45

N180 is treated as an active recreation area for the purpose of allocating recommended amenity criteria in this NIA. N181 is considered a commercial premises. N104 is a place of worship that is not currently in use. Project amenity noise criteria for these three non-residential receptors has been adopted based on recommended amenity limits determined in accordance with the NPfI:

- $L_{Aeq,15minute}$ 53 dB for N180
- $L_{Aeq,15minute}$63 dB for N181
- $L_{Aeq,15minute}$ 48 dB for N104.

3.1.3 Maximum noise event criteria

Maximum noise event criteria, used to assess sleep disturbance impacts during the night period, are prescribed in Table 2 within Condition 2 of Schedule 3 of PA 08_0102. That table is reproduced above.

3.1.4 Cumulative noise criteria

Table 4 within Condition 4 of Schedule 3 of PA 08_0102 lists cumulative noise criteria applicable for each noise assessment group assessed for which landowners become entitled to acquisition upon request. This table is reproduced below.

Location	Day	Evening	Night
NAGs 4, 5, 8 and 9	55	45	40
All other privately-owned land	50	45	40

3.2 Voluntary land acquisition and mitigation policy

In September 2018, the NSW government published the Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments (the VLAMP) (NSW Government, 2018). This document describes the NSW Government's policy for voluntary mitigation and land acquisition to address noise impacts from state significant mining, petroleum and extractive industry developments.

3.2.1 Mitigation and acquisition criteria

The VLAMP provides the following guidance on the applicability of noise mitigation and acquisition criteria:

A consent authority can apply voluntary mitigation and voluntary land acquisition rights to reduce:

- operational noise impacts of a development on privately owned land; and
- rail noise impacts of a development on privately owned land near a non-network rail line (private rail line), that is on, or exclusively servicing an industrial site (see Appendix 3 of the RING);

But not:

- construction noise impacts, as these impacts are shorter term and can be controlled;

- noise impacts on the public road or rail network; or
- modifications of existing developments with legacy noise issues, where the modification would have beneficial or negligible noise impacts.

3.2.2 Voluntary mitigation rights

The VLAMP states:

A consent authority should only apply voluntary mitigation rights where, even with the implementation of best practice management at the mine site:

- the noise generated by the development would meet the requirements in Table 1 (see following page), such that the impacts would be characterised as marginal, moderate or significant, at any residence on privately owned land; or
- the development would increase the total industrial noise level at any residence on privately owned land by more than 1 dB(A) and noise levels at the residence are already above the recommended amenity noise levels in Table 2.2 of the Noise Policy for Industry; or
- the development includes a private rail line and the use of that private rail line would cause exceedances of the recommended acceptable levels in Table 6 of Appendix 3 of the RING by greater than or equal to 3 dB(A) at any residence on privately owned land.

All noise levels must be calculated in accordance with the NPfI or RING (as applicable).

3.2.3 Voluntary land acquisition rights

The VLAMP states:

A consent authority should only apply voluntary land acquisition rights where, even with the implementation of best practice management:

- the noise generated by the development would be characterised as significant, according to Table 1 (see following page), at any residence on privately owned land; or
- the noise generated by the development would contribute to exceedances of the acceptable noise levels plus 5 dB in Table 2.2 of the NPfI on more than 25% of any privately-owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls 1; or
- the development includes a private rail line and the use of that private rail line would cause exceedances of the recommended maximum criteria in Table 6 of Appendix 3 of the RING at any residence on privately owned land.

All noise levels must be calculated in accordance with the NPfI or RING (as applicable).

Table 1 of the VLAMP outlines a procedure for characterising noise impact and provides examples of potential receptor-based treatments that could be used to mitigate residual noise impact; this table is reproduced below.

[1] *Voluntary land acquisition rights should not be applied to address noise levels on vacant land other than to vacant land specifically meeting these criteria.*

Table 1 – Characterisation of noise impacts and potential treatments[16]

If the predicted noise level minus the project noise trigger level[17] is:	And the total cumulative industrial noise level is:	Characterisation of impacts:	Potential treatment:
All time periods 0-2dB(A)	Not applicable	Impacts are considered to be **negligible**	The exceedances would not be discernable by the average listener and therefore would not warrant receiver based treatments or controls
All time periods 3-5dB(A)	• ≤ recommended amenity noise level in Table 2.2 of the NPfI; or • > recommended amenity noise level in Table 2.2 of the NPfI, but the increase in total cumulative industrial noise level resulting from the development is ≤1dB	Impacts are considered to be **marginal**	Provide mechanical ventilation / comfort condition systems to enable windows to be closed without compromising internal air quality / amenity.
All time periods 3-5dB(A)	> recommended amenity noise level in Table 2.2 of the NPfI, and the increase in total cumulative industrial noise level resulting from the development is >1dB	Impacts are considered to be **moderate**	As for marginal impacts but also upgraded façade elements like windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.
Day and evening >5dB(A)	≤ recommended amenity noise levels in Table 2.2 of the NPfI	Impacts are considered to be **moderate**	As for marginal impacts but also upgraded façade elements like windows, doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.
Day and evening >5dB(A)	> recommended amenity noise levels in Table 2.2 of the NPfI	Impacts are considered to be **significant**	Provide mitigation as for moderate impacts and see voluntary land acquisition provisions above.
Night >5dB(A)	Not applicable	Impacts are considered to be **significant**	Provide mitigation as for moderate impacts and see voluntary land acquisition provisions above.

Table 1 of the VLAMP (NSW Government, 2018)

3.3 Corrections for annoying noise characteristics (modifying factors)

Fact Sheet C of the NPfI outlines procedures for assessing modifying correction factors. These correction factors, also referred to as modifying factor penalties, are applied to predicted/measured noise levels at the receptor before comparison with relevant noise trigger levels/criteria, to account for the possible additional annoyance caused by these noise characteristics.

Open cut mines are not generally tonal or intermittent in nature as per the intent of the NPfI. Whilst individual noise sources, such as machine drives, alarms and hydraulic systems may exhibit tonal characteristics, these sources operate concurrently with the open cut mine, and the resulting combined sound power spectrum is not tonal in nature. RCM operates 24 hours per day, and therefore does not exhibit intermittent noise characteristics. No further assessment of these characteristics has been made.

Section 5.4 includes assessment of potential low frequency noise impact.

4 Noise model parameters

4.1 Noise model

Noise levels were predicted using RTA Technology's Environmental Noise Model (ENM), a computer-based model, to determine the acoustic impact of proposed CHPP upgrade activities. The model takes into account geometric spreading, atmospheric absorption and barrier and ground attenuation. ENM Terrain Category 2, representing a rural land environment, was adopted for model input.

Modelling included new noise sources associated with MOD 10 only. No other existing fixed plant or open cut noise sources were included in the modelling. Compliance will be assessed with the assumption that existing operations are operating at the noise criterion at each receptor. Any increase in predicted levels will identify a noise risk due to MOD 10 upgrades.

4.2 Enhancing meteorology

Potential impacts were evaluated using prevailing meteorological conditions consistent with the MOD 9 assessment that were determined in accordance with the NPfI. These are presented in Table 4.1.

Table 4.1 Model meteorological conditions

Temperature °C	Humidity %	Wind		Vertical Temperature Gradient °C/100 m
		Speed m/s	Direction [1]	
Day period (7am to 6pm)				
10	80	0	-	-0.5
Evening period (6pm to 10pm)				
10	80	0	-	-0.5
10	80	0	-	4
10	80	3	112.5	-0.5
10	80	3	135	-0.5
Night period (10pm to 7am)				
10	80	0	-	-0.5
10	80	0	-	4
10	80	3	112.5	-0.5
10	80	3	135	-0.5
10	80	3	157.5	-0.5

Notes: 1. Degrees magnetic north, "-" indicates calm conditions.

4.3 Plant sound power

The locations of modelled noise sources have been based on information provided by Bloomfield. $L_{Aeq,15minute}$ sound power data was used for model inputs for all sources. The front-end loader sound power was measured on site at Rix's Creek Coal Mine. The mobile crusher sound power was sourced from EMM's internal database.

Total linear (L_W) and A-weighted (L_{WA}) sound power levels are provided in Table 4.2. The proposed SBCs, breaker and screen have been assessed with cladding.

Table 4.2 Sound power data $L_{Aeq,15minute}$ dB

Description	L_W	L_{WA}
ROM bin	118	110
Conveyors per metre	83	78
Solid bowl centrifuges (6) with cladding	114	99
Rotary breaker with cladding	118	103
Screen with cladding	119	101
Grizzly feeder	118	112
Impacts on grizzly feeder	136	130
Feeder breaker	120	109
Mobile crusher	124	118
Front end loader (992K)	118	110

4.4 Noise mitigation

A number of operational noise mitigation measures have been considered in the design of MOD 10 infrastructure and are included in the noise predictions. These include:

- The design of the upgraded ROM including a grizzly and feeder breaker which are underground. This provides shielding to nearby receivers from loading / impact noise at the ROM.
- Cladding of significant components of the CHPP infrastructure including the SBCs, rotary breaker and screens.
- Mobile crusher has been assessed operating at RL15 in the Falbrook and Camberwell pit to take advantage of pit topography and provide shielding to nearby receivers.

5 Results

5.1 Operational noise predictions

Table 5.1 presents predictions for the MOD 10 upgrades under noise enhancing meteorological conditions. MOD 10 noise levels have been added to intrusiveness noise criteria which represents existing operations at noise limits. Results are compared against RCN project approval noise limits. Green shaded results indicate predictions are 1 dB above noise limits.

Table 5.1 Operational noise predictions, $L_{Aeq,15minute}$ dB

Receiver	Intrusive noise criteria			MOD 10 and existing operations		
	Day	Evening	Night	Day	Evening	Night
1	36	36	36	36	36	36
2	39	39	39	39	39	39
3	39	39	37	39	39	37
4	40	40	40	40	40	40
5	41	41	41	41	41	41
6	39	39	39	39	39	39
7	42	42	42	42	42	42
9	42	42	42	42	42	42
10	42	42	42	42	43	43
11	38	38	38	38	39	39
12	37	37	37	37	38	38
13	40	40	40	40	40	40
14	40	40	40	40	40	40
15	40	40	38	40	40	38
16	40	40	38	40	40	38
17	40	40	38	40	40	38
18	36	36	36	36	36	36
19	36	36	36	36	36	36
20	35	35	35	35	35	35
21	36	36	36	36	36	36
22	35	35	35	35	35	35
23	36	36	36	36	36	36
24	39	39	39	39	39	39
27	40	40	38	40	40	38
31	40	40	38	40	40	38
32	40	40	38	40	40	38
33	40	40	38	40	40	38
34	40	40	38	40	40	38
37	40	40	38	40	40	38

Table 5.1 Operational noise predictions, $L_{Aeq,15minute}$ dB

Receiver	Intrusive noise criteria			MOD 10 and existing operations		
	Day	Evening	Night	Day	Evening	Night
44	35	35	35	35	35	35
55	35	35	35	35	35	35
61	35	35	35	35	35	35
62	35	35	35	35	35	35
65	35	35	35	35	35	35
76	35	35	35	35	35	35
79	35	35	35	35	35	35
80	35	35	35	35	35	35
104	35	35	35	35	35	35
108	35	35	35	35	35	35
112	35	35	35	35	35	35
137	35	35	35	35	35	35
138	35	35	35	35	35	35
140	35	35	35	35	35	35
146	35	35	35	35	35	35
148	35	35	35	35	35	35
149	41	41	38	41	41	38
150	35	35	35	35	35	35
151	35	35	35	35	35	35
152	35	35	35	35	35	35
155	35	35	35	35	35	35
157	35	35	35	35	35	35
159	35	35	35	35	35	35
160	35	35	35	35	35	35
161	35	35	35	35	35	35
162	35	35	35	35	35	35
163	35	35	35	35	35	35
164	41	41	38	41	41	38
165	41	41	38	41	41	38
167	41	41	38	41	41	38
168	41	41	38	41	41	38
169	41	41	38	41	41	38
171	41	41	38	41	41	38
N18	35	35	35	35	36	36
N21	37	37	36	37	38	37
N22	37	37	37	37	37	37
N23	37	37	37	37	37	37

Table 5.1 Operational noise predictions, $L_{Aeq,15minute}$ dB

Receiver	Intrusive noise criteria			MOD 10 and existing operations		
	Day	Evening	Night	Day	Evening	Night
N24	35	35	35	35	35	35
N25	35	35	35	35	35	35
N26	35	35	35	35	35	35
N27	35	35	35	35	35	35
N28	35	35	35	35	35	35
N29	35	35	35	35	35	35
N30	35	35	35	35	36	36
N31	36	36	35	36	36	35
N32	37	37	35	37	37	35
N34	39	39	36	39	39	36
N35	39	39	35	39	39	36
N36	35	35	35	35	35	35
N37	35	35	35	35	35	35
N38	35	35	35	35	35	35
N39	35	35	35	35	35	35
N40	35	35	35	35	35	35
N41	35	35	35	35	35	35
N42	36	36	36	36	36	36
N43	36	36	36	36	36	36
N50	39	39	39	39	39	39
N51	37	37	37	37	37	37
N52	35	35	35	35	35	35
N53	38	38	38	38	38	38
N54	39	39	39	39	39	39
N62	40	40	40	40	40	40
N63	40	40	40	40	40	40
N67	40	40	40	40	40	41
N88	40	40	40	40	40	40
N91	40	40	39	40	40	39
N103	37	37	37	37	37	37
N104	53	53	53	53	53	53
N105	41	41	41	41	41	41
N133	37	37	37	37	37	37
N139	36	36	36	36	36	36
N161	41	41	41	41	41	41
N171	39	39	36	39	39	36
N172	42	42	37	42	42	37

Table 5.1 Operational noise predictions, $L_{Aeq,15minute}$ dB

Receiver	Intrusive noise criteria			MOD 10 and existing operations		
	Day	Evening	Night	Day	Evening	Night
N173	40	40	38	40	40	39
N174	40	40	38	40	40	38
N175	40	40	38	40	40	38
N176	41	41	38	41	41	38
N179	40	40	40	40	40	40
N180	58	58	58	58	58	58
N181	58	58	58	58	58	58
N183	38	38	35	38	38	35
N184	39	39	36	39	39	36
N185	39	39	36	39	39	36
N186	39	39	36	39	39	36
N187	40	40	38	40	40	38
N188	41	41	38	41	41	38
N189	41	41	38	41	41	38
N222	39	39	36	39	39	36
N223	39	39	36	39	39	36

Notes: 1. Green shaded results indicate predictions are 1-2 dB above noise limits.

2. Orange shaded results indicate predictions are 3-5 dB above noise limits.

3. Red shaded results indicate predictions are more than 5 dB above noise limits.

Noise levels from the MOD 10 upgrades alone are predicted to be below intrusiveness criteria at all assessment locations. Existing operations have been assumed to be operating at the noise limit for the purpose of this assessment. With this assumption nine receptors are predicted to receive mining noise higher than an intrusive noise criterion with MOD 10 upgrades added to existing operations. Minor 1 dB exceedances during the night period are predicted at N35, N67, N173 and during the evening and night period at receptors 10, 11, 12, N18, N21, N30, under noise enhancing meteorological conditions. No exceedance is predicted during the day period.

Exceedances of 0 to 2 dB are considered negligible in accordance with the VLAMP, as increased noise levels of this magnitude would not be discernible to the average listener and do not warrant receiver-based treatments or controls.

5.2 Private land area assessment

A private land area assessment was undertaken as part of the NIA for MOD9, with the outcome demonstrating that no private landholdings have more than 25% of the land area predicted to exceed VLAMP criteria in any time period. As no significant change to noise impacts are predicted as a result of MOD 10, no further private land assessment has been undertaken.

5.3 Maximum noise level assessment

Potential sleep disturbance impact was assessed from impact noise generated by material falling onto the grizzly feeder. A sound power of L_{max}/L_{Amax} 136/130 dB was modelled at the ROM facilities to represent an impact event.

Assessment of sleep disturbance involved modelling the impact noise at the ROM facilities and adding the result to the other operational noise sources for MOD 10 to obtain an estimate of possible short-term maximum noise emissions.

Sleep disturbance model predictions are less than the relevant $L_{A1,1minute}$ criterion prescribed in PA 08_0102 (and reproduced in Section 3.1.2) for all receptors. As such, there is no sleep disturbance impact predicted. As the grizzly feeder is underground in the ROM pad the new ROM configuration may reduce the potential of sleep disturbance impacts compared to the current configuration.

5.4 Low frequency noise assessment

Low frequency noise modifying factor adjustment applicability was quantitively assessed using one-third octave sound power inputs in order to obtain one-third octave model predictions. Predicted one-third octave LAeq spectra for each of the prevailing meteorological conditions were evaluated directly against NPfI low frequency noise thresholds.

All results were below NPfI thresholds for privately owned receptors, meaning low frequency noise modifying factor adjustment applicability is not predicted.

5.5 Cumulative noise assessment

Cumulative noise levels for RCM and other neighbouring industrial sources have been assessed in the Rixs Creek South NIA and the RCN MOD9 NIA. The result of these assessments was that cumulative noise impacts from the combined operations and other neighbouring industrial sources were in compliance with cumulative criteria in PA 08_0102.

MOD 10 includes no proposed changes to the open cut operation and the modified development is predicted to result in no significant increase in noise levels. As noise levels will be managed to comply with approved intrusive noise criteria, compliance with cumulative noise criteria in PA 08_0102 should continue.

6 Noise management

Procedures for the management and monitoring of noise are outlined in the Rix's Creek Mine Noise Management Plan (NMP). RCM operates a comprehensive noise management system on site that uses a combination of predictive meteorological forecasting and attended noise management monitoring to guide the day-to-day planning of exploration activities and mining operations, and the implementation of both proactive and reactive noise mitigation measures.

Section 4.4 of this report details mitigation measures that have been considered in the design of MOD 10 infrastructure and are included in noise predictions. The NMP will be updated to reflect any changes to the relevant conditions resulting from this application and will include updated management measures if required to ensure all commitments are implemented, and monitoring is undertaken as required to maintain compliance with approved noise criteria. Throughout the life of the mine, alternative noise controls and management strategies may be implemented to ensure ongoing compliance with approved noise criteria.

Noise predictions of MOD 10 upgrades show that minor exceedances of up to 1dB are only predicted when existing site operations are already at site limits and only during periods of meteorological enhancement. Operational noise levels should be continued to be managed using measures detailed in Section 7 of the RCM NMP.

7 Conclusion

This NIA has considered the potential noise impacts associated with the PA 08_0102 MOD 10. The assessment was completed in accordance with relevant NSW guidelines and policies, including the NPfI.

This NIA demonstrates that RCN should be able to continue to operate in accordance with approved noise criteria set out in PA 08_0102, provided adequate noise management and mitigation controls (currently in place at RCN) are implemented during periods of noise enhancing meteorological conditions.

Proposed ROM and CHPP upgrades are predicted to increase noise levels by up to 1 dB during periods of noise enhancing meteorological conditions assuming that RCN is already operating at noise limits. Whilst noise will be managed within the existing noise criteria under PA 08_0102, the noise from the MOD 10 changes are unlikely to be noticed by surrounding residents. As the grizzly feeder is underground in the ROM pad, the new ROM configuration may reduce the potential of sleep disturbance impacts compared to the current configuration.

The in-pit crusher proposed in MOD 10 is not expected to contribute to offsite noise levels assuming it operates in the Falbrook or Camberwell pit below a level of RL15.

Existing noise mitigation controls in place at RCM are suitable to manage environmental noise impact and should typically only be required during periods of meteorological enhancement. It is recommended these be applied based on information obtained from internal attended monitoring and application of the RCM Trigger Action Response Plan.

It is recommended that RCM should continue to manage noise emission to maintain compliance in the same manner as it currently employs.

Appendix A
Glossary

EMM
creating opportunities

A.1 Glossary

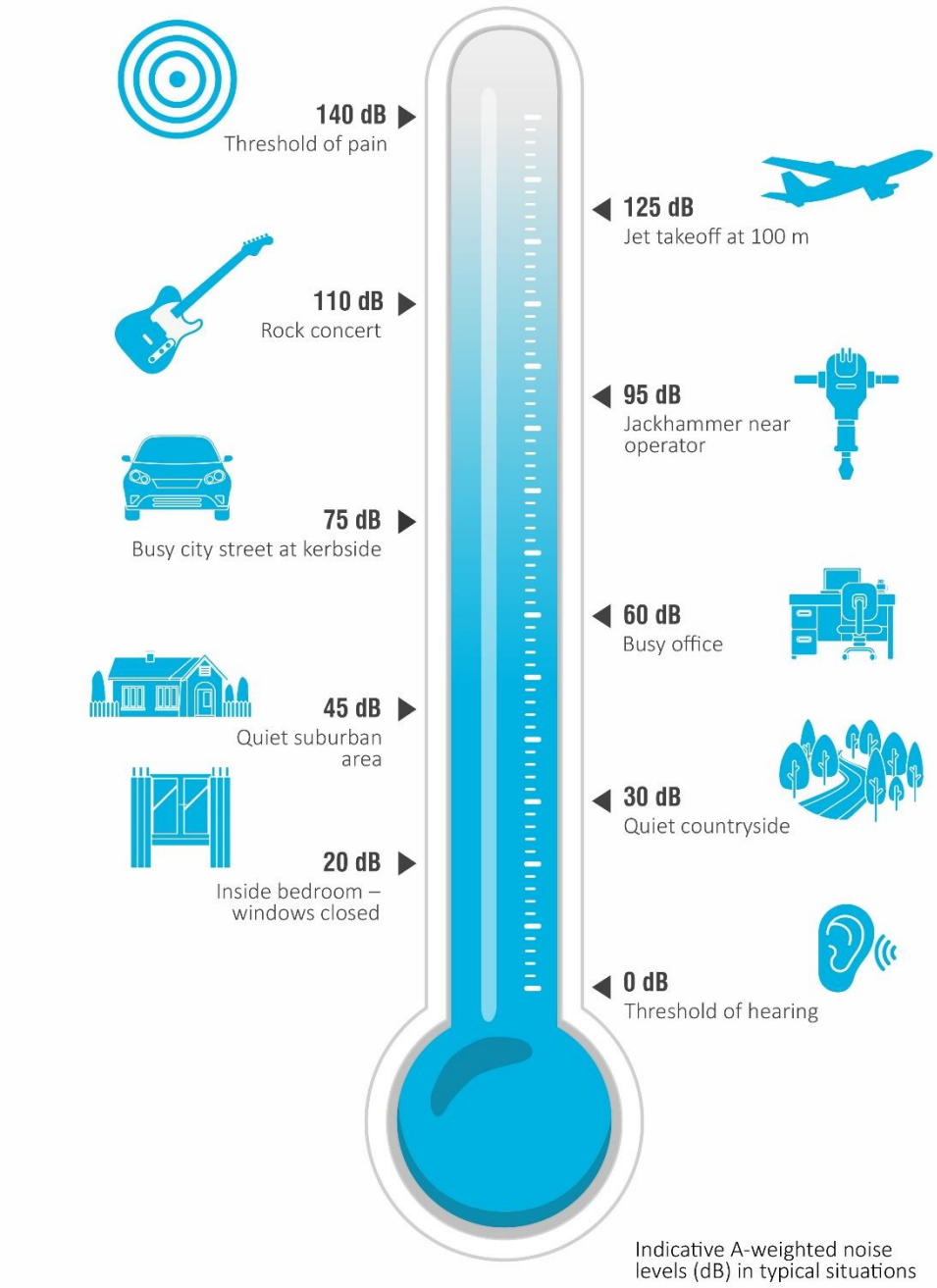
Table 7.1 Glossary of acoustic terms

Term	Description
dB	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
L_{A1}	The 'A-weighted' noise level which is exceeded 1% of the time.
L_{A10}	The 'A-weighted' noise level which is exceeded 10% of the time.
L_{A90}	Commonly referred to as the background noise level. The 'A-weighted' noise level exceeded 90% of the time.
L_{Aeq}	The energy average noise from a source. This is the equivalent continuous 'A-weighted' sound pressure level over a given period.
$L_{Aeq,15minute}$	This is the equivalent continuous 'A-weighted' sound pressure level over a 15-minute period. The $L_{Aeq,15min}$ descriptor refers to an L_{Aeq} noise level measured over a 15-minute period.
L_{Amin}	The minimum 'A-weighted' noise level received during a measuring interval.
L_{Amax}	The maximum root mean squared 'A-weighted' sound pressure level (or maximum noise level) received during a measuring interval.
L_{Ceq}	This is the equivalent continuous 'C-weighted' sound pressure level over a given period. The $L_{Ceq,15min}$ descriptor refers to an L_{Ceq} noise level measured over a 15-minute period. C-weighting can be used to measure low frequency noise.
Day period	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 9 am to 6 pm at a sensitive place and 7 am to 6 pm at a commercial place.
Evening period	All days: 6 pm to 10 pm.
Night period	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 9 am at a sensitive place and 10 pm to 7 am at a commercial place.

It is useful to have an appreciation of decibels (dB), the unit of noise measurement. Table 7.2 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure 7.1.

Table 7.2 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times (or quarter) as loud



Source: Noise Measurement Manual (Department of Environment and Heritage Protection 2013).

Figure 7.1 Common noise levels

Appendix B

Proposed MOD 10 upgrades

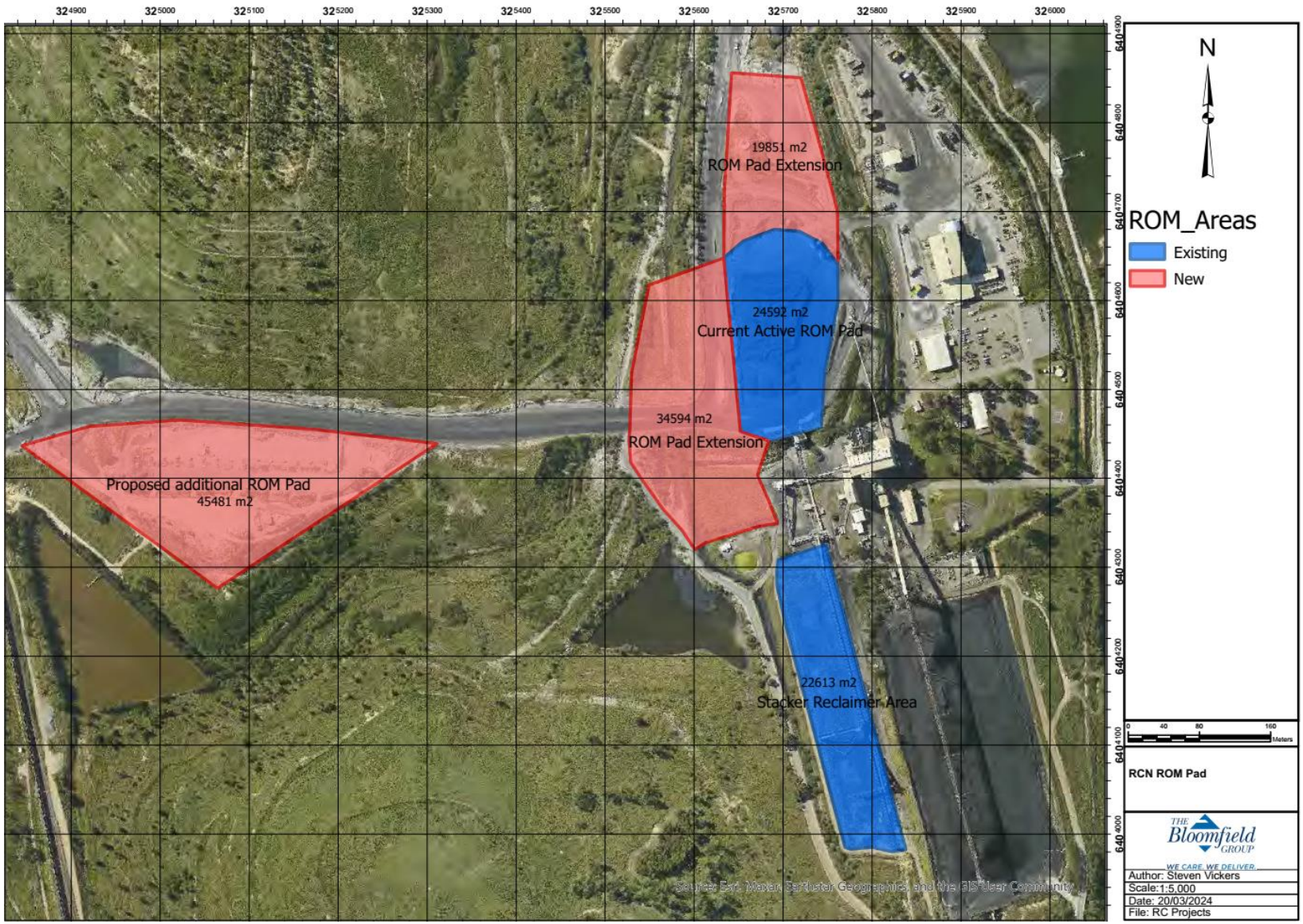


Figure 7.2 Proposed extended and additional ROM areas

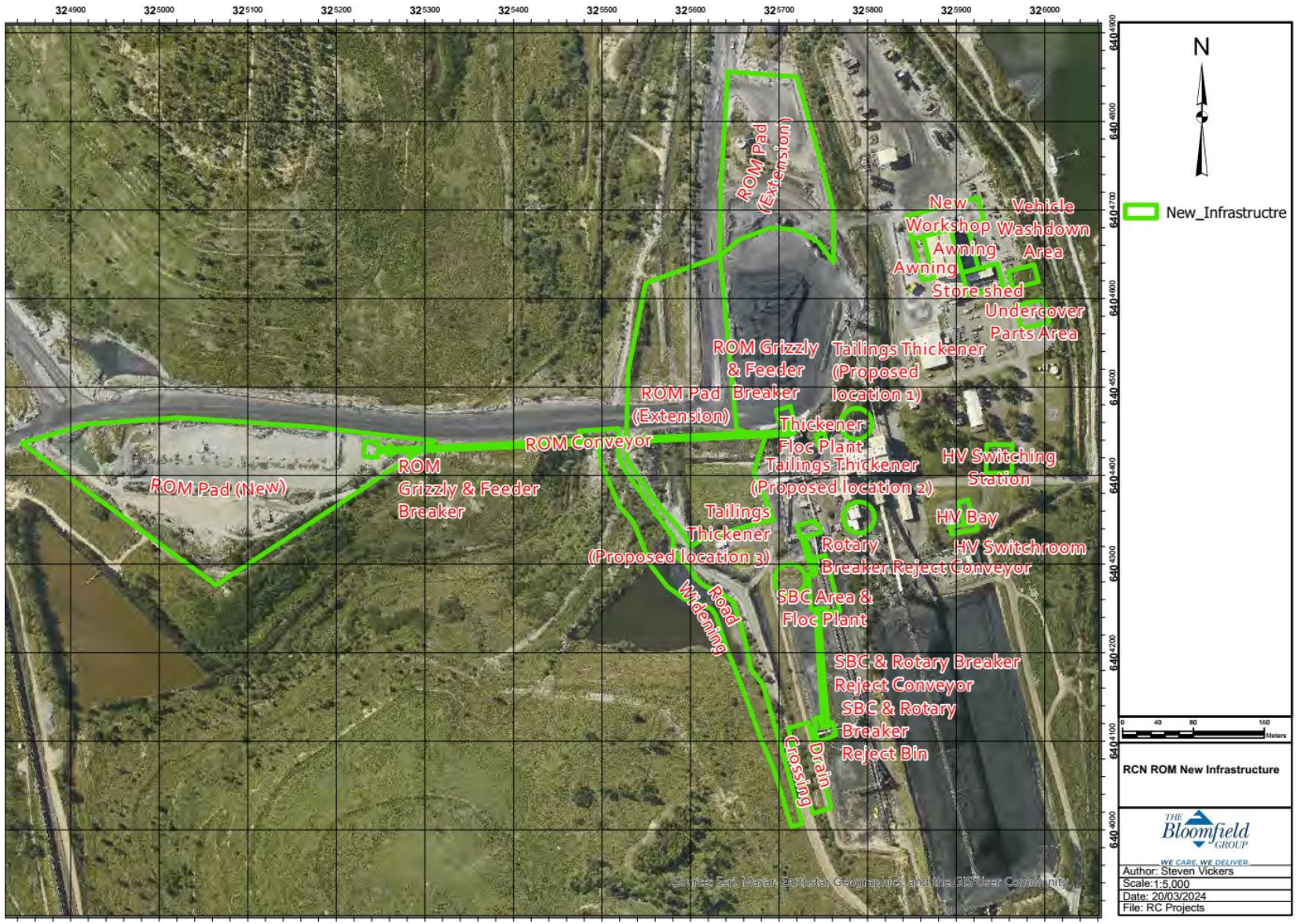


Figure 7.3 **Proposed extended and additional ROM areas**

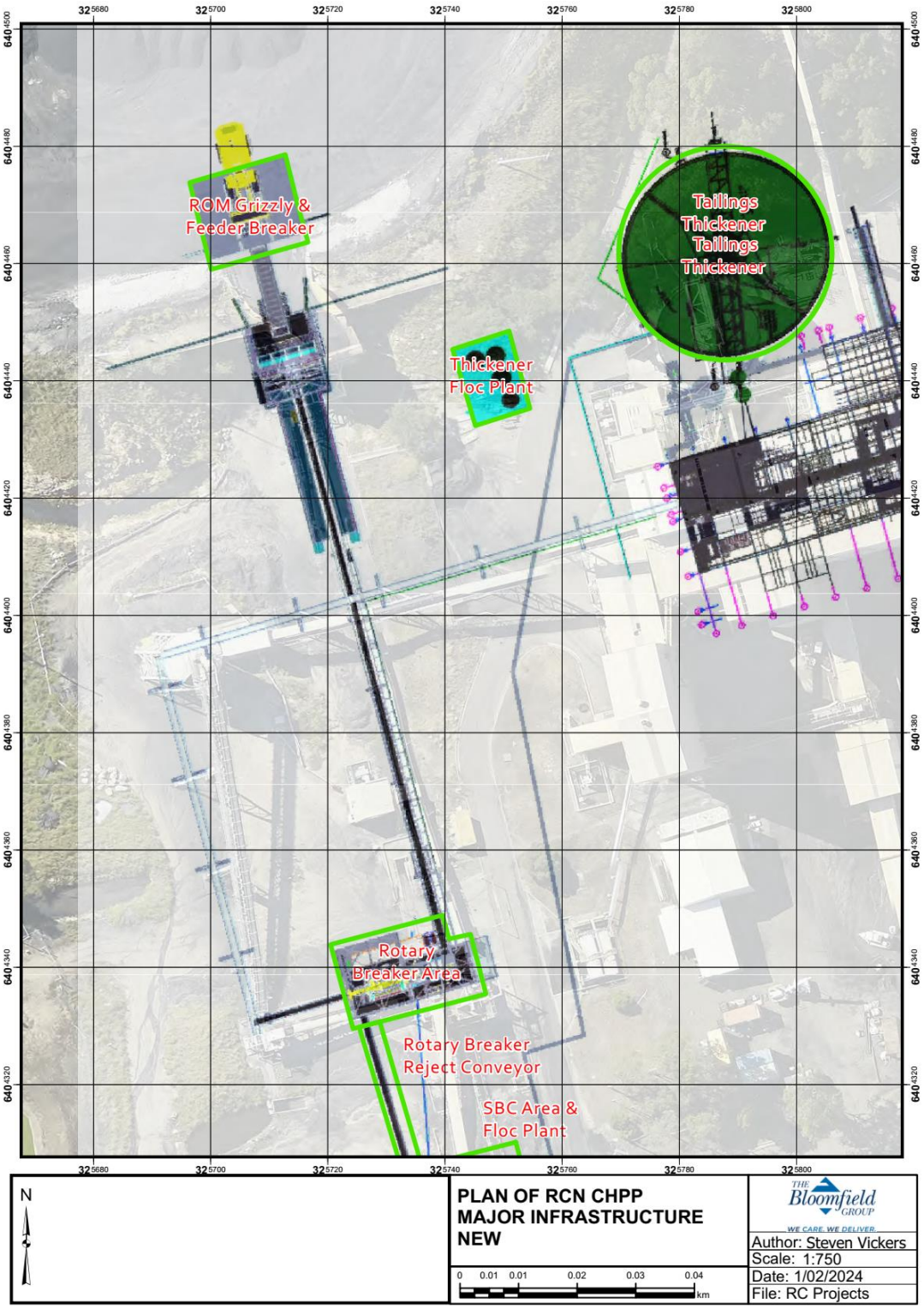


Figure 7.4 RCN ROM and CHPP upgrades

Australia

SYDNEY
Ground floor 20 Chandos Street
St Leonards NSW 2065
T 02 9493 9500

NEWCASTLE
Level 3 175 Scott Street
Newcastle NSW 2300
T 02 4907 4800

BRISBANE
Level 1 87 Wickham Terrace
Spring Hill QLD 4000
T 07 3648 1200

CANBERRA
Level 2 Suite 2.04
15 London Circuit
Canberra City ACT 2601

ADELAIDE
Level 4 74 Pirie Street
Adelaide SA 5000
T 08 8232 2253

MELBOURNE
Suite 8.03 Level 8 454 Collins Street
Melbourne VIC 3000
T 03 9993 1900

PERTH
Suite 9.02 Level 9 109 St Georges Terrace
Perth WA 6000

Canada

TORONTO
2345 Younge Street Suite 300
Toronto ON M4P 2E5

VANCOUVER
60 W 6th Ave Suite 200
Vancouver BC V5Y 1K1

linkedin.com/company/emm-consulting-pty-limited

emmconsulting.com.au

APPENDIX C

SURFACE WATER ASSESSMENT

Rix's Creek North Mine – Modification 10

Surface Water Assessment

Bloomfield Collieries Pty Ltd

Doc. Ref.: RCM-001-B3

Date: 31 May 2024

Rev. No.	Doc Ref.	Report Date	Report Author	Reviewer
3	RCM-001-B	31 May 2024	MB	AH

For and on behalf of **HydroBalance**
Environmental and Mine Water Management Solutions

Matthew Briody
Principal Engineer

HydroBalance
Environmental and Mine Water Management Solutions
HydroBalance.au

Matthew Briody (Principal Engineer) E: Matt@HydroBalance.au M: 04 0614 4514
Ashleigh Hackett (Senior Engineer) E: Ashleigh@HydroBalance.au M: 04 6699 2924

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1 Introduction

1.1 Background

The Bloomfield Group (Bloomfield) operates the Rix's Creek Coal Mine (RCM). RCM is located on the northwestern side of Singleton in the Hunter Valley Coalfields of NSW and is intersected by the New England Highway. RCM is the collective name for Rix's Creek North (RCN) (previously known as the Integra Open Cut and/or the Camberwell Open Cut) and Rix's Creek South (RCS) (the original Rix's Creek Mine). Figure 1.1 illustrates the regional locality of the RCM.

RCN currently operates under PA 08_0102 which permits Bloomfield to conduct open cut mining operations until 31 December 2035. The approved operations at RCN are summarised in Section 2.

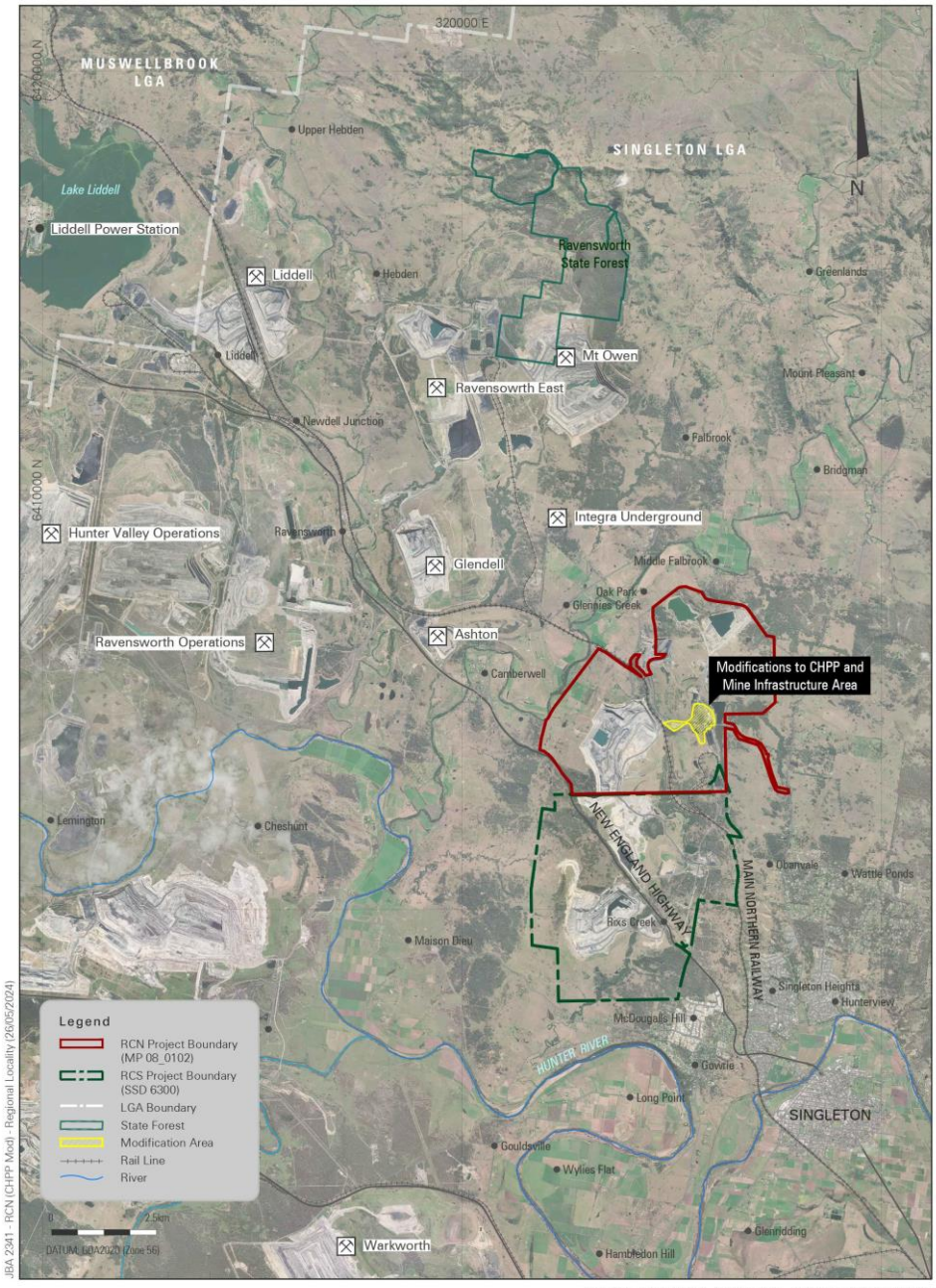
1.2 Description of Modification

Bloomfield is proposing to prepare an application to modify PA 08_0102 (MOD 10 or the Modification) to facilitate the following activities:

- Coal handling and process changes; including installation of new processing equipment on the ROM stockpile areas and RCN CHPP;
- Additional ROM coal stockpiles to provide additional stockpiling capacity within the approved area of disturbance at RCN;
- Upgrade to the RCN CHPP to include tailings dewatering facilities and thickener capacity to enable the co-disposal of partially dried tailings materials with overburden within the mining area;
- Workshop extension;
- In pit crusher for the processing of rock materials for internal road base and other onsite purposes;
- Substation replacement and installation of a switching station;
- Disposal of heavy vehicle waste tyres in-pit; and
- Administrative changes to conditions of MP 08_0102 which have minimal environmental impacts.

No changes are proposed to the currently approved mining operations, including mining and processing rates, mining methods and disturbance areas. The proposed activities will be undertaken entirely within the previously approved disturbance areas. The activities proposed by the Modification are described further in Section 4.

HydroBalance was commissioned by Bloomfield to undertake a surface water impact assessment for the Modification. The surface water impact assessment will form part of the Modification application.



RIXS CREEK NORTH MODIFICATION

Regional Locality

FIGURE 1

Figure 1.1 – Regional locality (JBA, 2023)

1.3 Report structure

This report is structured as follows:

- Section 2 describes the approved operations at RCN.
- Section 3 describes the existing surface water environment including the regional and local drainage characteristics.
- Section 4 describes the proposed changes to the RCN water management system as part of the Modification.
- Section 5 describes the potential impacts of the proposed Modification on surface water resources, and proposed mitigation and management measures.
- Section 6 provides a summary of the surface water assessment outcomes and conclusions.
- Section 7 provides a list of references.

2 Description of approved operations

RCN currently operates pursuant to PA 08_0102 (modified on nine occasions to date) which allows for the following operations:

- Coal extraction of up to 6.0 Mtpa of Run of Mine (ROM) coal, of which:
  - 1.5 Mtpa from the Falbrook Pit;
  - 4.5 Mtpa from the Camberwell Pit;
- Extension of the South Pit (Camberwell Pit) using open cut mining methods via:
  - Shovel and excavator methods down to the base of the Hebden Seam;
  - Additional ROM coal production through highwall or auger mining methods;
- Emplacement of overburden:
  - Within the Camberwell and Falbrook Pits;
  - An overburden emplacement area (OEA) adjacent to the Falbrook Pit;
- Coal Handling including:
  - Processing of ROM coal using the RCN CHPP;
  - Receival of and processing ROM coal from the Integra Underground using the RCN CHPP;
  - Transport of coal from RCN to RCS for processing at the RCS CHPP and rail transport (MOD 5);
  - Receival of coal for processing and rail transport from RCS (MOD 5);
  - Receival of up to 5 Million bank cubic metres (Mbcm) per annum from RCS (MOD 7);
  - Rail transportation of up to 7.3 Mtpa of product coal from the site;
- Waste management; and
- Ancillary activities associated with coal mining.

The conceptual development layout of PA 08_0102 is presented in Figure 2.1.

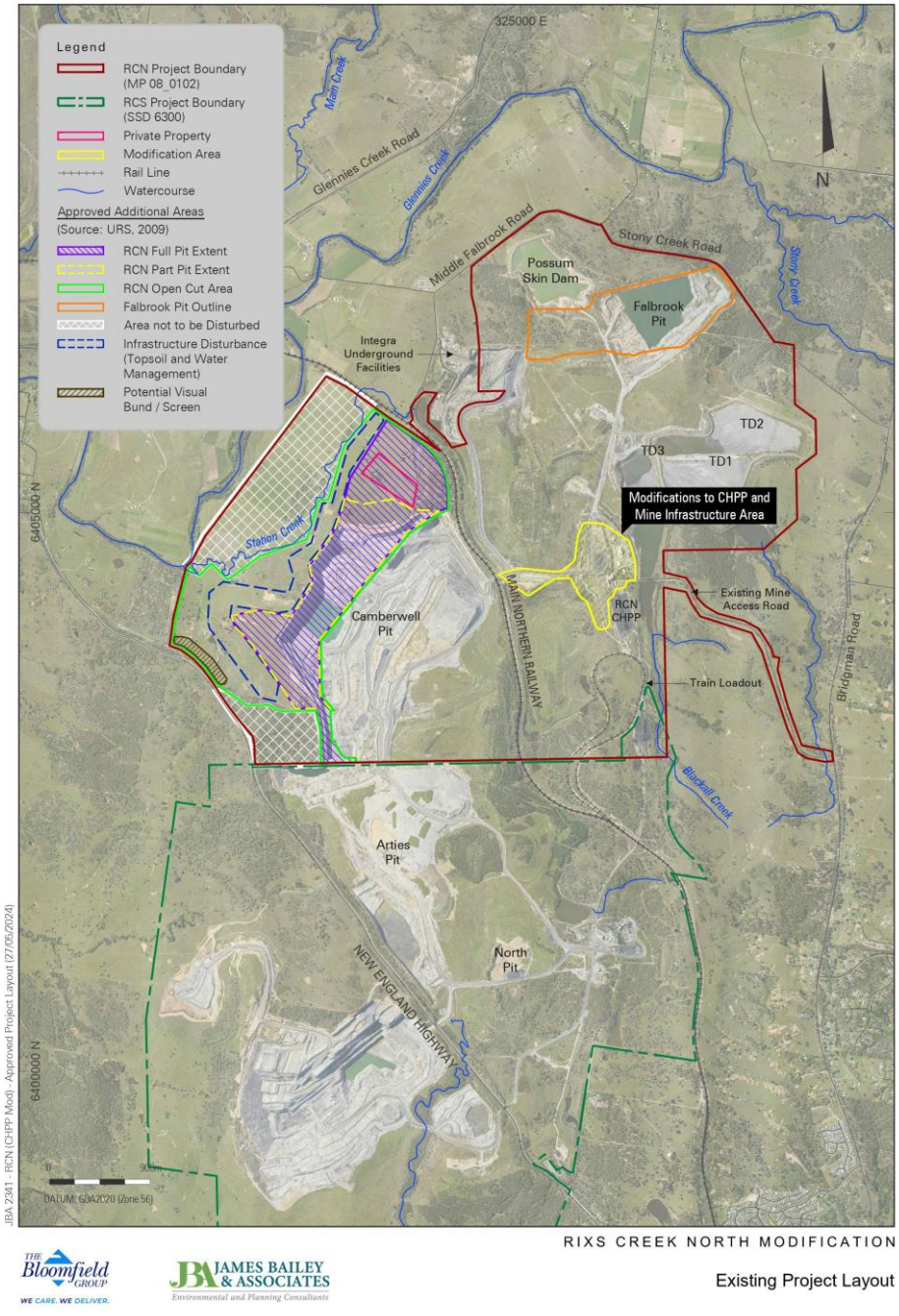


Figure 2.1 – Rix's Creek North approved development layout (JBA, 2023)

3 Existing surface water environment

3.1 Climate

Long term average daily rainfall and evaporation data for RCN was obtained from the SILO database (Jeffrey, et al., 2001) for the period January 1889 to January 2024 (135 years). Average monthly rainfall and evaporation are shown in Figure 3.1.

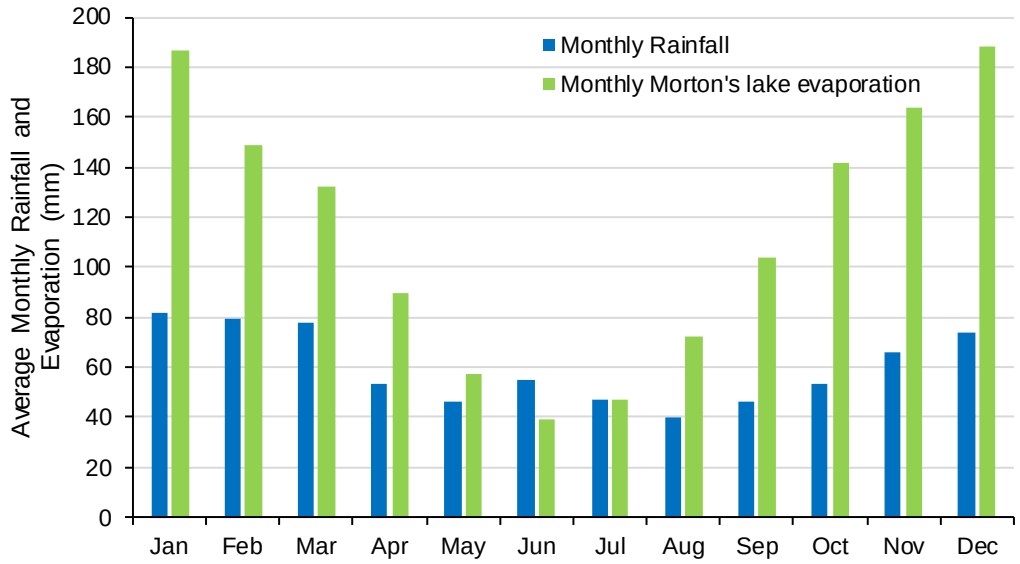


Figure 3.1 – Average Monthly Rainfall and Evaporation from SILO Database

3.2 Regional drainage network

RCM is located within the Glennies Creek catchment, a tributary of the Hunter River. The total catchment area of Glennies Creek to its confluence with the Hunter River is approximately 512 km^2. The regional drainage network is shown in Figure 3.2.

Flows along Glennies Creek adjacent to RCN are regulated by Glennies Creek Dam, which captures surface runoff from the catchment area of around 225 km^2. The Glennies Creek catchment has been extensively cleared of native vegetation. Current land uses with the catchment include grazing, cropping, mining and nature conservation.

3.3 Local drainage network

The local drainage network in and adjacent to RCM is shown in Figure 3.3. Prior to mining, the majority of RCN is drained by Station Creek and two of its tributaries, Martins Creek and Blackwall Creek, with some areas near the northern boundary of RCN draining directly to Glennies Creek via a number of small, unnamed tributaries.

A small area also drained to Stony Creek, a tributary of Reedy Creek, which joins Glennies Creek to the north of the RCN.

3.4 Surface water quality

Water quality sampling is undertaken at RCN in the upstream and downstream reaches of the local waterways in accordance with the EPL, which requires the monitoring of selected waterways for pH, Electrical Conductivity (EC), Total Suspended Solids (TSS) and Total Dissolved Solids (TDS).

Five of the water quality monitoring points are located upstream of the site, to inform the baseline water quality. Two of the water quality monitoring points are located adjacent to or downstream of the site, to determine any potential impacts from operations.

The upstream waterway monitoring sites are:

- W1 – Station Creek
- W3 – Martins Creek
- W4 – Glennies Creek (upstream of the Station Creek confluence)
- W6 – Blackwattle Creek
- W7 – Stony Creek (where it crosses Stony Creek Road)

The downstream waterway monitoring sites are:

- W5 – Glennies Creek (downstream of the Station Creek confluence)
- W11 – Glennies Creek (downstream at Camberwell where it crosses the New England Highway)

The locations of the RCN water quality monitoring points are shown in Figure 3.3. A summary of the RCN water quality data collected between 2012 and 2024 is presented in Table 3.1. This table shows that there is not a discernible difference between the upstream and downstream water quality over the long-term dataset, indicating that RCN has not historically had a significant impact on the receiving water quality.

Table 3.1 – Local RCN receiving water quality

Monitoring location	Statistic	Water quality parameter			
		EC (µS/cm)	pH	TSS (mg/L)	TDS (mg/L)
Upstream locations					
W1	No. samples	113	113	113	113
	20th percentile	560	7.2	8	412
	Median	1,063	7.6	16	652
	80th percentile	5,754	8.4	49	3,478
W3	No. samples	97	97	97	97
	20th percentile	155	6.5	27.6	325
	Median	241	6.7	48	608
	80th percentile	355	7.0	146	899
W4	No. samples	137	137	137	137
	20th percentile	276	7.6	5	172
	Median	369	7.7	8	225
	80th percentile	531	7.9	13	305
W6	No. samples	78	78	78	78
	20th percentile	1,513	7.4	7	942
	Median	7,010	7.6	16	4,285
	80th percentile	10,460	8.1	45.2	6,984
W7	No. samples	108	108	108	108
	20th percentile	140	6.6	8	157
	Median	256	6.8	14	222
	80th percentile	455	7.1	33	322
Downstream locations					
W5	No. samples	134	134	134	134
	20th percentile	272	7.6	5	182
	Median	392.5	7.8	9	231
	80th percentile	562	8	16	322
W11	No. samples	137	137	137	137
	20th percentile	287.2	7.7	5	179
	Median	404	7.8	8	242
	80th percentile	580	8	13	347

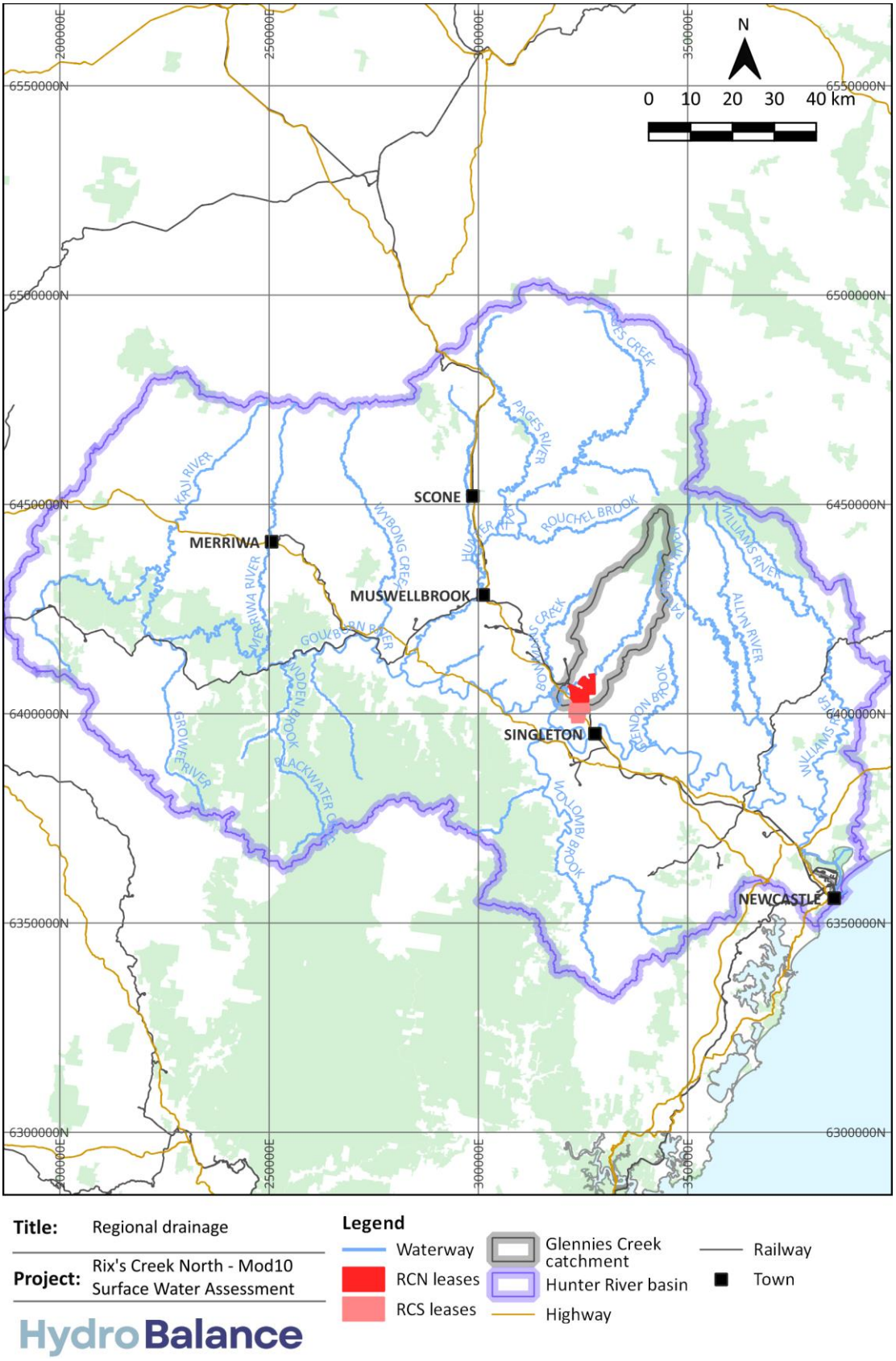


Figure 3.2 – Regional drainage network

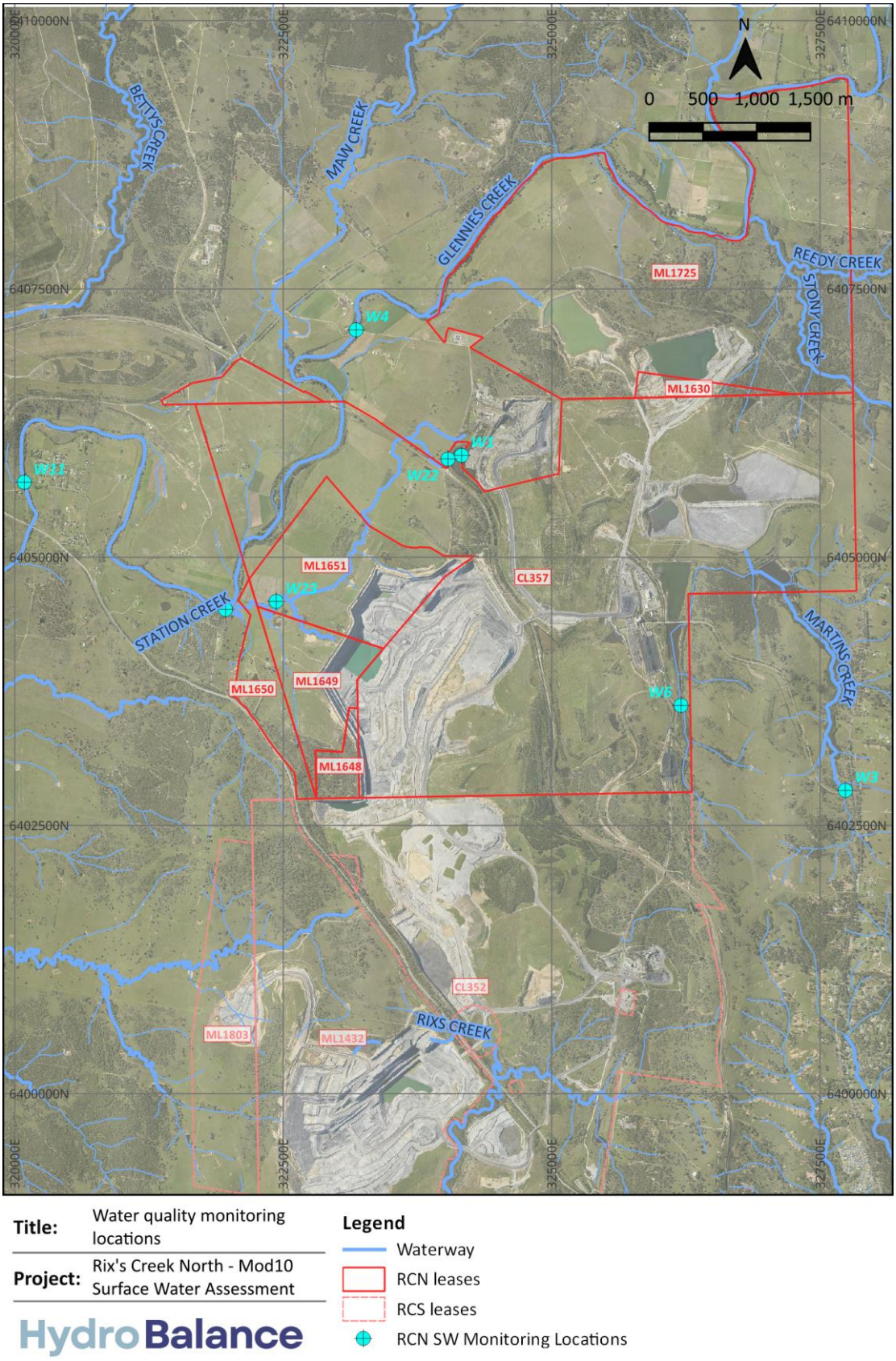


Figure 3.3 – Waterway monitoring locations

4 Proposed changes due to Modification

The proposed modification includes the following elements (see Figure 4.1):

- Coal handling and process changes; including installation of new processing equipment on the ROM stockpiles areas and CHPP;
- Additional ROM stockpiles to provide additional stockpiling capacity within the approved area of disturbance at RCN;
- CHPP to be upgraded to include tailings dewatering facilities and an upgrade to the capacity of the thickener to enable the co-disposal of partially dried tailings materials with overburden;
- Workshop extension;
- In pit crusher for the processing of rock materials for internal road base and other onsite purposes; and
- Substation replacement and switching station.

The key elements relevant to potential surface water impacts are related to:

- Changes in disturbance areas associated with new works; and
- Impact of the changes to the management of tailings materials with the inclusion of dewatering facilities on the overall site water balance.

Details of these changes to the surface water management system are provided in the following sections.

4.1 Change in disturbance areas

4.1.1 CHPP handling and processing

The following changes are proposed to the CHPP process:

- Two ROM pad in-ground hoppers including two grizzly and feeder-breakers – to reduce oversize blockages (noting that only one feeder-breaker would be operational at any one time);
- Double deck wet screen – to reduce fine/clay blockages;
- Rotary breaker after wet screen – for the early removal of reject material;
- Conveyors – to convey the material from the centre of the ROM pad to the ROM hopper and for the removal of breaker reject; and
- Removal of existing primary, secondary and tertiary sizers.

These activities are located within the approved mine disturbance footprint, and runoff from these areas will continue to be captured within the existing surface water management system.

4.1.2 ROM coal stockpiles

As part of the Modification, further ROM coal areas are proposed:

- An extension of the existing northern ROM pad to the north, west and south west (by approximately 5.44 ha); and
- A new ROM pad west of the CHPP on the existing western haul road (approximately 4.55 ha).

The northern ROM pad extension (ID 26 on Figure 4.1) is located within the existing approved mine disturbance area, and runoff from the stockpile areas will continue to be captured within the existing mine water management system (via D1).

The new ROM coal pad west of the CHPP is located within the existing park-up area to the south of the haul. Runoff from this catchment (including the adjacent haul road) currently drains to a dirty water dam located at the western extent of the park-up area, south of the haul road.

The dirty water dam located in the north-west corner of the new western ROM pad area is planned to be upgraded to capture runoff from the 1% AEP 24-hour storm event and will capture coal contact runoff from the new ROM pad and the adjacent haul road. This captured water will then be returned to the mine water management system via pump and pipeline.

There is no change in dirty/clean water catchment areas associated with the expansion of the ROM coal stockpiles.

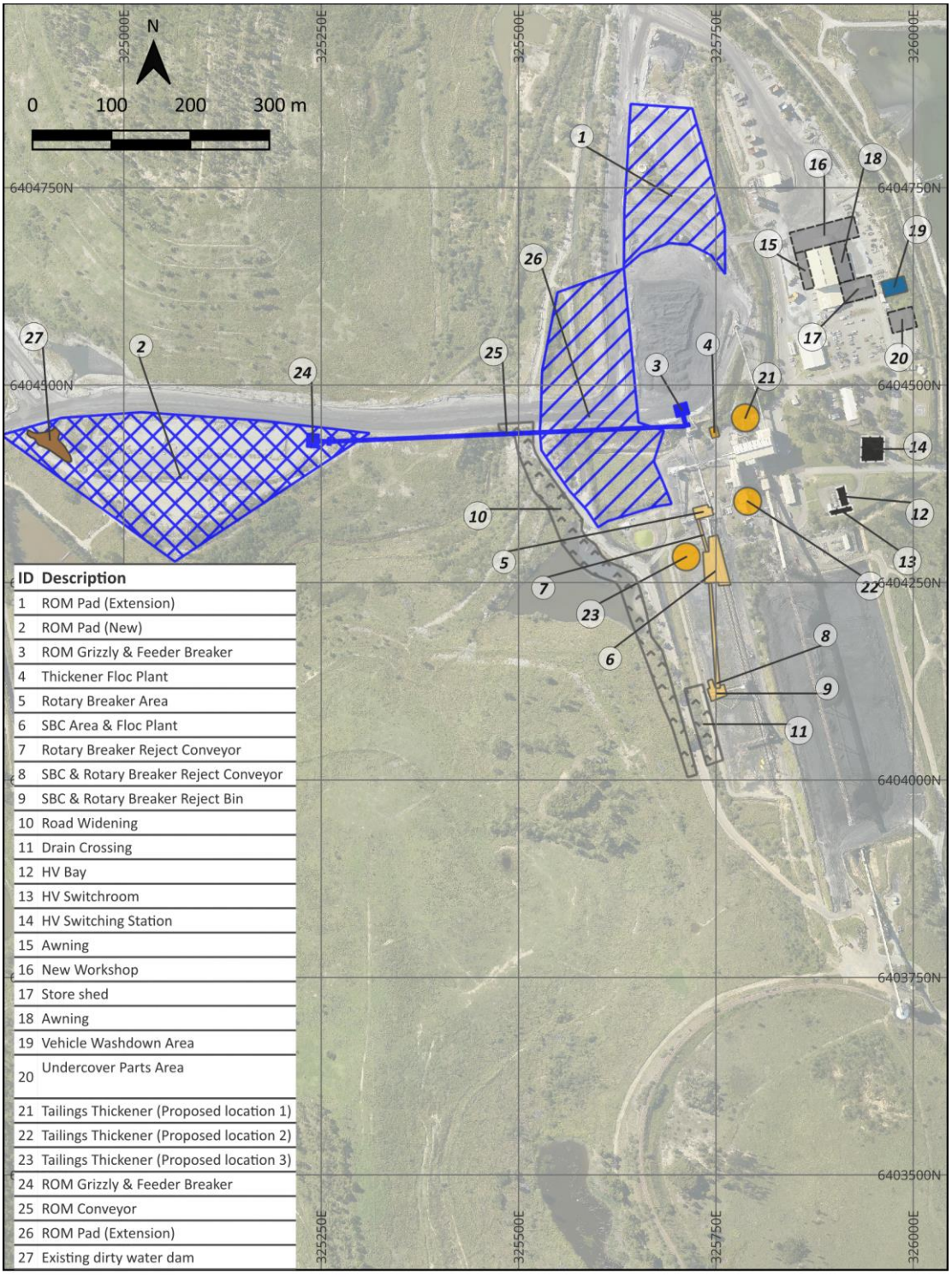


Figure 4.1 – Modification 10 proposed infrastructure

4.1.3 RCN Workshop extension

Bloomfield is proposing an extension of the existing workshop, which is entirely located within the approved mine disturbance footprint (i.e. no additional disturbance from that approved). Runoff from the workshop extension will be contained within the existing workshop water management system which includes an oil/water separator.

4.1.4 Mobile rock crushing plant

Bloomfield is proposing to utilise a mobile rock crushing facility to process rock materials encountered during mining operations to various size fractions for use on the site. Crushed rock will be reused onsite in activities such as the construction of haul roads, hardstand areas or in mine rehabilitation areas for armouring drainage lines or sections of the final landform design.

The mobile rock crushing facility will be operated at various locations within the approved mine disturbance footprint (i.e. no additional disturbance from that approved). Dust suppression water will be delivered by watercart and stored within water storage tanks for use during operation. Runoff will be contained within the mine water management system.

4.1.5 Substation replacement and proposed switching station

Bloomfield is proposing to replace the existing substation, hardstand substation and install a new switching station. These works will be located within the approved mine disturbance footprint.

4.2 Changes to the CHPP tailings dewatering facilities

The existing RCN CHPP circuit is summarised in Figure 4.2. ROM coal is processed by the CHPP, with coarse rejects buried in the site spoil dumps and fine tailings deposited within the tailings dams as a slurry. Key water losses from the tailing's dams include evaporation from the decant water pond and moisture entrainment in the consolidated tailings. The remaining water collected in the decant ponds would be returned to the CHPP circuit, for process water makeup.

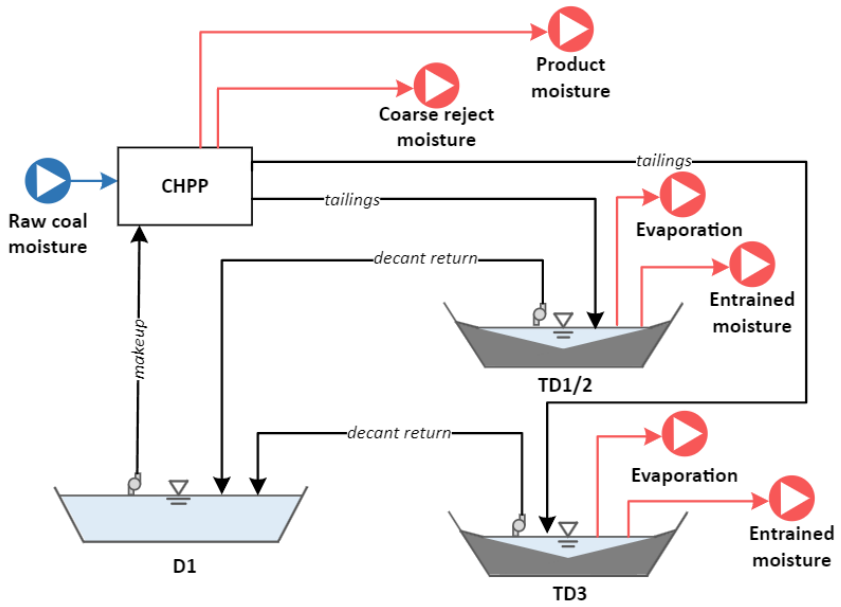


Figure 4.2 – Existing RCN CHPP circuit

The following process changes are proposed for the RCN CHPP:

- Upgrade to the ROM coal handling and feed to the CHPP through the installation of in-ground hoppers at the existing ROM bin and proposed western ROM coal stockpile, each with grizzly and feeder-breakers and an overland conveyor system for the western ROM coal stockpile feeding crushed coal into the existing ROM hopper. The existing sizers below the ROM bin will no longer be required and removed; and
- Improvement to tailings dewatering using a new thickener (35 m in diameter and removal of the existing 18 m diameter), floc batching plant, Tailings Dewatering Plant, and conveyor system to a new reject bin.

These process changes will allow the RCN CHPP to treat coarse and fine reject materials to enable the disposal within the mining voids rather than the ongoing generation of tailings materials to be disposed in tailings dams.

The proposed CHPP circuit configuration is summarised in Figure 4.3.

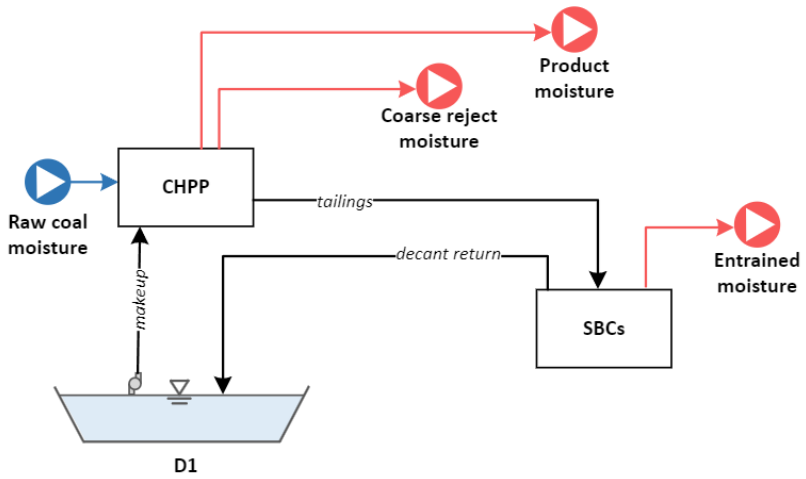


Figure 4.3 – Proposed RCN CHPP circuit

The change in tailings management strategy is expected to have a minor impact on the overall CHPP/tailings water balance. Bloomfield have advised that the moisture content of the dewatered rejects stream will be generally consistent with the consolidated moisture contents of the in-situ tailings material, at around 35% w/w. As such, the loss of moisture through entrainment in the consolidated fine tailings /dewatered rejects will be approximately the same for both options.

The key difference in water consumption as a result of the Modification will be the reduction in evaporative losses from the surface of the tailings dam decant pond. It is estimated that approximately 185 ML/year of evaporation currently occurs from the surface of the decant pond. This is based on a decant pond surface area of 13.5 ha, with a long-term average annual lake evaporation of 1,371 mm/year.

The reduction in evaporative losses will have an impact on the net water makeup water for the CHPP/tailings circuit, with a net reduction in water consumption of around 185 ML/a. In effect, this means that there may be, on average, up to 185 ML/a of additional water to manage within the mine water management system, which would have otherwise been evaporated from the tailings dams.

5 Assessment of potential impacts, and mitigation and management measures

5.1 Potential impacts

The potential impacts of the Modification on surface water resources include:

- impacts on stream flows due to catchment area excision (due to capture of runoff within onsite storages);
- impacts on downstream water quality;
- impact on the site water balance, and potential excess water generation.

An assessment of each of these potential impacts of the Modification is provided in the following sections.

5.2 Stream flow impacts

The proposed upgrade works are all located within existing mine disturbance areas (i.e. captured within the mine water management system or sediment dams)and will not have any impact on downstream stream flows. As such, there will be no loss of catchment flows in any receiving waters as a result of the Modification.

5.3 Water quality impacts

No additional offsite release of mine-affected or sediment laden water are expected to occur due to the Modification. Therefore, the potential impact to receiving water quality due to the Modification would be negligible.

5.4 Impact on site water balance

The changes to the site water balance as a result of the Modification are discussed in Section 4.2, and could potentially result in a reduction in water usage of around 185 ML/a. In effect, this means that there may potentially be up to185 ML/a of additional water to manage within the mine water management system which would have otherwise been stored or handled within the tailings dams.

Bloomfield is proposing a number of mitigation measures to offset the projected net decrease in water loss. These are discussed in the following sections.

5.4.1 Evaporator technology

In 2023, Bloomfield commissioned a consultant to investigate the technical feasibility of reinstating evaporator technology (as is currently approved for RCN) to manage excess water and reduce current water inventories. This study (Bloomfield, 2023c) developed a conceptual design for a fan evaporator network that had the capacity to lose around 3,000 ML/a, with the ability to scale up to around 7,000 ML/a.

Reinstating an evaporator network with a net loss of 3,000 ML/a would be more than sufficient to mitigate the reduction in losses associated with the proposed CHPP upgrade works.

5.4.2 Greater Ravensworth Area Water and Tailings Strategy (GRAWTS)

Glencore own and operate a number of coal mines in the Greater Ravensworth area, including Ravensworth, Mt Owen Complex, Liddell and Integra Underground. The Greater Ravensworth Water and Tailings Strategy (GRAWTS) was developed in 2014 to allow for the transfer of water and tailings between each of their operations, as well as neighbouring operations.

Bloomfield and Glencore have agreement to enable the transfer of water from RCM into the GRAWTS. The transfer of surplus water into GRAWTS will reduce regional water abstraction and improve local storage capacities at RCM.

RCN holds approvals to transfer water to Integra which forms part of the GRAWTS. In addition, RCM has installed the required monitoring infrastructure to record all water transfers into the GRAWTS.

The volume of water able to be transferred into the GRAWTS is more than sufficient to mitigate the addition water to be recycled as a result of the proposed CHPP upgrade works.

Alternatively, water can also be pumped to the neighbouring Ashton Coal mine (subject to an agreement), if required.

6 Conclusions

This report assesses the potential surface water impacts of the proposed Modification. The assessment has concluded the following:

- The potential impact of the Modification on stream flows in the receiving waters would be negligible.
- The potential impact of the Modification on receiving water quality would negligible.
- The changes to the tailings dewatering and disposal strategy may result in a potential reduction in site water usage of around 185 ML/a (i.e. there may be up to 185 ML/a of additional water to manage within the mine water management system).
- The proposed mitigation measures (reinstating evaporator technology and the (approved) ability to transfer water into the GRAWTS) is more than sufficient mitigate the reduction in losses associated with the proposed CHPP upgrade works.

Therefore, it is our view that the Modification will have negligible or no residual impacts on surface water resources.

7 References

Bloomfield, 2021	*Rix's Creek Mine Water Management Plan*, The Bloomfield Group, Revision 2.8, May 2021.
Bloomfield, 2023a	*Rix's Creek North Tailings Dewatering Project – Basis of Design*, The Bloomfield Group, Version I, 2 March 2023.
Bloomfield, 2023b	*Rix's Creek Mine – Year Ending March 2023 Annual Review*, The Bloomfield Group, June 2023.
Bloomfield, 2023c	*RCM Water Management – Evaporators Project Update Sep23*, The Bloomfield Group, September 2023.
EPA, 2020	*Environmental Protection Licence 3391: Rix's Creek Mine*, NSW Environment Protection Authority, 15 December 2020.
JBA, 2023	*Rix's Creek North Continuation Project: Scoping Reporting Final*, James Bailey & Associates, August 2023.
Jeffery, et al., 2001	*Using Spatial Interpolation to Construct a Comprehensive Archive of Australian Climate Data*, Environmental Modelling & Software, Vol 16/4, pp 309-300, 2001. (https://www.longpaddock.qld.gov.au/silo/)