NSW GOVERNMENT | Planning & Environment

STATE SIGNIFICANT DEVELOPMENT ASSESSMENT
Rix's Creek Continuation of Mining Project (SSD 6300)

Secretary's Environmental Assessment Report
Section 4.38 of the
Environmental Planning and Assessment Act 1979
May 2018

Cover Photo:
Rix's Creek Mine - Departmental Site Visit, September 2015

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EXECUTIVE SUMMARY

Rix's Creek Mine is an existing open-cut coal mine located 5 kilometres northwest of the township of Singleton in the Singleton local government area. The mine is owned and operated by Bloomfield Collieries Pty Limited (Bloomfield), a subsidiary of The Bloomfield Group, which is a Hunter Valley-based and Australian-owned company.

Mining has occurred in the area since the 1880s and Rix's Creek Mine itself commenced operations in the early 1990s. The mine currently operates under Ministerial development consent DA 49/94 granted on 19 October 1995, which permits the construction and operation of an open cut coal mine until June 2019. Other existing regulatory approvals include an Environment Protection Licence under the *Protection of the Environment Operations Act 1997* (EPL 3391) and two mining leases under the *Mining Act 1992* (CL 352 and ML 1432). Current production rates are approximately 2.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, leading to 1.5 Mtpa of product coal.

To facilitate the ongoing operation of the mine, Bloomfield is seeking approval for the expansion and continuation of mining until 2038. This proposal was originally known as the Rix's Creek Extension Project and is now referred to as the Rix's Creek Continuation of Mining Project (the Project). The original proposal included extending mining in Pit 3 (West Pit) and increasing peak production to 4.5 Mtpa ROM coal to recover an additional 32 million tonnes (Mt) of product coal.

The Project is classified as State significant development under section 4.36 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it triggers the criteria in Clause 5 of Schedule 1 of the *State Environmental Planning Policy (SEPP) (State and Regional Development) 2011,* as it is development for the purposes of coal mining.

The Department publicly exhibited the development application and accompanying Environmental Impact Statement (EIS) for the Project from 3 November 2015 to 3 December 2015. The Department received 140 submissions, including nine from public authorities and 131 from members of the public and special interest groups.

None of the public authorities objected to the Project. Of the public and special interest group submissions received, 85 (approximately 65%) supported the Project, primarily due to its ongoing employment and local economic benefits; 44 (approximately 34%) objected to the Project, primarily due to concerns over potential impacts to air quality, noise, water, biodiversity and climate change; and two submissions provided comments on the Project.

In accordance with section 4.5 of the EP&A Act and clause 8A(1) of *SEPP (State and Regional Development) 2011*, the Independent Planning Commission of NSW (IPCN) is the consent authority and must determine the application, as more than 25 public submissions in the nature of objection were received. Approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is not required because the Project was declared to not be a 'controlled action'.

Bloomfield prepared a response to submissions (RTS) report to address the concerns raised in submissions. In this RTS, Bloomfield also changed aspects of the Project as a result of its December 2015 acquisition of the neighbouring Integra Open Cut Mine (later renamed as Rix's Creek North). With Integra's available infrastructure and coal resources, Bloomfield decided to remove an already approved but unbuilt rail loop and associated loading facility from the Project and reduce the proposed maximum production rate from 4.5 to 3.6 Mtpa ROM coal, to recover 25 Mt of product coal. Bloomfield later provided an Addendum RTS with additional information to address comments from the Department and agencies on the RTS.

During the early stages of its assessment of the Project, the Department identified that the EIS did not provide a comprehensive assessment of proposed disturbance areas, particularly land located to the north of Pit 3. Bloomfield provided additional information in the Addendum RTS to address this matter; however, the Department considered that discrepancies remained between the approved and actual disturbance areas at Rix's Creek Mine. This had implications for the extent of the Project's proposed disturbance areas that required to be assessed. The Department's Compliance team undertook an investigation and the matter was eventually resolved via consent orders in the Land and Environment Court (the Court) in August 2017.

Following the agreed Court orders, Bloomfield provided supplementary impact assessments for the Project and a Revised RTS report that superseded the previous RTS and Addendum RTS.

The Department has carried out a preliminary assessment of the merits of the Project, having regard to its potential environmental, social and economic impacts; relevant statutory obligations; all information provided by Bloomfield; and material submitted both in support and against the Project.

On 12 December 2017, the Minister for Planning asked the Planning Assessment Commission (now the IPCN) to review the merits of the Project, and requested that the Commission hold public hearings during the review. On 1 March 2018, amendments to the EP&A Act commenced, which no longer contain functions for the IPCN to review the merits of an SSD project. However, as the Minster had already requested this review before 1 March 2018 and communicated that request to the Commission, the review must be conducted by the IPCN.

The Department's assessment has focussed on the following matters:

- potential amenity and health impacts on nearby residential receivers, particularly in relation to air quality, noise and blasting impacts;
- potential impacts on surface water catchments, surface water quality and groundwater resources;
- direct and indirect impacts on biodiversity within the proposed disturbance areas;
- establishment of a final landform that integrates with the surrounding natural environment, addresses relevant safety and stability considerations and provides land suitable for beneficial re-use post-mining; and
- social and economic effects to the local community, the region and the State of NSW.

Other issues related to visual amenity, traffic and transport, agriculture, Aboriginal cultural heritage, European heritage, waste and hazards have also been considered in the Department's assessment.

The Department is generally satisfied that the Project represents a reasonable and logical extension to the existing operations of Rix's Creek Mine and acknowledges that Bloomfield has designed the Project to incorporate a range of reasonable and feasible mitigation and management measures to minimise potential environmental, health and amenity impacts. The amendments made in the Revised RTS, including the reduced maximum production rate of 3.6 Mtpa ROM coal, would further reduce these impacts.

Mining would largely progress to the northwest in Pit 3 and therefore the predicted air quality, noise and blasting impacts would decrease for the majority of potentially affected receivers to the southeast in Singleton. However, the Project would still result in exceedances of the relevant air quality criteria at some receivers near Maison Dieu and Camberwell. In accordance with the Government's *Voluntary Land Acquisition and Mitigation Policy*, the Department recommends that:

- one receiver and four vacant land holdings (R1, Lot 2 DP 804005, Lot 52 DP 252692, Lot 53 DP 252692 and Lot 54 DP 252692) are afforded acquisition rights;
- two receivers and three vacant land holdings (R170, R171, Lot 3 DP 1111313, Lot 1 DP 121623 and Lot 1 DP 1136411) are afforded acquisition rights only if acquisition is not able to be achieved under the consents for other mines which cause the greater proportion of overall impacts; and
- four receivers (R173, R175, R176 and R177) are afforded air quality mitigation rights.

Despite its existing and proposed mitigation measures, Bloomfield would be unable to reduce its proposed noise levels to fully meet its Project Specific Noise Levels (PSNLs) under the *Industrial Noise Policy 2000* (INP). However, under the INP, alternate 'achievable' noise criteria (ANC) may be considered for existing operations with predicted exceedances of their PSNLs, following the implementation of all reasonable and feasible noise mitigation measures. ANC have been proposed for the Project and the Department and EPA accept that Bloomfield has already applied all reasonable and feasible noise mitigation measures and therefore endorse the proposed use of ANC instead of PSNLs as noise limits for the Project. Importantly, the ANC are significantly lower than the existing approved noise criteria.

Bloomfield has committed to proactively adapting operations to comply with new lower intrusive noise criteria at all receivers. This would deliver a beneficial change to an existing operation with legacy noise issues. Notwithstanding, three receivers are predicted to exceed the cumulative amenity criterion. Acquisition of these three receivers is already recommended due to air quality impacts. Therefore, the Department would not recommend any additional noise-related mitigation or acquisition rights. In

respect of blasting, the Department considers that the Project could be straightforwardly managed to comply with relevant blast vibration and overpressure criteria at nearby receivers.

The Project would not result in significant surface water impacts on catchment areas/runoff rates, flooding, or water quality for downstream users or the receiving environment. Bloomfield would be able to satisfy a large proportion of its water needs using water sourced and/or recycled on site; and surplus water could be readily sourced. The Project would impact on groundwater resources; however, these impacts would be largely located within the Project area, limited to a less productive groundwater source and no other groundwater users or GDEs would be affected.

Bloomfield has sought to design the Project to avoid and minimise biodiversity impacts. Nevertheless, the Project would disturb approximately 213 hectares (ha) of vegetation to make way for the open pit mining areas, including the clearing of 48.1 ha of woodland vegetation and 164.6 ha of derived native grassland. Bloomfield has proposed to offset these impacts by retiring the required ecosystem credits in two stages. A number of options have been considered and Bloomfield's current preference would be to pay into the Biodiversity Conservation Fund, although it is continuing to examine options in relation to land-based offsets.

Bloomfield has committed to undertaking progressive rehabilitation to deliver a post-mining landform that could be returned to mainly agricultural use with flexibility to alter this use to suit the needs of Singleton beyond 2038. The Department is satisfied that the Project area could be rehabilitated to meet current best practice standards for the mining industry in NSW and that the Project could be managed to achieve sustainable final landform and rehabilitation outcomes.

The Project is predicted to provide economic benefits of approximately $270 million net present value (NPV) to the State of NSW through payment of coal royalties, wage premiums and company tax. When comparing these benefits to the costs of the environmental consequences such as greenhouse gas emissions, the Project would still result in a minimum net benefit of $120 million NPV to the State of NSW.

The Project would also provide socio-economic benefits at a local and regional scale, through continued employment of 130 staff and future generation of 87 jobs, funding of local infrastructure and community services and facilities through a Planning Agreement (PA) with Council and continued operation of the Bloomfield Foundation. Although some residual social impacts may be experienced as a result of the Project, the Department considers that conditions of consent could be recommended to manage and minimise these impacts.

Based on this assessment, the Department considers that Bloomfield has designed the Project in a manner that achieves an appropriate balance between maximising the recovery of a recognised coal resource of State significance and minimising the potential impacts on surrounding landowners and the environment, as far as is practicable.

The Department's assessment has identified several minor matters for clarification that would strengthen the assessment of the Project, such as the approach to staged offsetting and associated disturbance areas, greater clarity around the estimated economic benefits to the State and further details on the PA offer. The Department does not expect this information to materially change its preliminary findings on the overall merits of the Project, but rather assist in the development of robust and specific conditions to govern the Project.

Overall, the Department believes that the benefits of the Project would outweigh its costs and that the proposed mine plan strikes an appropriate balance between protecting the environment and local community and realising the significant economic benefits of the Project to the region and the State of NSW. Consequently, the Department's preliminary findings are that the Project would be expected to deliver a net benefit, is in the public interest and is approvable, subject to strict conditions.

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1. BACKGROUND

1.1 Existing Operations

Rix's Creek Mine is an existing open-cut coal mine located 5 kilometres (km) northwest of the township of Singleton in the Singleton local government area (see **Figure 1**). The mine is owned and operated by Bloomfield Collieries Pty Limited (Bloomfield), which is a subsidiary of The Bloomfield Group, a Hunter Valley-based and Australian-owned company.

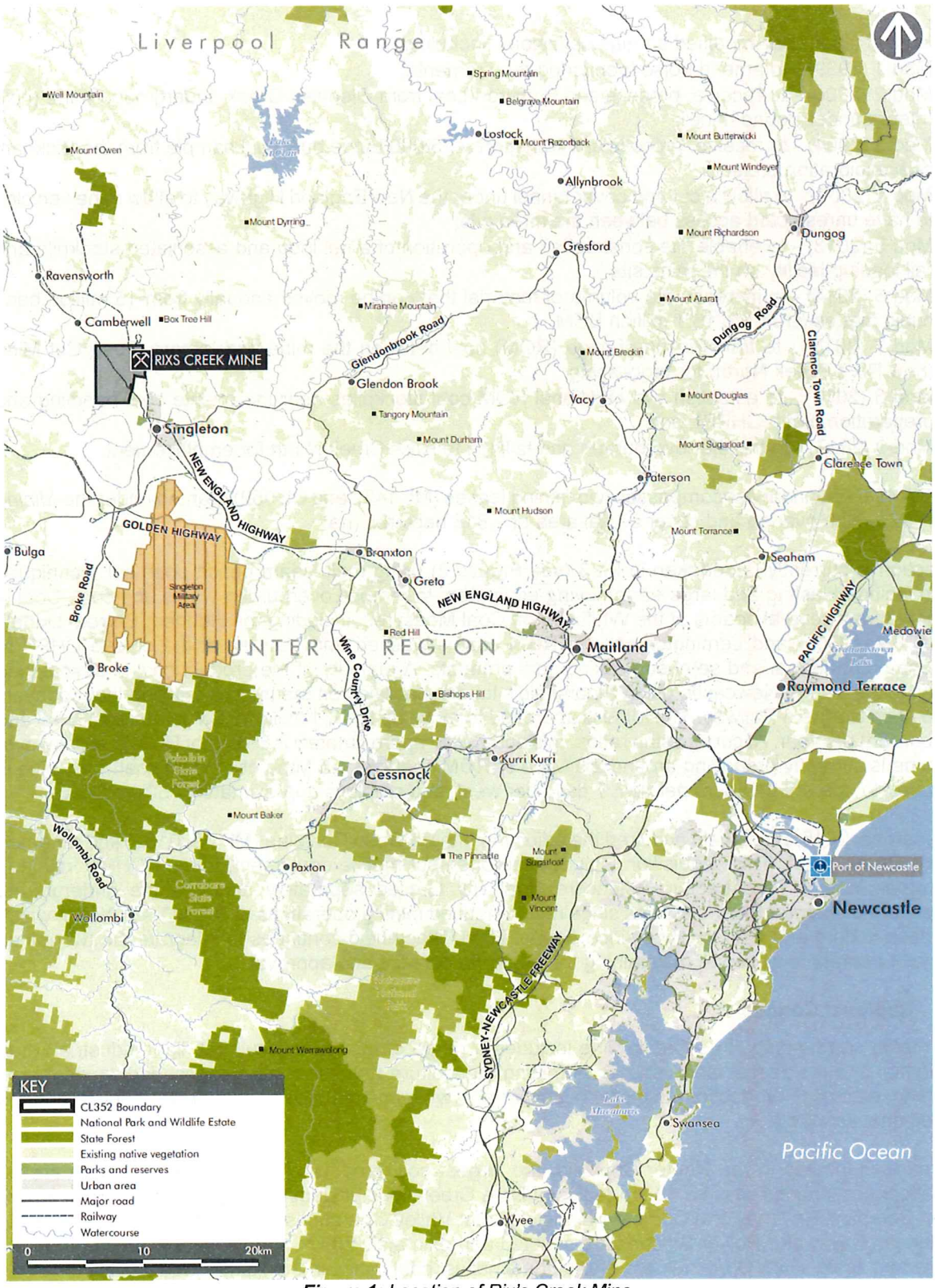

Figure 1: *Location of Rix's Creek Mine*

Coal mining has occurred in the area since the 1880s and the eastern section of the mine site is underlain by historical underground workings. Rix's Creek Mine itself commenced open-cut operations in the early 1990s.

Rix's Creek Mine currently operates under DA 49/94, which was granted on 19 October 1995 by the then Minister for Urban Affairs and Planning under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Under DA 49/94, coal extraction is approved for a period of 21 years from the latter of either the date of consent or the date of issue of the relevant mining lease (ML). ML 1432 was granted on 24 June 1998 and therefore coal extraction is approved until 24 June 2019.

The consent has been modified on nine occasions, including:

- Mod 1 (1999) - to amend noise monitoring requirements;
- Mod 2 (2003) - to receive, process and transport coal from Glennies Creek underground mine (now Integra underground mine);
- Mod 3 (2004) - to receive, process and transport a 25,000 tonne bulk coal sample from the Bickham coal exploration project;
- Mod 4 (2009) - to allow a cut and cover tunnel under the New England Highway to allow mine vehicles to have unrestricted access between the three pits;
- Mod 5 (2013) - to enable the construction and operation of a rail loop and associated stockpile and rail loading facility on the mine site;
- Mod 6 (2014) - to increase the volume of material that can be moved annually from 15 million bank cubic metres (BCM) to 16.1 million BCM;
- Mod 7 (2016) - to transfer run-of-mine (ROM) coal between the mine and Integra Open Cut Mine (now Rix's Creek North) for processing;
- Mod 8 (2016) - to establish two additional ROM coal stockpiles near the on-site coal handling and preparation plant (CHPP); and
- Mod 9 (2017) - to transfer overburden and tailings to Rix's Creek North for emplacement.

The DA 49/94 boundary encompasses two mining leases (ML 1432 and CL 352) granted under the *Mining Act 1992*, which overlap and cover a total area of 1,818 hectares (ha).

Extraction is currently undertaken in Pit 3 (see **Figure 2**) using multi-seam bench open-cut techniques which include blasting and large earthmoving equipment to remove overburden waste and coal. Coal is extracted from several seams of the Whittingham Coal Measures, including the Hebden, Barrett, Liddell, Arties, Pikes Gully and Lemington seams. ROM coal is washed and blended at the on-site CHPP to produce both thermal and semi-soft coking coal products. A majority of the product coal is despatched via rail to the Port of Newcastle using Bloomfield's loading facilities on the Integra rail loop that connects to the Main Northern Railway. The mine is approved to move up to 16.1 million BCM of material (coal and overburden) per year. At current strip ratios, this equates to approximately 2.8 Mtpa of ROM coal, however the mine is currently producing around 2.5 Mtpa of ROM coal and 1.5 Mtpa of product coal. The mine is approved to operate 24 hours per day, 7 days per week and employs approximately 130 workers.

In December 2015, Bloomfield acquired the adjoining Integra Open Cut Mine (MP 08_0102) and renamed it Rix's Creek North. This acquisition included the open-cut mobile equipment, Integra CHPP, rail loop and other surface infrastructure. Glencore Coal Pty Limited separately acquired the underground component of Integra. Bloomfield has since recommenced mining operations at Rix's Creek North, which had been in care and maintenance since August 2014. Bloomfield continues to integrate the two mines as a joint operation, while still maintaining the separate consent and approval.

1.2 Regional Context

The region surrounding Rix's Creek Mine includes a range of mining, agricultural, light industrial, rural residential and residential land uses. Coal mining, agriculture and associated service industries, horse breeding, electricity production, tourism, viticulture and wine making provide the largest contributions to the regional economy.

The mine is located in the Hunter Coalfield, the largest coal producing region in NSW. There are 18 operational coal mines within a 10-km radius of Rix's Creek Mine, including Integra Underground, Mount Owen Complex, Ravensworth Complex, Liddell, Hunter Valley Operations and Ashton. AGL Macquarie's Liddell and Bayswater Power Stations are situated approximately 20 km northwest of the mine. In terms of size and scale, Rix's Creek Mine is one of the smallest coal mines in the Hunter Coalfield.

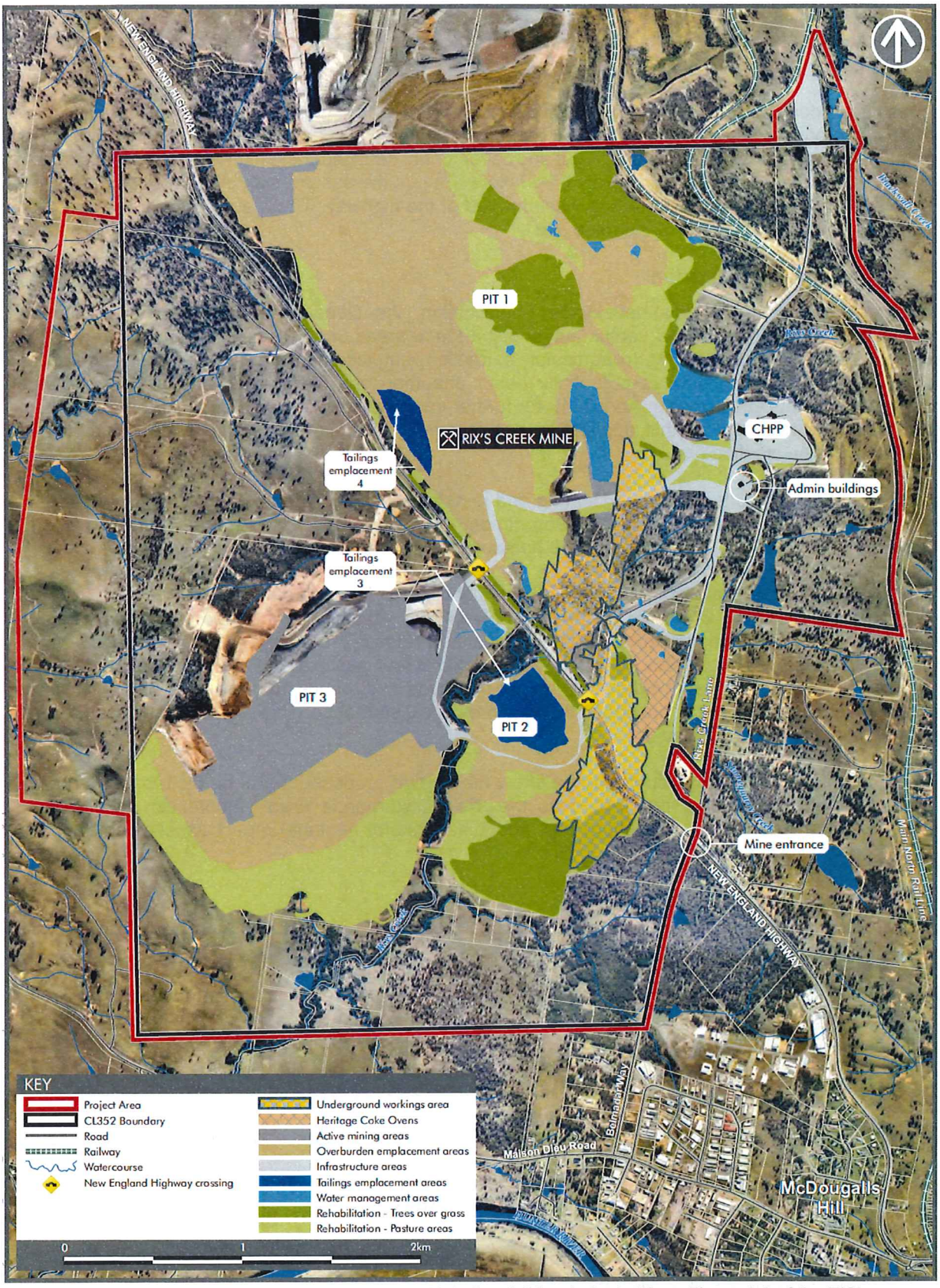

Figure 2: *Layout of existing operations at Rix's Creek Mine (adapted from Figure 1-3 of the EIS)*

Rix's Creek Mine is located approximately 5 km northwest of Singleton, 3.5 km southeast of Camberwell and 1.6 km east of the locality known as Maison Dieu. Since the mine commenced open-cut operations in 1989, Singleton and its surrounding suburbs have expanded, including towards the mine. The closest densely populated area is Singleton Heights, located to the southeast, on the other side of the Main Northern Railway line. The mine is generally surrounded by rural residential suburbs and small agricultural land holdings, with the exception of Rix's Creek North Mine to the north and Maison Dieu Industrial Area

(also referred to as the McDougalls Hill Business Park) to the south-southeast. The Rixs Creek ephemeral watercourse flows across the southern portion of the mine site and connects to the Hunter River approximately 5 km to the south.

The main transport corridors in the region include the New England Highway and Main Northern Railway, both of which provide access to Newcastle. The New England Highway runs from the northwest to the southeast, directly across the mine site. A cut and cover tunnel runs under the highway linking the different mining areas of Rix's Creek Mine, namely Pit 1 ('North Pit') on the eastern side of the highway and Pit 2 ('South Pit') and Pit 3 ('West Pit') on the western side of the highway. The Main Northern Railway also traverses the northwest corner of the mine site.

1.3 Compliance Investigation

During the assessment of this development application, the Department identified potential non-compliances related to approved versus actual disturbance areas under the existing Rix's Creek Mine development consent (DA 49/94). In particular, extraction, emplacement and other disturbance areas north of Pit 3 were identified as potentially being unauthorised. The matter was assigned to the Department's Compliance team in April 2017 for further investigation. This also delayed progress of the Department's assessment of this application as the extent of the areas requiring assessment and approval had to be clarified first.

The investigation concluded that land clearing and mining had been undertaken in breach of DA 49/94 and civil proceedings were lodged by the Department in the Land and Environment Court (the Court), with the consent of Bloomfield, to remedy the non-compliances identified.

On 16 August 2017, Bloomfield agreed to the Court's consent orders and declared that it had carried out mining operations at Rix's Creek Mine in breach of DA 49/94. This breach included prior disturbance of approximately 96 ha of land, for which Bloomfield must now retire 2,716 ecosystem credits in accordance with the *NSW Biodiversity Offsets Policy for Major Projects* and associated *Framework for Biodiversity Assessment* (FBA). The consent orders clarified the approved disturbance boundaries of DA 49/94, which were amended to include the approximate 96 ha of previous disturbance. This is depicted as the 'Existing Permitted Mining Area' in **Figure 3**.

Accordingly, the areas highlighted in orange show the agreed proposed 212.8 ha disturbance area for this development application, referred to as the 'New Disturbance Area'. Bloomfield subsequently provided revised biodiversity, agriculture and Aboriginal cultural heritage impact assessments for the 'New Disturbance Area'.

2. PROJECT

2.1 Description of the Project

On 27 October 2015, Bloomfield lodged a State significant development application for the Rix's Creek Continuation of Mining Project (the Project). The Project seeks to extend open-cut mining at Rix's Creek Mine until approximately 2038 (a further 19 years), to facilitate the production of an additional 25 million tonnes (Mt) of product coal. The original proposal generally included the continuation of all activities currently approved under DA 49/94, including utilisation of existing infrastructure, with the following key changes:

- expanding existing open-cut mining operations in Pit 3 to the northwest and mining a small area south of Pit 1 known as the 'North Pit Area';
- increasing the maximum extraction and processing rates to 4.5 Mtpa of ROM coal;
- constructing a new overburden emplacement area (OEA) to the west of Pit 3 within a new mining lease area (MLA 487);
- constructing a second cut and cover tunnel (underpass) beneath the New England Highway; and
- employing up to an additional 100 employees.

Following the exhibition of the Project, Bloomfield acquired the neighbouring Rix's Creek North Mine, and subsequently amended the proposal by:

- removing the approved but unbuilt rail loop and associated loading facility which were previously approved under Mod 5;
- reducing the proposed extraction rate from 4.5 Mtpa to 3.6 Mtpa of ROM coal between 2021 – 2023;
- increasing the extraction rate from 1.6 Mtpa to 3.6 Mtpa of ROM coal between 2024 – 2025;

- reducing the number of additional employees required during peak production period from 234 to 217; and
- amending the southern boundary of the 'North Pit Area' to remove the proposed diversion of Stonequarry Gully.

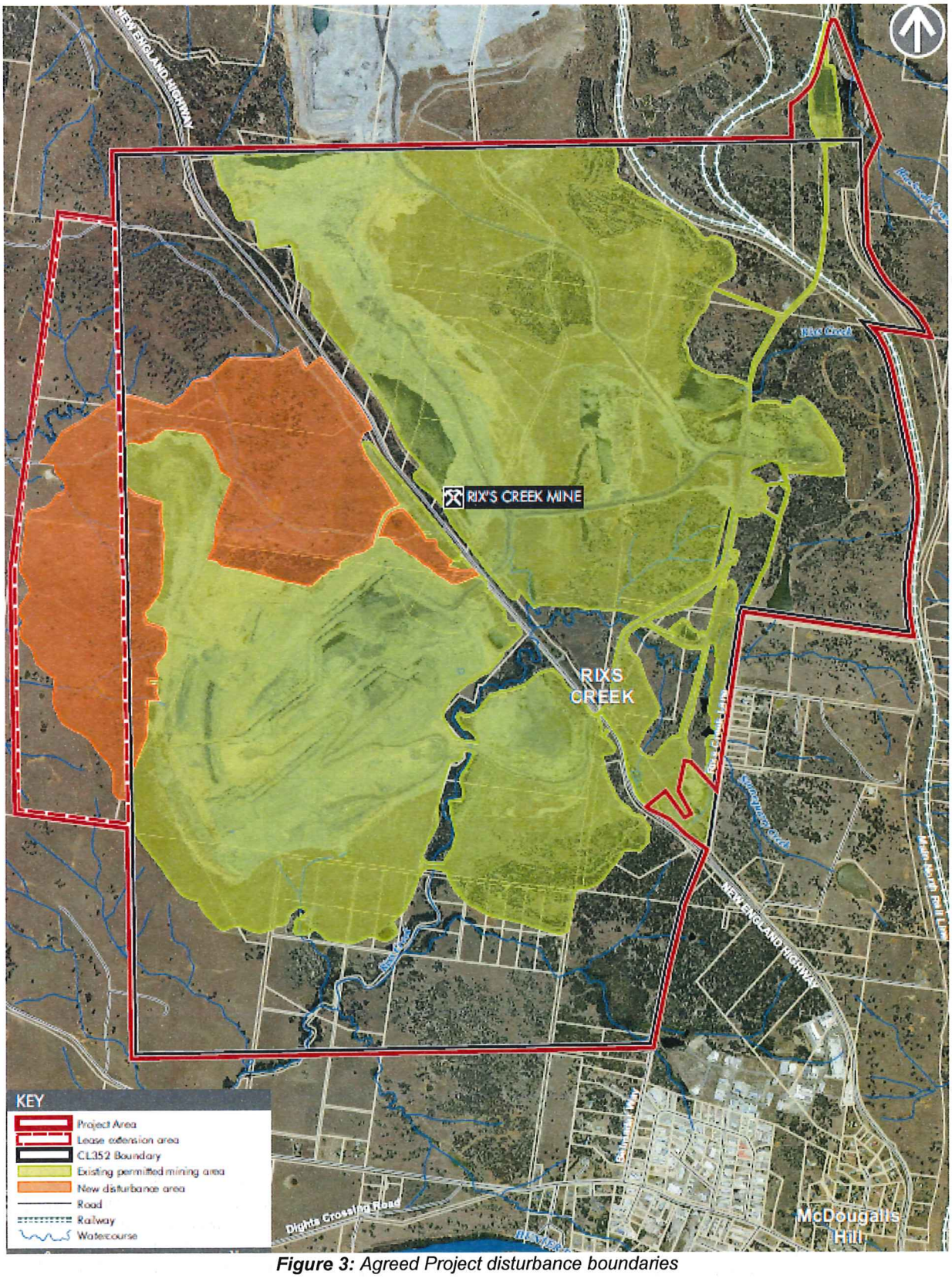

Figure 3: *Agreed Project disturbance boundaries*

The Project is summarised in **Table 1** below, and described in detail in Bloomfield's Environmental Impact Statement (EIS) and Revised Response to submissions (Revised RTS) (see **Appendices A** and **C**). **Figure 4** shows the key components of the Project, including the proposed extended mining areas.

Table 1: *Key components of the Project*

Aspect	Existing approval	Proposed development
Development Application and Mining Lease Boundaries	• ML 1432 and CL 352, with a total area of 1,818 ha	• Additional 170 ha mining lease area for the new western OEA (MLA 487)
End of Mine Life	• 2019	• 2038
Mining Areas	• Pits 1 ('North Pit' or 'Arties Pit'), 2 ('South Pit') and 3 ('West Pit')	• Extending Pit 3 to the northwest • Mining of the 'North Pit Area' just south of Pit 1
Maximum Extraction Rate	• 16.1 million BCM of material, which delivers approximately 2.8 Mtpa of ROM coal	• 3.6 Mtpa of ROM coal
Mining Method	• Open-cut multi-seam bench mining involving blasting and using a truck and excavator fleet	• No change
Mining Depth	• Pit 1 down to Liddell and Arties Seams • Pit 2 down to the Barrett Seam • Pit 3 down to the Barrett Seam	• No change • No change • Increased depth in Pit 3 down to the Hebden Seam
Overburden Emplacement and Waste Management	• Overburden material used to progressively backfill pits and emplaced in out-of-pit OEAs • Tailings storage facilities in sections of Pits 1 (Tailings Emplacement 4) and 2 (Tailings Emplacement 3)	• No change • No change • New OEA to accommodate overburden from the expanded Pit 3 • Co-disposal of dried tailings with overburden and continued use of Tailings Emplacement 4
Coal Processing	• On-site CHPP used for processing ROM coal from both Rix's Creek and Rix's Creek North • 4.5 Mtpa ROM coal processing capacity	• No change • No change
Transport	• ROM coal trucked to the on-site CHPP via internal haul roads • Product coal trucked to the rail loading facility on the Integra rail loop and then railed to the Port of Newcastle via the Main Northern Railway	• No change
Operating Hours	• 24 hours a day, 7 days a week	• No change
Employment	• 130 staff	• Maximum of 217 staff
Infrastructure	• Construction and operation of surface facilities including CHPP, coal stockpiles, administration and amenities facilities, workshop and rail loading facilities (previously completed except for rail loop and loading facility) • Construction and operation of a cut and cover tunnel beneath the New England Highway (completed)	• Continued use of existing surface facilities with the exception of no longer constructing the proposed on-site rail loop and loading facility • Construction of a second cut and cover tunnel beneath the New England Highway
Site Access	• Road access is available via Rix's Creek Lane off the New England Highway	• No change
Disturbance Areas (as per agreed Court orders)	• Approximately 1,032 ha	• Additional 212.8 ha
Biodiversity Offsets	• Establishment of a 118.32 ha biodiversity offset strategy for the impacts associated with the proposed Rix's Creek rail loop and associated loading facility, as per Mod 5 • Retiring of 2,716 ecosystem credits in accordance with the FBA, as per the Court's orders	• Establishment of a biodiversity offset strategy in accordance with either the *Upper Hunter Strategic Assessment* (UHSA) or the FBA for the flora and fauna impacts associated with the 212.8 ha of disturbance

Aspect	Existing approval	Proposed development
Rehabilitation and Final Landform	• Progressive rehabilitation of the mine site to pasture and trees over grass • Final landform designed to minimise slope and OEA heights and to merge imperceptibly with adjoining undisturbed lands • Two final voids would remain in the landform • Return the land to a condition suitable for a range of post-mining land uses	• Continued progressive rehabilitation including entirely backfilling Pit 1, leaving one final void in Pit 3

2.2 Justification for the Project

Bloomfield asserts that the Project is needed to fulfil long-term contracts for the supply of thermal and semi-soft coking coal to international customers in Japan, Korea and Taiwan. The Project would allow Bloomfield to capitalise on the remaining available coal resource at Rix's Creek Mine, which equates to approximately 25 Mt of product coal, without significant capital investment.

Bloomfield also considers that the Project would constitute ecologically sustainable development. The Project has been designed to maintain continuity of coal production by optimising resource recovery in an environmentally and socially responsible manner.

Bloomfield states that the mine is well established in the community and would result in continued positive socio-economic benefits from ongoing employment and indirect flow-on effects to the regional economy. The Project would allow for the continuation of 130 existing jobs and the generation of an additional 87 jobs at maximum production.

Bloomfield considers that the Project would allow for the continuation of community benefit initiatives including the Bloomfield Foundation, which provides grants and funding to local health and social groups as well as schools and sports clubs. Overall, Bloomfield considers the Project would have positive socio-economic benefits for the local region.

3. STRATEGIC CONTEXT

3.1 NSW Coal Industry

Society is heavily reliant on coal for both electricity generation and steel production. Thermal coal is used to produce electricity in order to provide basic energy needs, both at the domestic and international level, with coal delivering energy security and providing around 80% of NSW's electricity needs, 76% of Australia's electricity needs and 40% of the world's electricity needs.

While steps are being taken across the world to increase renewable energy generation and reduce society's reliance on fossil fuels for electricity generation, the International Energy Agency's (IEA's) *World Energy Outlook 2016* forecasts that, despite significant commodity price fluctuations over the past 10 years, global demand for thermal coal has broadly stabilised at current levels. The same is true for semi-soft coking coal, where sustained demand from emerging markets focussed on industrial development continues to drive steel production and consequent demand for coking coal. The recovery of export coal prices throughout 2017, together with continued demand for high quality Hunter Valley coal products further supports the ongoing development of coal mines in this region, at least in the short to medium term.

The NSW coal industry currently generates around 80% of the value of the State's mineral production and represents about 25% of total NSW exports (for both goods and services combined), making it NSW's biggest mineral and export commodity. NSW coal production has grown steadily over the past decade, primarily to meet demand from growing Asian markets.

NSW produced approximately 246.8 Mt of ROM coal in 2015-2016, yielding 191 Mt of saleable or product coal worth around $14.6 billion. This saleable coal continues to account for a significant proportion of the State's export revenue, with around 170 Mt exported during 2015-2016, principally through the Port of Newcastle. Most remaining NSW coal production was consumed domestically.

Port and rail capacity throughout the State is continuing to be developed to support the resource industry, with future expansions at the Newcastle coal terminals expected to provide a total of around 230 Mt of

annual coal export capacity. NSW coal production and exports are expected to rise in line with this capacity, subject to market fluctuations.

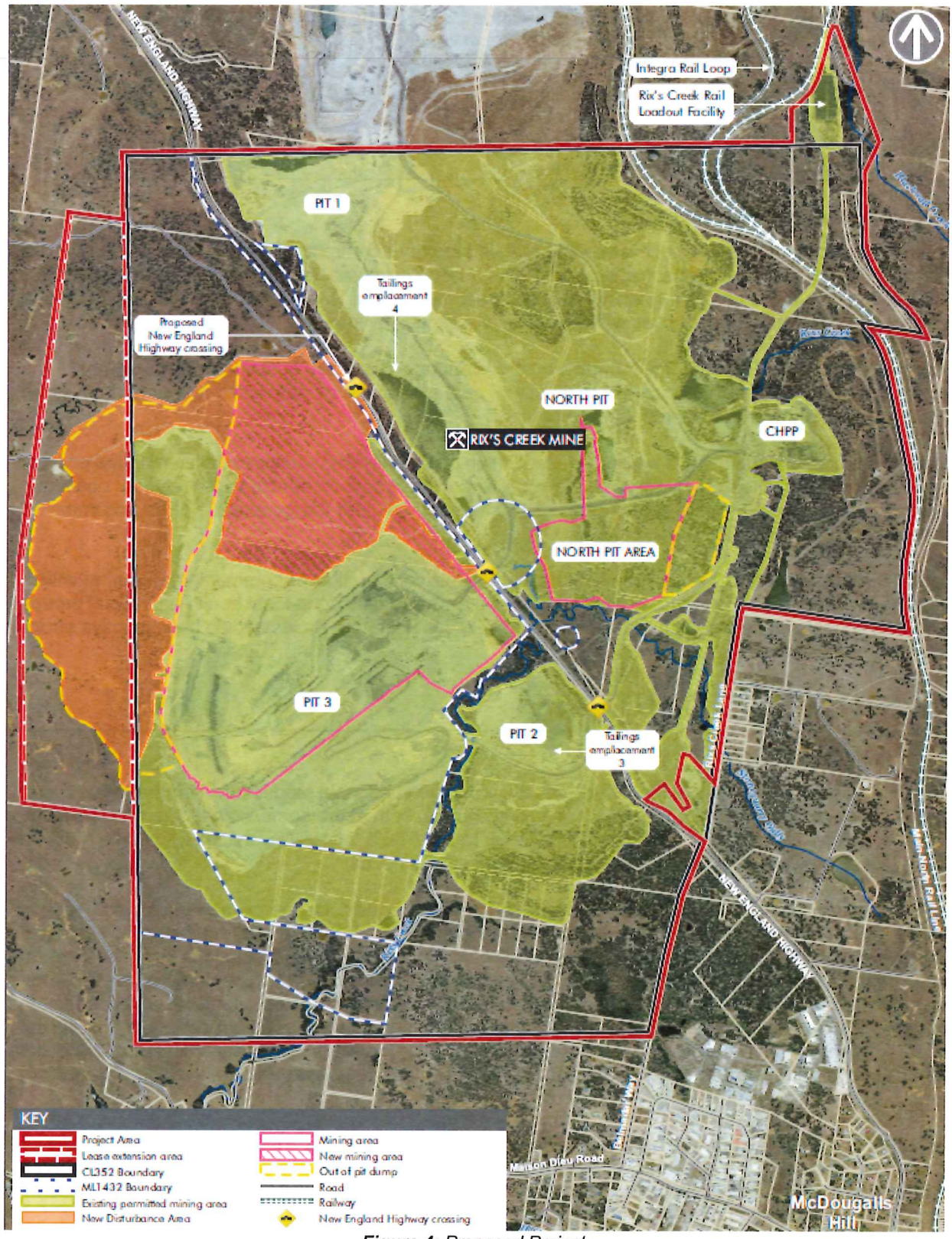

Figure 4: *Proposed Project*

At present, the Hunter Coalfield is the most significant coalfield in NSW, producing around 54% of the State's coal production. It comprises more than 20 operating coal mines which are located in a broad corridor on either side of the Main Northern Railway line between Singleton and Muswellbrook.

As at 30 June 2017, the NSW coal industry employed just over 20,538 people, with the Hunter Coalfield (11,748 people) accounting for over half of the coal mining jobs in NSW. With up to 217 ongoing and new

full time equivalent positions, the Project represents a secure employment opportunity for mining jobs in the Hunter region.

3.2 Hunter Strategic Plans and Policies

Upper Hunter Strategic Regional Land Use Plan

The *Upper Hunter Strategic Regional Land Use Plan* (SRLUP, September 2012) provides a framework for balancing strong economic growth in the coal industry with the protection of high value agricultural land in the Upper Hunter region. The plan identifies key regional planning challenges as:

- improving the balance between agricultural land uses and resource development proposals, focusing on achieving co-existence between mining, coal seam gas and agriculture;
- maintaining or enhancing opportunities for environmentally responsible mining and coal seam gas development to deliver reliable energy supplies to the State that reduce energy costs and carbon emissions and that generate economic wealth for the State;
- maintaining or enhancing future opportunities for sustainable agriculture; and
- defining and protecting strategic agricultural land.

One of the first steps in achieving these outcomes was the identification and mapping of three categories of strategic agricultural land in the region. These categories include Biophysical Strategic Agricultural Land (BSAL), which is essentially the best farming land in the region, and the Equine and Viticulture Critical Industry Clusters (CICs), which represent unique concentrations of productive agricultural enterprises associated with two iconic agricultural industries in the Upper Hunter region.

To ensure that potential impacts on these strategic agricultural lands are appropriately considered, any mining or coal seam gas proposals located on strategic agricultural land outside an existing mining lease must be referred to the independent Mining and Petroleum Gateway Panel. This Gateway Process allows for the early identification of potential impacts on agricultural land and water resources and the determination of any additional information or assessment requirements necessary to inform the merit assessment of the proposed development.

While the new mining lease area is not located on BSAL, or within a Equine or Viticulture CIC, Bloomfield undertook soil testing to validate the BSAL mapping. Bloomfield applied for and was issued a Site Verification Certificate (SVC) on 29 August 2014 in accordance with the SRLUP. The SVC is essentially an exemption from the Gateway Process because the proposal will not affect BSAL.

Hunter Regional Plan 2036

The Department's Hunter Regional Plan 2036 sets out the Government's strategic vision for the Hunter Region based on four key goals, which are to establish a leading regional economy in Australia, a biodiversity-rich natural environment, thriving communities and greater housing choice and jobs. These goals are to be achieved by delivering on a range of directions and actions set out in the Plan.

In broad terms, the Plan's directions and actions aim to support new and established industries in the Hunter Valley and leverage their proximity to Asian markets. The directions recognise the strategic importance of the established coal mining industry and its infrastructure links to the export market via the Port of Newcastle, as well as recognising the important role that industries including renewable energy, agriculture, viticulture and equine operations play in delivering a diversified regional economy.

Importantly, the Plan emphasises the need to manage these different land uses in pursuit of complementary outcomes and attainment of the overriding goals of the Plan. The Department considers that this has been achieved in its assessment of the application, which balances the environmental, social and economic costs and benefits of the Project.

Upper Hunter Strategic Assessment

The UHSA is a joint initiative of the NSW and Commonwealth Governments to improve the assessment of new or expanded coal mines which have the potential to impact on biodiversity values in the Upper Hunter Valley. The UHSA involves upfront identification of biodiversity values present within identified areas, the biodiversity impacts associated with potential mining activities within these areas and the development of a co-ordinated offsetting strategy that would be secured through the establishment of an Upper Hunter Offsets Fund (UHOF).

The UHOF is proposed to utilise funds paid by individual mining companies to identify, acquire and secure offset lands that meet each company's respective biodiversity offset obligations, while delivering a more

coordinated and strategic approach to biodiversity management and conservation across the Hunter Valley. This coordinated approach aims to support the cumulative assessment of biodiversity values in the Upper Hunter and deliver improved outcomes by establishing strategic corridors, which may not have been possible through the alternate provision of individual offsets by each mining company.

As a signatory and financial contributor to the preparation of the draft Biodiversity Plan underpinning the UHSA, Bloomfield considered it was eligible to have its Project assessed under the draft UHSA Interim Policy framework as a transitional 'Path 1' Project. This framework utilises the *Biodiversity Certification Assessment Methodology* (BCAM) to assess impacts on NSW threatened species under the *Threatened Species Conservation Act 1995* (TSC Act).

On this basis, Bloomfield prepared its EIS to address the requirements of the draft UHSA Interim Policy in the expectation that the draft UHSA Biodiversity Plan would be publicly exhibited and finalised prior to the determination of the Project. However, the public exhibition and endorsement of the draft UHSA Biodiversity Plan has been delayed and therefore this pathway for biodiversity assessment is not yet available to its participants. While there is still potential for this plan to be finalised prior to the determination of this Project, reliance on the UHSA alone provides uncertainty to both Bloomfield and the broader NSW community.

Consequently, Bloomfield has not only provided a complete UHSA assessment, including responses to issues raised in agency and community submissions on the Project, but has also provided an alternative assessment of biodiversity impacts undertaken in accordance with the FBA.

The Department's assessment in **Section 6.5** considers both policy frameworks and focuses primarily on Bloomfield's now preferred FBA assessment pathway.

3.3 Bloomfield's Operations in the Hunter Valley

The Bloomfield Group is an Australian-owned and operated group of private companies with interests in mining and engineering in the Hunter Valley. It employs approximately 500 people and operates the Rix's Creek and Rix's Creek North mines, as well as Bloomfield Colliery in East Maitland. These mines provide a supply of thermal and semi-soft coking coal to export markets including Japan, Korea and Taiwan, with small quantities also consumed domestically.

Bloomfield is committed to continuing its coal operations in the Hunter Valley. In addition to this application, Bloomfield acquired Rix's Creek North in December 2015 and recommenced operations in 2016 (see **Section 1.1**). Further, on 19 January 2018, Bloomfield lodged a modification application to extend the life of Bloomfield Colliery until 2030.

The life of the Bloomfield Colliery was initially intended to conclude in 2020, and Bloomfield committed to transferring staff to Rix's Creek and Rix's Creek North upon closure. Subject to the modification being approved, Bloomfield would instead look to fill its additional employment requirements from the local area.

4. STATUTORY CONTEXT

In line with the requirements of section 4.15 of the EP&A Act, the Department's assessment of the Project has given detailed consideration to a number of statutory requirements. These include the:

- objects found in section 1.3 of the EP&A Act; and
- the matters listed under section 4.15(1) of the EP&A Act, including applicable environmental planning instruments and regulations.

The Department has considered all of these matters in its preliminary assessment of the Project and has provided a summary of this consideration below. Further consideration of the objects and other relevant provisions of the EP&A Act and environmental planning instruments is found in **Appendix D**.

4.1 State Significant Development

The proposed development is declared to be State significant development under section 4.36 of the EP&A Act as it triggers the criteria in clause 5 of Schedule 1 to *State Environmental Planning Policy (SEPP) (State and Regional Development) 2011,* as it is development for the purposes of coal mining.

In accordance with section 4.5 of the EP&A Act and clause 8A(1) of *SEPP (State and Regional Development) 2011*, the Independent Planning Commission of NSW (IPCN) is the consent authority and

must determine the application, as more than 25 public submissions in the nature of objection were received.

4.2 Permissibility

The Project area is located in the Singleton local government area and is predominantly zoned RU1 (Primary Production) under the *Singleton Local Environmental Plan 2013* (Singleton LEP). Open-cut mining is permissible with consent in the RU1 zone under the Singleton LEP. The construction of a cut and cover tunnel (ie a road) on land zoned SP2 (Classified Road) is also permissible with consent under the Singleton LEP. Although there are small parcels of land zoned SP2 (Railway) and E2 (Environmental Conservation) also located in the Project area, no development is proposed on this land. Consequently, all components of the Project are permissible with development consent under the Singleton LEP.

4.3 Objects of the EP&A Act

The Minister or his delegate must consider the objects of the EP&A Act when making decisions under the Act. The objects of most relevance to the decision on whether or not to approve the Project are found in sections 1.3(a), (b), (c), (e) and (f). They are:

(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources;
(b) to facilitate ecological sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment;
(c) to promote the orderly and economic use and development of land;
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities, and their habitats; and
(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).

The Department is satisfied that the Project encourages the proper development of natural resources (Object 1.3(a)) and the promotion of orderly and economic use of land (Object 1.3 (c)), since the Project:

- comprises permissible land uses on the subject land;
- targets a coal resource that has been determined by the Department's Division of Resources & Geoscience (DRG) to be significant from a State and regional perspective;
- targets a coal resource that is located almost entirely within existing coal exploration and mining lease boundaries, in a region that is dominated by coal mining operations;
- can be largely carried out using existing site and transport infrastructure; and
- would provide considerable socio-economic benefits to the community of NSW.

Consideration of the protection of the environment (Object 1.3(e)) is provided in **Section 6** of this report. The Department considers the Project has been designed to minimise environmental impacts where practicable, including utilising existing mining and transport infrastructure to extract a State significant coal resource.

While some land clearing resulting in the loss of existing vegetation and habitat would occur, Bloomfield has proposed to offset this impact through meeting the requirements of the FBA or the UHSA. In doing so, the Department is satisfied that biodiversity values would be maintained in the long-term. The Department is also satisfied that the impacts to threatened species and habitats can be managed and/or mitigated through appropriate conditions that require biodiversity offsets and detailed rehabilitation strategies.

Consideration of sustainable management of built and cultural heritage (Object 1.3(f)) is provided in **Section 6.9** of this report. Following its consideration, the Department considers the Project would not significantly impact the built or cultural heritage of the locality. The Department is satisfied that any residual impacts on heritage can be managed and/or mitigated by imposing appropriate conditions.

The Department has also considered the encouragement of ecologically sustainable development (ESD) (Object 1.3(b)) in its assessment of the Project (see **Appendix D**). The Department also notes Bloomfield's consideration of these matters (see Section 31.2 of the EIS), and considers that the Project is able to be carried out in a manner that is consistent with the principles of ESD.

The Department's assessment has sought to integrate all significant environmental, social and economic considerations. The key costs and benefits of the Project have been carefully considered and some have been independently peer reviewed.

4.4 Significant Effect on Threatened Species

The recently repealed sections 5A to 5D of the EP&A Act relate to the consideration, assessment and management of threatened species. In deciding whether the Project is likely to have a significant adverse effect on threatened species, populations or ecological communities, or their habitats, the consent authority was until recently required to take into consideration:

- the factors listed in section 5A(2) of the EP&A Act (the 'seven-part test'); and
- any assessment guidelines issued and in force under the *Threatened Species Conservation Act 1995* (TSC Act) or *Fisheries Management Act 1994*.

The Department considered the seven-part tests presented in Appendix I of the EIS and the *Threatened Species Assessment Guidelines* (DECC 2007) in deciding whether the Project is likely to cause significant effects on threatened species, populations or ecological communities, or their habitats. This consideration has informed the Department's assessment of these impacts (see **Section 6.5**).

The Department's assessment concludes that the potential direct and indirect impacts of the Project could be sufficiently mitigated or compensated to meet acceptable standards, following application of the proposed avoidance, mitigation and offsetting measures. The Project would result in a negligible impact to aquatic biodiversity and groundwater dependent ecosystems.

Subject to the proposed avoidance, mitigation and offsetting measures, the Department considers there is unlikely to be a significant effect on threatened species, populations, or ecological communities, or their habitats.

4.5 Environmental Planning Instruments

Several environmental planning instruments apply to the Project, including:

- *SEPP (State and Regional Development) 2011;*
- *SEPP (Mining, Petroleum and Extractive Industries) 2007* (Mining SEPP);
- *SEPP (Infrastructure) 2007* (Infrastructure SEPP);
- *SEPP No. 33 – Hazardous and Offensive Development*;
- *SEPP No. 44 – Koala Habitat Protection*;
- *SEPP No. 55 – Remediation of Land*;
- *Hunter Regional Environment Plan (Heritage) 1989*; and
- Singleton LEP.

The Department has noted Bloomfield's consideration of these matters in the EIS and assessed the Project against the relevant provisions of these instruments (see **Appendix D**). Based on this assessment, the Department is satisfied that the Project can be carried out in a manner that is consistent with the aims, objectives and provisions of these instruments.

4.6 Integrated & Other Approvals

Under section 4.41 of the EP&A Act, a number of approvals are not required to be separately obtained for the Project. These include:

- various heritage approvals required under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977;*
- an authorisation under the recently repealed *Native Vegetation Act 2003* for the clearing of native vegetation; and
- certain water approvals under the *Water Management Act 2000*.

The Department has considered the matters covered by this legislation in consultation with the relevant agencies, and considers that conditions could be developed and imposed to mitigate and/or offset the potential impacts of the Project on these matters.

Under section 4.42 of the EP&A Act, a number of further approvals are required, but must be granted substantially consistent with any development consent for the Project. These include:

- variations to the existing mining leases and a new mining lease under the *Mining Act 1992*;

- approvals for development within the Patrick Plains Mine Subsidence District under the *Mine Subsidence Compensation Act 1961*;
- variations to the site's existing EPL under the *Protection of the Environment Operations Act 1997* (POEO Act); and
- consent for road works under section 138 of the *Roads Act 1993.*

The Department has consulted with the authorities responsible for granting these approvals during the assessment process. None of these authorities objected to the approval of the Project, subject to the imposition of suitable conditions (see **Section 6**).

4.7 Site Verification Certificate

As outlined in **Section 3.2**, Bloomfield required a SVC as it proposes to extend ML 1432 to the west to accommodate a proposed OEA. In accordance with clause 50A of the *Environmental Planning & Assessment Regulation 2000* (EP&A Regulation), Bloomfield obtained a SVC, verifying that the subject land is not BSAL. Accordingly, a mining lease application was lodged on 23 February 2015 (MLA 487).

4.8 Commonwealth Approvals

On 21 November 2014, a delegate of the Commonwealth Minister for the Environment determined that the Project is not a 'controlled action' under the EPBC Act (see Appendix F of the EIS).

Since this time, the Commonwealth has listed the *Central Hunter Valley Eucalypt Forest and Woodland* (CHVEFW) as a critically endangered ecological community (CEEC). The timing of this listing did not affect the decision that the Project is not a controlled action. However, remapping of CHVEFW provided in the Revised RTS identified a greater extent of impact to CHVEFW (47 ha) than previous identified in the referral to the Commonwealth (19 ha). The Department recommends that Bloomfield consult directly with Commonwealth Department of Environment and Energy (DoEE) as to whether the Project should be re-referred as a result of this identified increase.

Notwithstanding, impacts to the CHVEFW have been considered from the State's perspective (see **Section 6.4**)

4.9 Exhibition and Notification

Under clause 9 of Schedule 1 of the EP&A Act, the Secretary is required to publicly exhibit the EIS for the Project for a minimum of 28 days. After accepting the EIS for the Project, the Department:

- publicly exhibited the EIS from 3 November 2015 until 3 December 2015:
  - on the Department's website;
  - at the Department's Information Centre;
  - at Singleton Shire Council's office; and
  - at the Nature Conservation Council's office;
- advertised the exhibition in the *Newcastle Herald*, *Hunter Valley News* and *Singleton Argus*;
- notified relevant public authorities (NSW Government agencies and Singleton Shire Council); and
- notified relevant authorities in accordance with the Mining SEPP and the Infrastructure SEPP.

In undertaking these processes, the Department has satisfied the notification requirements of clause 9 of Schedule 1 of the EP&A Act and the relevant environmental planning instruments.

During the assessment process, the Department also made an extensive range of documents relevant to the assessment of the Project available on its website.

4.10 Independent Planning Commission Review

On 1 March 2018, amendments to the EP&A Act commenced. The new section 2.9 sets out the functions of the IPCN, previously known as the Planning Assessment Commission (PAC).

Unlike its precursor (section 23D), section 2.9 does not contain any express function for the IPCN to review any (or any aspect or part of any) development, activity, infrastructure or project where requested to do so by the Minister or Secretary. However, on 12 December 2017, the Minister for Planning asked the PAC to review the merits of the Project, and requested that the PAC hold a public hearing during the review.

Because the Minister had already requested a review by the PAC prior to 1 March and communicated that request to the PAC, then the review must be conducted by the IPCN and its findings and recommendations are to be taken into account in the decision-making process (section 4.16(7) and section 5.9 EP&A Act).

The terms of reference for the IPCN's review are shown below. Once it receives the IPCN's review report, the Department will finalise its assessment of the merits of the Project and refer the development application back to the IPCN for determination.

1. Carry out a review of the Rix's Creek Coal Mine Extension Project, by:
   a) considering the EIS for the development, the issues raised in submissions, the response to submissions, any other information provided concerning the development by the Applicant and any information provided during the course of the review or as part of the public hearing;
   b) considering the likely economic, environmental and social impacts of the development in the locality, the region and the State;
   c) assessing the merits of the development as a whole, having regard to all relevant NSW Government policies and guidelines; and
   d) providing recommendations on any additional reasonable and feasible measures that could be implemented to avoid, minimise and/or manage the potential impacts of the development.
2. Hold a public hearing during the review as soon as practicable after the Department of Planning and Environment provides its preliminary assessment report to the Commission; and
3. Submit its final report on the review to the Department of Planning and Environment within 12 weeks of receiving the Department's preliminary assessment report, unless otherwise agreed with the Secretary of the Department.

5. CONSULTATION

In response to the exhibition of the Project, the Department received 140 submissions, comprising:
- 9 from public authorities, including Singleton Shire Council;
- 85 public and special interest groups submissions in support of the Project; and
- 46 public and special interest group submissions objecting to or commenting on the Project.

A summary of the issues raised in submissions is provided below. A full copy of these submissions is provided in **Appendix B.**

On 11 December 2015, the Department requested that Bloomfield prepare an RTS report that responded to the submissions and the Department's review of the EIS, including the peer review of the Project's economic assessment.

On 21 October 2016, Bloomfield submitted a partial RTS that responded to the submissions and detailed the changes made to the Project due to efficiencies identified between the operation of Rix's Creek and the newly acquired Rix's Creek North (see **Section 2.1**).

On 21 December 2016, Bloomfield provided an Addendum RTS that contained additional information to address Departmental and agency comments on the RTS and the Compliance investigation related to unauthorised clearance associated with DA 49/94 (see **Section 1.3**). The Addendum RTS did not clarify the identified discrepancies between the approved versus actual disturbance areas; however, the matter was eventually resolved by the Court in August 2017.

Following the agreed Court orders, Bloomfield provided a Revised RTS on 24 November 2017 which included revised impact assessments based on the outcomes of the consent orders. The Revised RTS fully replaced the previous RTS and Addendum RTS. The Department consulted with relevant agencies following receipt of the RTS, Addendum RTS and Revised RTS, and all three documents are provided in **Appendix C**.

5.1 Public Authorities

No public authorities objected to the Project. However, most raised issues or expressed concerns with specific aspects of the Project and/or provided recommendations relating to their administrative and regulatory responsibilities.

Following the provision of additional information in the Revised RTS, most public authorities advised the Department that they are satisfied that their concerns have been adequately addressed and/or can be managed through appropriate conditions of consent. The following summary provides an overview of the key comments made by public authorities.

The **Office of Environment and Heritage** (OEH) raised a number of issues over biodiversity and flooding. This included initial deficiencies and information gaps in the EIS regarding mapping of the CHVEFW, credit calculations, mitigation of impacts on biodiversity, offset alternatives and flooding. OEH was satisfied with the Aboriginal Cultural Heritage Assessment and recommended that a detailed Aboriginal Cultural Heritage Management Plan be prepared for the Project.

Following review of the Revised RTS and additional documentation provided by Bloomfield, OEH was satisfied that Bloomfield had addressed its comments. OEH recommended conditions of consent relating to Aboriginal cultural heritage, flooding and securing biodiversity offsets. The Department has further considered flooding and biodiversity impacts in **Sections 6.4** and **6.5**, respectively.

The **Environment Protection Authority** (EPA) was satisfied that the Air Quality Impact Assessment (AQIA) had been undertaken generally in accordance with its guideline *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2005.* However, clarification was sought on diesel emissions, predicted exceedances of relevant air quality criteria, the omission of some sensitive receptors at Maison Dieu and the Country Acres Caravan Park, the assessment of emissions from wind erosion, and the estimation of nitrogen dioxide from blasting.

Most of these matters were addressed in the Revised RTS. However, the EPA advised the Department to consider other receivers in close proximity to those identified as 'representative'. The Department's consideration of air quality impacts is provided in **Section 6.1**.

EPA also raised concern that the EIS had stated that the mine is licensed for water discharge under the current conditions of EPL 3391. However, it noted that the EPL does not permit any discharges from the site, including under the Hunter River Salinity Trading Scheme. In its Revised RTS, Bloomfield noted that should a licensed discharge point be required in the future, or any other activity outside the current requirements of the EPL, an amendment to the EPL would be sought.

EPA also recommended a number of conditions of consent in relation to noise limits, monitoring and reporting. The Department has further considered the Project's noise impacts in **Section 6.2**.

NSW Health did not object to the Project, but raised several concerns over the Project's potential health impacts resulting from air quality, noise and surface water.

NSW Health expressed a preference for the EIS to consider the likely future air quality standards for annual average PM_{10} and $PM_{2.5}$ which were subsequently adopted in January 2017. NSW Health noted the predicted air quality criteria exceedances at receivers 170 – 177 and emphasised that existing acquisition rights do not negate cumulative impacts to these properties. NSW Health also emphasised the need to control the emissions of blast fumes from the Project area. The Department has considered the Project's air quality impacts further in **Section 6.1**.

NSW Health noted that noise can have a negative impact on human health and recommended that the proposed mitigation measures are implemented sooner and that strict controls are in place during worse case operating conditions. Bloomfield's RTS advised that the recent acquisition of the Integra Mine included acquisition of attenuated mining equipment that would result in the earlier implementation of noise mitigation. The Department has considered the Project's noise impacts in **Section 6.2**.

NSW Health made several recommendations related to conditions of consent for the Project, including the application of reasonable and feasible noise and dust mitigation and management measures.

The **Department of Primary Industries** (DPI) provided comments from its **Water Division** (formerly DPI Water, now DoI - Water). DoI - Water considered that the EIS did not provide a sufficient assessment of the proposed mining-related impacts to Stonequarry Gully. Bloomfield has since removed this proposed creek diversion from the Project and this matter requires no further consideration.

DoI - Water noted that the groundwater model had not been accompanied by an independent peer review as required by the *NSW Aquifer Interference Policy* (AIP), but considered that the impacts of the Project were likely to be within acceptable bounds. DoI - Water identified a number of information gaps relating

to groundwater and water licensing in the EIS and requested that these gaps be addressed within the Water Management Plan. Bloomfield met DoI - Water to discuss these information gaps and supplementary information was included in the Revised RTS, including an independent peer review by Dundon Consulting Pty Ltd. DoI - Water considered that the Revised RTS adequately addressed the issues raised in its submission. The Department has considered the Project's surface and groundwater impacts in **Section 6.4**.

DPI's **Division of Agriculture** advised that it had no significant issues of concern but made several comments regarding the proposed Project. It noted that more rehabilitated land would be allocated to Class 5 rather than Class 4 land. Despite this reduction of higher quality agricultural land, the proposed rehabilitation methods are likely to result in greater agricultural productivity.

No comment was provided from DPI's Fisheries or Lands offices.

DRG supported the Project as a responsible recovery of the State's coal resources and outlined the anticipated financial benefits to the State of NSW.

DRG considered that sustainable rehabilitation outcomes could be achieved as part of the Project and recommended conditions of consent to establish rehabilitation obligations on Bloomfield. These obligations included a final landform design to be consistent with the surrounding topography, the need to undertake progressive rehabilitation on an ongoing basis, adherence to specific rehabilitation objectives and preparation of a Rehabilitation Management Plan. In its Revised RTS, Bloomfield committed to undertake the Project in accordance with the imposed conditions of consent, which it anticipated would reflect DRG's recommendations.

Roads and Maritime Services (RMS) did not object to the Project provided that a comprehensive Construction Traffic Management Plan is submitted to and accepted by RMS prior to commencement of any construction activity on the road reserve of the New England Highway. In addition, RMS requested that all structures on the RMS network, including the side track road, are designed in accordance with relevant codes and guidelines, and that Bloomfield enters into a Works Authorisation Deed with RMS. Bloomfield committed to undertake the Project in accordance with the imposed conditions of consent, which it anticipated would reflect RMS's recommendations.

Singleton Shire Council (Council) did not raise any significant concerns over the Project, but emphasised the importance of a comprehensive assessment of the Project's noise and air quality impacts. Council advised that a local planning proposal seeking to rezone land for residential uses to the southeast of the Project area was currently under consideration and that the extent of any impacts to this proposed residential land was not clear in the EIS.

Council considered that any conditions relating to the final landform should be flexible in order to enable adaptive end of mine planning that responds to community and industry views over time. Council was satisfied that the Revised RTS addressed its areas of interest and made no further comments or recommendations.

The **Heritage Council of NSW** (Heritage NSW) recommended a condition of consent to require additional historical research in relation to the linear embankment and mound associated with the former Rix's Creek Coke Ovens. Heritage NSW also proposed requirements for monitoring the coke ovens during blasting activities. Bloomfield accepted these requirements as likely conditions of consent.

The **Dams Safety Committee** (DSC) noted that the proposed development area would not impact on any prescribed dams or dam Notification Areas and as such, had no further comment on the Project.

5.2 Community and Special Interest Group Submissions

The Department received 131 submissions from members of the public and special interest groups. Of these, 85 submissions (65%) were in support of the Project. In general, these submissions considered that the Project would deliver local and regional socio-economic benefits, job security and a range of community benefits, including donations to charities and local hospitals. These submissions raised concern that there would be adverse local socio-economic impacts if the Project was not approved and many submitters believed that the mine had a good record of environmental performance.

The Department identified that most supportive submissions came from residents in the Hunter region, particularly around Maitland, Newcastle and, to a lesser extent, Singleton.

5.2.1 Issues Raised

The Department received 44 objections (34%) to the Project and 2 further submissions providing comments only. A key issue raised in objections was the Project's potential air quality impacts from increased dust emissions and associated health impacts. There was concern for cumulative noise and dust emissions in Camberwell, but also more broadly in the Hunter Valley.

A large proportion of submissions objected to the continuation of coal extraction in light of the global efforts to reduce CO_2 emissions to manage impacts of climate change. A summary of the key issues raised in these submissions is provided in **Figure 5**. The location of objecting submitters extended over a broader area and included residents from local, regional and non-regional areas.

Other issues raised in the submissions objecting to the Project, included:

- *noise* – increased operational noise impacts on nearby residents and the village of Camberwell;
- *surface water* – potential contamination of nearby waterways, including Rixs Creek, Dead Mans Gully, Glennies Creek and the Hunter River, and the associated implications to agricultural industries;
- *groundwater* – concerns regarding the adequacy of the groundwater assessment;
- *final void* – the proposed size of the final void and potential hazards to the public; and
- *flora and fauna* – impacts to the Squirrel Glider and CHVEFW CEEC, and lack of details concerning biodiversity offsets.

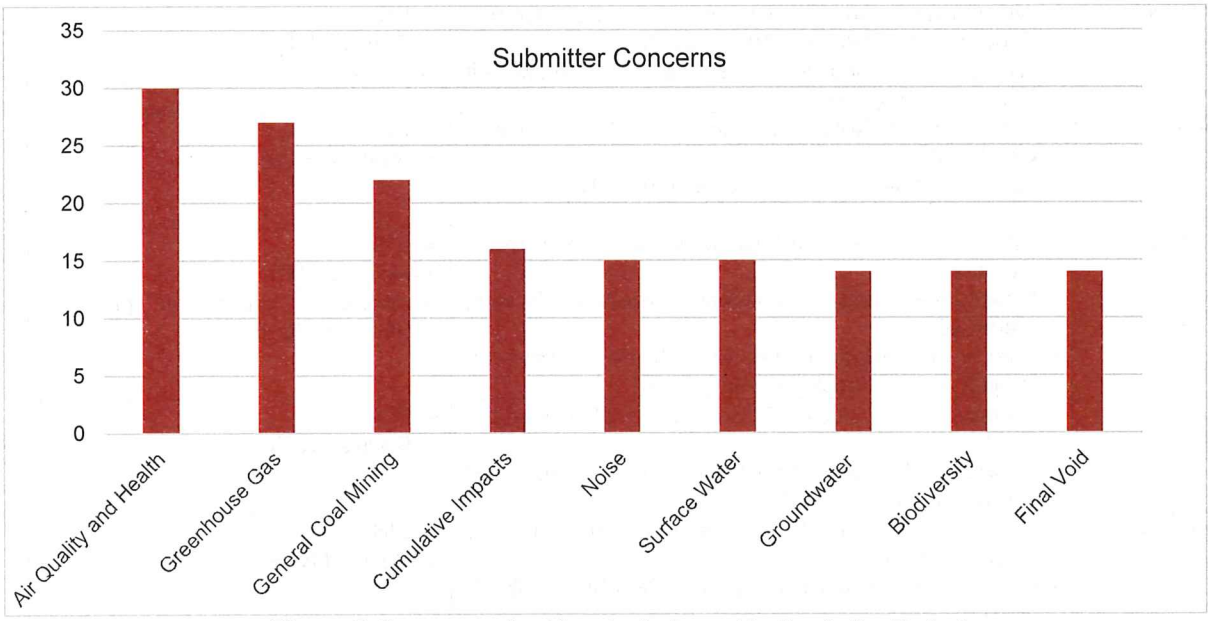

***Figure 5**: Concerns raised in submissions objecting to the Project*

6. ASSESSMENT

The Department has considered the following in its assessment of the Project:

- the EIS, submissions from the public, special interest groups, and public authorities;
- Bloomfield's Revised RTS;
- independent review of the economic appraisal of the Project;
- additional information provided by Bloomfield;
- applicable environmental planning instruments (EPIs) and draft EPIs;
- relevant NSW Government policies and guidelines, including but not limited to the *Hunter Regional Plan 2036*, SRLUP and the *Voluntary Land Acquisition and Mitigation Policy* (VLAMP);
- the suitability of the site for the Project; and
- relevant provisions of the EP&A Act, including its objects and the requirements of section 79C.

The Department notes that the EIS was prepared in accordance with Secretary's Environmental Assessment Requirements (SEARs) issued in March 2014 and most of the studies within the EIS were prepared between 2014 and 2015.

The Department also notes that approximately 2.5 years have passed since the EIS was lodged with the Department. During this time, the scope of the Project has changed (see **Section 2.1**), the areas requiring

assessment have changed (see **Section 1.3**) and the Department and other key agencies have requested additional assessment-related information. As such, some of the supporting EIS studies have been revised or contemporised. **Table 2** below summarises the key assessment issues and the corresponding specialist assessments relied on in the Department's assessment (with superseded assessments in strikethrough).

Over these past four years there have also been a number of changes to NSW Government legislation, policy or guidelines. Each of these have specific savings and transitional arrangements; however, for the most part the applicable legislation, policy or guidelines for this Project remain as referenced in the SEARs and as assessed in the EIS. Nevertheless, the Department has specified any key policy changes below and whether or not they apply to this Project.

Lastly, the Department notes that the indicative calendar years referenced in the EIS and Revised RTS (2017, 2020, 2023 and 2026) are no longer relevant. The Department has instead referred below to mine plan years as Year 1 (2017), Year 4 (2020), Year 7 (2023) and Year 10 (2026).

The Department's assessment is provided below.

Table 2: *Relevant studies*

Issue	***Applicant's Relevant Study***	***Provided In***
Air Quality	• Air Quality and Greenhouse Gas Assessment, Todoroski Air Sciences, August 2015 • Air Quality Specialist Response, Todoroski Air Sciences, June 2016	• EIS • Revised RTS
Noise	• Environmental Noise Assessment, Global Acoustics, October 2015 • Noise Specialist Response, Global Acoustics, January 2016	• EIS • Revised RTS
Blasting	~~• Effects of Blasting in the Continuation Area, Terrock, October 2015~~ ~~• Effects of Blasting in the Continuation Area, Terrock, March 2017~~ • Effects of Blasting in the Rix's Creek Continuation Project Area, Terrock, February 2018[1]	~~• EIS~~ ~~• Revised RTS~~ • Additional Information provided February 2018
Surface Water	• Surface Water Study, JP Environmental, November 2014 • Surface Water Specialist Response, JP Environmental, June 2016	• EIS • Revised RTS
Groundwater	• Groundwater Impact Assessment, RPS Group, September 2014 • Groundwater Specialist Response, RPS Group, March 2016	• EIS • Revised RTS
Rehabilitation	• Rehabilitation Strategy, AECOM Australia Pty Ltd, August 2015 • Revised Response to Submissions, AECOM Australia Pty Ltd, November 2017	• EIS • Revised RTS
Biodiversity	• Ecology Report, Eastcoast Flora Survey, October 2015 ~~• Response to Submissions – Biodiversity, EMM Consulting, October 2017~~ • Revised Response to Submissions – Biodiversity, EMM Consulting, March 2018[2]	• EIS ~~• Revised RTS~~ • Additional Information provided March 2018
Social	• Social Impact and Opportunity Assessment, Umwelt Australia Pty Ltd, July 2015	• EIS
Economic	• Economic Assessment, KPMG, July 2015 • Economic Specialist Response, KPMG, March 2017 • Economic Assessment, KPMG, March 2018	• EIS • Revised RTS • Additional Information provided March 2018
Traffic	• Traffic Impact Assessment, AECOM Australia Pty Ltd, October 2015	• EIS

[1] This document provided a complete revised blasting assessment which superseded both previous blasting assessments.
[2] This document provided a complete replacement of the 2017 Response to Submission document.

Issue	Applicant's Relevant Study	Provided In
Aboriginal Heritage	• Aboriginal Archaeological & Cultural Heritage Impact Assessment, AECOM Australia Pty Ltd, September 2014 • Heritage Assessment Review, AECOM Australia Pty Ltd, November 2017	• EIS • Revised RTS
Historic Heritage	• Aboriginal Archaeological & Cultural Heritage Impact Assessment, AECOM Australia Pty Ltd, September 2014 • Heritage Assessment Review, AECOM Australia Pty Ltd, November 2017	• EIS • Revised RTS
Visual	• Landscape Character and Visual Impact Assessment, RPS Group, June 2015 • Revised Response to Submissions, AECOM Australia Pty Ltd, November 2017	• EIS • Revised RTS
Land capability and Agriculture	• Soil and Land Impact Assessment, SLR, June 2015 • Agricultural Impact Assessment, Neil Nelson Agvice Pty Ltd, October 2017 • Revised Response to Submissions, AECOM Australia Pty Ltd, November 2017	• EIS • Revised RTS • Additional Information provided February 2018
Waste and Hazards	• Environmental Impact Statement Main Report, AECOM Australia Pty Ltd, October 2015 • Revised Response to Submissions, AECOM Australia Pty Ltd, November 2017	• EIS • Revised RTS

6.1 Air Quality

The EIS included an Air Quality and Greenhouse Gas Assessment (AQIA), prepared by Todoroski Air Sciences that predicted the potential dust, fume and odour emissions generated by the Project and evaluated the potential health and amenity impacts of these emissions. The AQIA relied on dispersion modelling to predict incremental (Project alone) and cumulative (Project plus background) emissions during the four indicative mine-plan years at all surrounding sensitive receivers, including 175 privately-owned residences and 34 mine-owned residences, during worst-case weather conditions. Revised Year 7 predictions were provided in the Revised RTS to reflect the reduced production rate.

The AQIA considered deposited dust, total suspended particulates (TSP), fine particulate matter (PM_{10} and $PM_{2.5}$), blast fumes and odour emissions in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2005 (*Approved Methods 2005). An assessment of potential human health impacts was also carried out by reference to World Health Organisation (WHO) criteria and the National Environmental Protection Measure (NEPM) reporting standard for $PM_{2.5}$.

In January 2017, the EPA released an updated version of the Approved Methods 2005, the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2016* (Approved Methods 2016). The development application for the Project predated gazettal of the Approved Methods 2016 and the transitional arrangements stipulate that the Project should be assessed against the air quality modelling and assessment criteria in the Approved Methods 2005. Notwithstanding, the Department has also considered the predicted air quality impacts of the Project in relation to the revised criteria in Approved Methods 2016. This is discussed further in **Section 6.1.3**.

Potential air quality impacts were the most common concern raised in public objections to the Project. In particular, objectors raised concerns over predicted impacts at their properties, cumulative impacts in the Hunter Valley and potential health effects from dust and blast fume emissions. The Department also notes that, on average, air quality complaints at Rix's Creek Mine accounted for approximately 20% of all complaints received between 2001 and 2015.

The EPA and NSW Health also raised concerns in relation to the AQIA, which were responded to in Bloomfield's Revised RTS. These concerns related to potential cumulative impacts, the assessment of diesel emissions and the consideration of likely future particulate matter standards (as later expressed in the Approved Methods 2016). No further comment has been made by the EPA or NSW Health in relation to these matters. The Department has carefully considered these matters.

6.1.1 Existing Air Quality Environment

The existing air quality environment around the Project is influenced by emissions from nearby mining operations as well as agricultural, industrial and urban activities. The regional topography, which includes the distant ridgelines of Barrington Tops National Park and Wollemi National Park, influences the regional wind flow. Prevailing winds come from the east-southeast or the north-west sectors, and the local topography contains gentle to undulating slopes with few local terrain effects. Weather conditions generally vary from stable with low rates of dust dispersion to periods of hot, high and constant winds with high dispersion rates.

Given the long history of open cut mining in the area, extensive monitoring data is available which provides a detailed picture of the local air quality environment. Rix's Creek Mine has an extensive air quality monitoring network that includes high volume air samplers, real time air samplers and dust deposition gauges, which is supplemented by OEH's Upper Hunter Air Quality Monitoring Network.

The AQIA identified that between 2010 and 2014, cumulative annual average PM_{10} levels for the Rix's Creek Mine were within the criterion of 30 $\mu g/m^3$. TSP monitoring data also indicated that the cumulative annual average TSP measurements were below the criterion of 90 $\mu g/m^3$. While exceedances of the incremental 24-hour PM_{10} criterion of 50 $\mu g/m^3$ were experienced during this period, Bloomfield advised that the majority of these exceedances were the result of regional bushfires.

Regional monitoring data confirms that existing background dust levels are known to exceed the 24-hour PM_{10} criterion, particularly during the drier summer months. It is important to recognise that Bloomfield is not the only contributor to cumulative air quality impacts in this area. A number of residences have already been acquired or offered acquisition under other mine approvals/consents due to significant air quality and/or noise impacts from nearby operations.

6.1.2 Existing Mitigation Measures

Bloomfield utilises an Environmental Meteorological System to proactively manage air quality, noise and blasting at Rix's Creek. This system provides daily forecast of emissions based the planned operations and predicted weather conditions, to identify if adjustments need to be made.

The EPA currently requires Bloomfield to implement best practice air quality management measures through a number of pollution reduction programs (PRPs) which have been applied to the mine's EPL. These PRPs included the review and adjustment of operational conditions for road dust and adverse weather conditions, as well as best practice measures to reduce particulate emissions generated at the site. Current dust mitigation practices include:

- restricting vehicle speeds on haulage roads, minimising hauling distances, and treating exposed surfaces and unsealed roads with water;
- minimising disturbance areas to reduce wind erosion, applying interim stabilisation on inactive areas and undertaking progressive rehabilitation;
- watering drill and blast areas to suppress dispersion of drill cuttings and monitoring meteorology prior to blasting;
- minimising unloading drop heights and watering stockpiles;
- ceasing mining operations when visible dust is generated and modifying operations during adverse weather conditions; and
- enclosing conveyers and chutes and other dust generating facilities.

These measures are further detailed in the existing Air Quality and Greenhouse Gas Management Plan for Rix's Creek Mine.

6.1.3 Predicted Air Quality Impacts

In undertaking its assessment of particulate matter impacts on sensitive receivers, the Department acknowledges that NSW Health and a number of public submissions commented on recent variations to environmental assessment advisory standards, as set in the NEPM and Approved Methods 2016. These policies adopt the former $PM_{2.5}$ advisory reporting standards of 25 $\mu g/m^3$ (24-hour) and 8 $\mu g/m^3$ (annual average), and a reduced PM_{10} assessment standard of 25 $\mu g/m^3$ (annual average). The NEPM also establishes goals for the further reduction of $PM_{2.5}$ by 2025.

The Project must be assessed and determined against applicable NSW policy, which at the date of this report is the Approved Methods 2005. The VLAMP, as at this date, also prescribes that mitigation and acquisition rights are to be determined in accordance with PM_{10} criteria of 50 $\mu g/m^3$ (24-hour) and 30

µg/m^3 (annual average), and does not provide for any mitigation or acquisition on the basis of $PM_{2.5}$ impacts. However, the VLAMP may soon be amended to reflect the criteria under the Approved Methods 2016. The Department has therefore considered the Project's predicted impacts in relation to contemporary criteria further below.

The locations of privately-owned and mine-owned residences are depicted in **Figure 6**. **Table 3** summarises the predicted exceedances of the applicable air quality criteria at privately-owned residences and vacant land holdings, together with details of existing and proposed acquisition rights. Only the highest predictions of the four years assessed are shown, which is commonly during year 2023, even with the reduced production rate. Mine-owned properties are considered separately below.

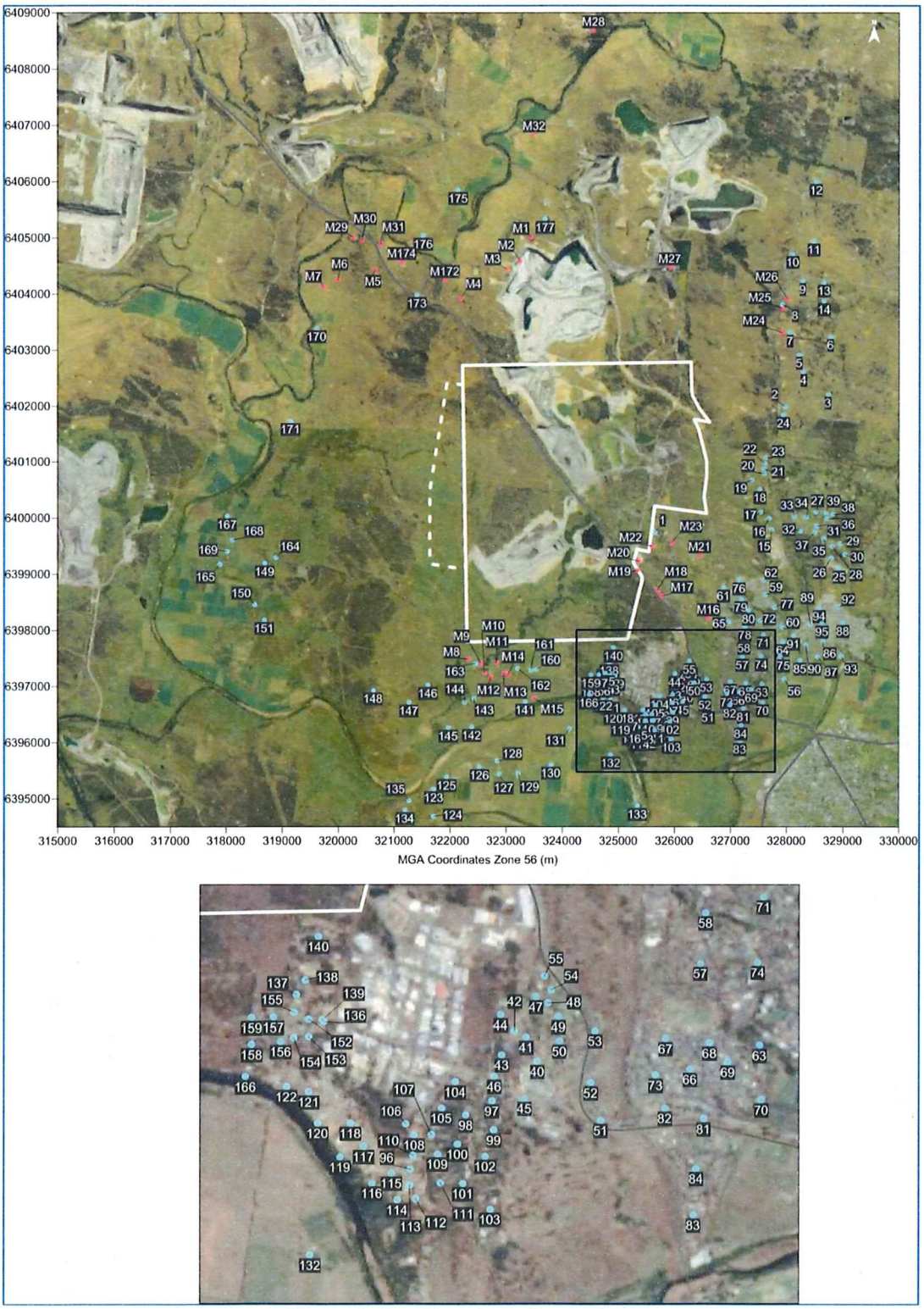

Figure 6: *Sensitive air quality receivers*

Table 3: *Summary of highest predicted exceedances of air quality criteria*

Receiver	24-hour PM_{10} Incremental ($\mu g/m^3$)	Annual Average PM_{10} Cumulative ($\mu g/m^3$)	Annual Average $PM_{2.5}$ Cumulative ($\mu g/m^3$)	Annual Average TSP Cumulative ($\mu g/m^3$)	Annual Average DD Incremental (g/m^2/month)	Annual Average DD Cumulative (g/m^2/month)	Dust impacts on more than 25% of land (24-hour PM10 criteria used as proxy)	Existing Acquisition Entitlements	Acquisition Recommended
Applicable Criterion	**50**	**30**	**8**	**90**	**2**	**4**			
R1 Lot 1 DP 1137660	71	34	8	80	0.8	2.9	Yes	Rix's Creek Mine (current negotiated agreement)	*Yes*
R170 Lot 2 DP 1111313	36	101	16	219	0.2	5.3	Yes	Ashton SEOC Rix's Creek North	*Yes, if acquisition is not reasonably achievable under Ashton SEOC or Rix's Creek North*
R171 Lot 75 DP 1124347	44	33	8	77	0.3	2.4	Yes	Ashton SEOC	*Yes, if acquisition is not reasonably achievable under Ashton SEOC*
R173 Lot 30 DP 1018512	49	43	9	92	0.1	2.6	No	Ashton SEOC	*No, mitigation recommended*
R175 Lot 1 DP 745211	17	36	8	84	0.0	2.6	No	Rix's Creek North	*No, mitigation recommended*
R176 Lot 11 DP 1169092	22	39	9	87	0.1	2.5	No	Rix's Creek North	*No, mitigation recommended*
R177 Lot 8 DP 246434	14	80	14	185	0.0	5.1	No	Rix's Creek North	*No, mitigation recommended*
Vacant Land Lot 3 DP 1111313	-	-	-				Yes	Ashton SEOC Rix's Creek North	*Yes, if acquisition is not reasonably achievable under Ashton SEOC or Rix's Creek North*
Vacant Land Lot 1 DP 121623	-	-	-				Yes	Ashton SEOC	*Yes, if acquisition is not reasonably achievable under Ashton SEOC*
Vacant Land Lot 1 DP 1136411	-	-	-				Yes	Ashton SEOC	*Yes, if acquisition is not reasonably achievable under Ashton SEOC*
Vacant Land Lot 2 DP 804005	-	-	-				Yes	n/a	Yes
Vacant Land Lot 52 DP 252692	-	-	-				Yes	n/a	Yes
Vacant Land Lot 53 DP 252692	-	-	-				Yes	n/a	Yes
Vacant Land Lot 54 DP 252692	-	-	-				Yes	n/a	Yes

Note: Pink shading indicates predicted exceedance.

It is predicted that the Project alone would result in an exceedance of the 24-hour PM_{10} criterion at one receiver (R1) for up to 19 days per year. R1 has an existing negotiated agreement with Bloomfield, and has acquisition rights under the existing consent. As the AQIA predicts continued exceedances of applicable air quality criteria at this receiver, the Department recommends the continuation of acquisition rights in accordance with the VLAMP.

No other receivers are predicted to experience exceedances of the incremental 24-hour PM_{10} criterion. Over the life of the Project, seven receivers (R1, R170, R171, R173, R175, R176 & R177) are predicted to experience exceedances of the cumulative annual average PM_{10} criterion. The Department notes that while the Approved Methods 2016 and NEPM standards do not apply to the Project, no additional receivers would exceed the lower PM_{10} criterion of 25 $\mu g/m^3$. Exceedances of the revised NEPM annual average $PM_{2.5}$ criterion are predicted to also occur at R170, R173, R176 and R177; however, there are no predicted exceedances of the NEPM incremental 24-hour $PM_{2.5}$ criterion.

With the exception of R1 (the closest residence located southeast of the Project), the receivers with predicted exceedances are generally located to the northwest of the mine and are significantly closer to and more affected by Rix's Creek North. They are also affected by a number of other neighbouring mines including Ashton South East Open Cut (Ashton SEOC), Mount Owen and Hunter Valley Operations. The Department notes that the cumulative impact assessment is conservative being based on all surrounding mines (including those approved but not yet constructed) operating at full production, which in practice is uncommon.

Based on the acquisition criteria in the VLAMP, the Department notes that some receivers would be eligible for voluntary acquisition rights under the Project. As mentioned above, R1 has an existing negotiated agreement with the mine, and the Department would recommend the continuation of acquisition rights for this receiver. The remaining six eligible receivers (R170, R171, R173, R175, R176 and R177) are currently subject to acquisition rights from other closer mining operations, notably Ashton SEOC and the neighbouring Rix's Creek North. The Department has reviewed the likely contribution of the Project toward the cumulative air quality exceedances at these receivers. In comparison to other closer mining operations, the Project would have a minor contribution (<10%) to annual average PM_{10} impacts. Moreover, if the other nearby mines were not operating, these receivers would be unlikely to experience air quality exceedances as a result of the Project alone. Consequently, the Department considers that Bloomfield should only be required to provide mitigation to these receivers, in accordance with the VLAMP.

Nevertheless, the land associated with R170 and R171, as well as seven other vacant land holdings, are predicted to experience air quality exceedances over more than 25% of their area. The AQIA identified these land holdings using the maximum extent of the Project alone 24-hour PM_{10} contour, excluding five exceedances over the total Project life, as permitted by the VLAMP (see **Figure 7**).

Consequently, the Department considers that:

- five receivers / vacant land holdings (R1, Lot 2 DP 804005, Lot 52 DP 252692, Lot 53 DP 252692 and Lot 54 DP 252692) are afforded acquisition rights;
- five receivers / vacant land holdings (R170, R171, Lot 3 DP 1111313, Lot 1 DP 121623 and Lot 1 DP 1136411) are afforded acquisition rights only if acquisition is not able to be achieved under the consents for other mines which cause the greater proportion of overall impacts; and
- four receivers (R173, R175, R176 and R177) are afforded air quality mitigation rights.

The location of each receiver is shown on **Figure 6**. The vacant land holdings are shown on **Figure 7**.

R170 and R177 are predicted to also experience exceedances of the cumulative annual average TSP and deposited dust criteria of 90 $\mu g/m^3$ and 4 g/m^2/month, respectively. As detailed above, these receivers are already recommended for acquisition and mitigation rights, respectively.

The Department notes that a planning proposal has been submitted to Council to rezone Lots 32 & 33 of DP 634692 (east of the mine site) from RU1 Primary Production to a mix of R1 General Residential and E2 Environmental Conservation. The Department received submissions from the owners of these lots seeking confirmation that there would be no adverse dust impacts to this potential residential development. Bloomfield's Revised RTS demonstrated that the Project would not result in exceedances of the 24-hour PM10, annual average PM10 and annual average PM2.5 criteria (see **Figure 7**).

Cumulative Impacts

As background particulate matter occasionally exceeds the 24-hour PM_{10} and $PM_{2.5}$ criteria, the EPA requested that Bloomfield undertake an assessment to predict the Project's impacts at privately-owned residences on these days. This assessment combined the Project's highest predicted 24-hour particulate matter concentrations with the highest observed background concentrations, using historical meteorological data. This assessment predicted that nine receivers (R19, R61, R140, R151, R163, R164, R170, R171 and R173) would experience exceedances of the cumulative 50 $\mu g/m^3$ 24-hour PM_{10} criterion for between 1 and 5 additional days per year. The cause of these additional days would be the result of high elevated background levels from other nearby mining operations. On all days where an exceedance is predicted, the Project's contribution would be low. The predicted additional days of exceedance are predominantly attributed to elevated background levels and would not be a result of the Project alone. Consequently, acquisition or mitigation under the VLAMP does not apply.

The EPA identified that additional days with cumulative exceedances may be experienced at other residences surrounding the nine receivers identified above. Bloomfield responded that the nine receivers would be subject to the greatest potential impact from the Project and that its impacts on surrounding receivers would be either similar or less. This was confirmed in the Revised RTS which provided a contemporaneous assessment of R45 showing similar but lower exceedances than R140. The Department accepts that other properties surrounding these nine receivers are likely to experience lesser Project impacts. The EPA confirmed in subsequent advice that no further assessment was required.

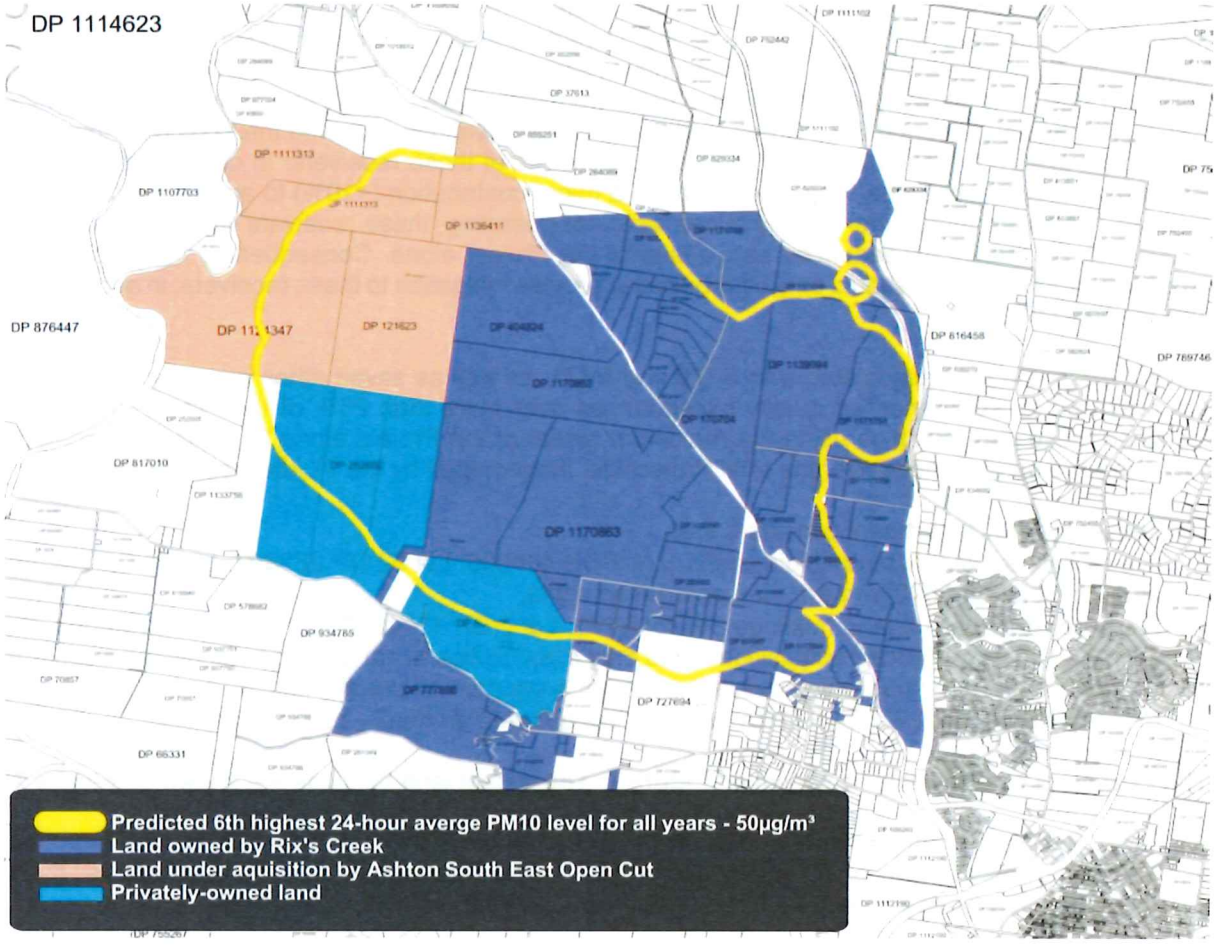

Figure 7: *Vacant land assessment using the predicted 6th highest 24-hour average PM_{10} level*

The Revised RTS included a revised production schedule with the maximum proposed production level reducing from 4.5 Mtpa to 3.6 Mtpa. However, as a conservative measure, this change was not quantified for the Level 2 AQIA. Consequently, the Department notes that the additional days of 24-hour PM_{10} described above, are likely to be lower than predicted.

Mine-Owned Residences

In addition to private properties, the Department recognises that Bloomfield and other mines own and tenant a number of residences in the area surrounding the Rix's Creek Mine. Dust levels at many of these mine-owned properties would exceed the applicable air quality criteria for privately-owned properties.

There are no applicable air quality criteria for mine-owned properties. Standard practice (first established by the Commission) is that the mine must inform any tenants of its properties of any potential health risks associated with predicted air quality impacts. Tenants may then make their own decision as to whether they remain in the property or seek alternate accommodation. The Department would recommend its standard conditions requiring Bloomfield to advise both landowners (in the case of a neighbouring mine) and tenants of any property significantly affected by air quality emissions of the possible health and amenity impacts of elevated dust concentrations, in consultation with NSW Health.

On this basis, the Department is satisfied that all current and future tenants would be made aware of the potential health implications of dust generated by the Project and that these issues would then be appropriately managed and/or mitigated.

6.1.4 Other Air Quality Impacts

Blast Fumes

The AQIA included an assessment of potential blast-related fumes. The predicted blast fumes would be within the 1-hour average NO_2 criterion of 246 $\mu g/m^3$ at all nearby private residences for all blasts occurring between 9 am and 3 pm in all modelled years. Between 3pm and 5pm, and under adverse weather conditions, blast fumes may exceed the NO_2 criterion.

A number of community submissions raised concerns over the incremental and cumulative impacts of blast-related fume plumes on the village of Camberwell, as well as other nearby residents. Additionally, NSW Health requested that appropriate control measures are implemented to protect the public from blast fume emissions.

The EPA requested clarification on the AQIA's derivation of emissions of NO_2 from blasting. The Revised RTS confirmed that the emissions rate assumed (63.3 kg) was the maximum mass of NO_2 emitted from any measured blast in the CSIRO study of Hunter Valley blasts (Attala et al, 2008). The EPA was satisfied with this conservative assumption.

The Revised RTS also confirmed that the stated NO_2 levels represented a worst-case unmitigated event and were generally unlikely to occur. Blast fumes cannot be controlled precisely as they are influenced by the explosive specifications, confinement, ground conditions and 'sleep time' (the length of time that the explosives remain the ground before firing). However, in practice, blasting would only be undertaken following consideration of prevailing weather conditions. In the event of unfavourable conditions such as temperature inversions or elevated wind speeds, blasting would be rescheduled. To determine if blasting conditions are appropriate, Bloomfield currently uses a blast overpressure dust and fume system that utilises weather forecast data to predict plume movements and reschedule blasts as necessary. Bloomfield currently operates a Blast Management Plan to manage this entire blast process from design to implementation, initiation and evaluation. Further, a Blast Fume Management Strategy based on the *Code of Practice: Prevention and Management of Blast Generated NOx Gases in Surface Blasting* (Australian Explosives Industry and Safety Group Inc, 2011) is used to specifically manage and monitor blast fume emissions.

The Department is generally satisfied that blast fume emissions could be managed to comply with the NO_2 criterion. This confidence is largely driven by evidence that the existing Rix's Creek Mine has been able to operate with relatively few blast-fume related issues. It could therefore be expected that the ongoing operation of the Project would be managed in a similar manner. The Department would therefore recommend continued preparation and implementation of a Blast Management Plan and Blast Fume Management Strategy to minimise off-site fume emissions.

Other blast-related impacts are further considered in **Section 6.3**.

Diesel Emissions

The AQIA included dispersion modelling of diesel powered equipment emissions for each indicative mine plan year. These emissions were added to background levels to determine the potential impacts of the Project.

This modelling predicted that no private or mine-owned receivers would experience exceedance of the maximum 1-hour average and annual average criteria for NO_2 concentration (246 µg/m^3 and 63 µg/m^3, respectively).

Bloomfield currently implements a number of measures at Rix's Creek to minimise diesel use as well as odour and NOx emissions. In addition, Bloomfield has acquired relatively new fleet from the Integra acquisition which will improve vehicle efficiency and reduce diesel consumption. Additionally, the provision of a second cut and cover tunnel would allow all for improved haulage efficiencies.

The EPA raised concern that the use of an emissions control factor should not apply to diesel exhaust emissions and that the AQIA had only provided an estimation of emissions from diesel engines used on haul roads and did not include other equipment.

Bloomfield's Revised RTS provided a recalculation of particulate matter emissions following the removal of the control factor for diesel exhaust emissions which resulted in an 11.1% increase in $PM_{2.5}$ emissions. Additionally, Bloomfield identified that diesel emissions from all sources were captured in emissions modelling and that the maximum predicted increase of $PM_{2.5}$ emissions at most privately-owned residences would be 0.1 µg/m^3. The EPA raised no further issues with the calculation of these emissions.

The Department also notes that Bloomfield's predictions were based on the initial production schedule (ie maximum production of 4.5 Mtpa) and in effect would be 20% lower at the revised maximum production schedule. Additionally, the Department is satisfied that the EPA could manage any specific sources of NOx emissions under any PRP that it chose to attach to the EPL for the Rix's Creek Mine.

Odour Emissions

The AQIA also included an assessment of odour impacts from spreading of bio-solids to assist with rehabilitation. Bio-solids have been applied at the site for a number of years at a typical application rate of 140 wet tonnes per ha. The Project is proposing to continue the spreading of bio-solids at its existing rate of approximately 10,000 tonnes per year. Dispersion modelling demonstrated that estimated odour emissions would be below the applicable odour criteria at all surrounding receptors.

The Department recommends that Bloomfield manage and mitigate odour impacts as part of the Project's Rehabilitation Management Plan. Mitigation measures likely to be proposed include premixing topsoil or overburden with bio-solids before spreading, analysing meteorological forecasts and only spreading bio-solids during favourable weather conditions.

Greenhouse Gas Emissions

The AQIA indicates that the Project would not materially change the mine's annual average greenhouse gas emissions (GHGEs) compared to existing operations, but would increase total emissions generated over the mine life, in line with the proposed 21-year extension in mine life.

The Project would contribute an estimated annual average 0.047 Mt of Scope 1 and Scope 2 CO_2-equivalent emissions each year. This represents about 0.009% of Australia's annual average emissions for 2013-14. Total indirect emissions over the life of the Project would be about 71 Mt of Scope 3 CO_2-equivalent emissions. Most of this would not be included in Australia's annual emissions, as product coal would be primarily exported for combustion overseas. Regardless, the Scope 1, 2 and 3 emissions associated with the Project and overseas combustion would result in a negligible increase in global temperature.

Under the conditions of consent for the existing Rix's Creek Mine, Bloomfield is required to implement measures to minimise energy use and GHGEs. The Department notes that Scope 1 and Scope 2 GHGEs have been valued as part of the Project's cost benefit analysis. This is discussed further in **Section 6.7**.

Given that the Project would not significantly change annual average GHGEs and in general terms represents a continuation of existing operations, the Department is satisfied that GHGEs could be managed appropriately under a continuation of existing conditions of consent.

6.1.5 Mitigation and Management

Bloomfield would continue to implement its existing mitigation measures as described in the mine's existing Air Quality and Greenhouse Gas Management Plan and as required under the site's EPL.

Bloomfield notes that the EPL's PPR also requires it to identify and assess the practicality of implementing further best practice measures over time. Bloomfield has committed to continue to use its existing monitoring network to actively monitor dust levels and establish triggers to inform the mine's management of when operations need to be temporarily modified or ceased.

As mining is proposed to progress northwest away from Singleton, dust levels are expected to reduce at some private properties in the later years of the Project. Whilst the direction of mining would progress toward Camberwell, the Department considers that Bloomfield's real-time monitoring network and adaptive management procedures should be able to minimise additional dust impacts to this area.

The Department recommends the continued implementation of all reasonable and feasible best practice air quality management measures. Overall, the Department considers that the existing dust mitigation and management measures at Rix's Creek Mine reflect best practice dust control and the continued implementation of an Air Quality and Greenhouse Gas Management Plan and monitoring network would allow for Bloomfield to identify and avoid potential exceedances of air quality criteria at privately-owned residences.

6.1.6 Conclusion

As mining progresses to the northwest, impacts on Singleton are expected to reduce, whereas impacts to Camberwell are expected to increase. However, the Department is generally satisfied that the increase in air quality impacts would be relatively minor compared to the existing air quality environment and that operational measures could be implemented to minimise potential impacts, particularly during adverse meteorological conditions.

Nevertheless, the Department notes that the AQIA indicates that several privately-owned properties are likely to trigger relevant provisions in the VLAMP and should be afforded rights to appropriate mitigation or acquisition as a result of the Project.

The Department is satisfied with Bloomfield's consideration of blast fumes, diesel emissions and GHGEs, and that these emissions can be managed to acceptable standards. Bloomfield has committed to continue implementing its air quality management system, including the use of predictive forecasting and real-time monitoring. Overall, the Department believes that the air quality aspects of the Project can be managed through the development of robust and contemporary conditions of consent and the implementation of comprehensive management measures.

6.2 Noise

The EIS included an Environmental Noise Assessment (ENA), prepared by Global Acoustics, that predicted the potential worst-case noise levels at privately-owned residences and evaluated the potential health and amenity impacts of these noise levels. The ENA used noise modelling to predict noise levels for all mine plan years under both neutral and noise-enhancing weather conditions. The ENA was undertaken in accordance with the *NSW Industrial Noise Policy* (INP), *NSW Road Noise Policy*, *Rail Infrastructure Noise Guidelines* and the VLAMP.

On 27 October 2017, the EPA released the *Noise Policy for Industry* (NPI), which replaces the INP as the relevant NSW Government policy for the management and control of industrial noise sources. The development application for the Project predated this release and the transitional arrangements stipulate that, apart from those aspects of the NPI that relate to low frequency noise, the INP continues to apply as the relevant NSW Government policy for the assessment and determination of the Project. The Project's low frequency noise impacts are discussed further below.

Noise impacts were raised regularly as a concern in public objections to the Project. Noise was also identified as an issue of concern to nearby residents in the EIS's Social Impact Assessment. The Department has carefully considered the existing operation of the mine, the design of the Project to minimise noise impacts and the implementation of reasonable and feasible mitigation measures to reduce noise emissions.

6.2.1 Existing Noise Environment

The existing noise criteria under DA 49/94 were defined prior to the application of the INP (see **Table 4**). At that time, the L_{A10} noise index was commonly used to establish noise criteria rather than the L_{Aeq}, which has been used since the release of the INP. In addition, the L_{A10} limit applies under neutral conditions whereas the L_{Aeq} applies under noise-enhancing weather conditions (ie source-to-receiver

wind speeds of 3 m/s or below at 10 m height. In order to enable comparison between these indices, the Department has converted the existing noise criteria to the equivalent L_{Aeq} levels by adding 5 dB (see **Table 4**).

Since the mine was first approved in 1995, Singleton Heights and other communities close to the mine have grown significantly. The mine now operates in a complex rural-suburban noise environment which is affected by a number of other significant noise sources, including other mines and non-mining transport infrastructure. In general, noise from other mines becomes noticeable under noise-enhancing weather conditions such as when winds are from the north or northwest or in temperature inversion conditions that commonly occur during nights and early mornings in winter months.

The ENA grouped sensitive receivers into 15 separate noise assessment groups (NAGs), based on the noise environment and location (see **Figure 8**).

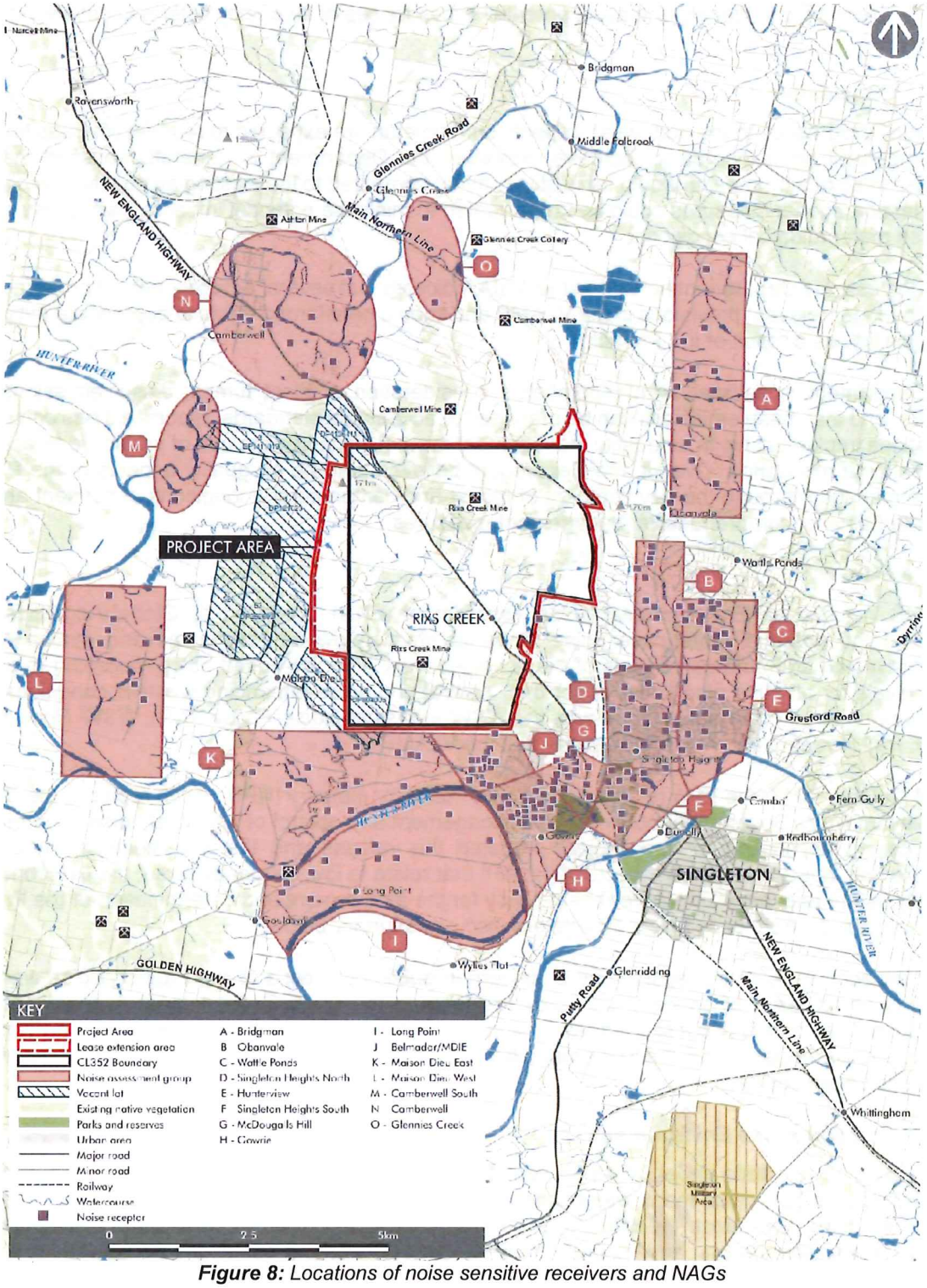

Figure 8: *Locations of noise sensitive receivers and NAGs*

Receivers to the east near Bridgman Road, Obanvale and Wattle Ponds (NAGs A – C, respectively) are rural areas affected by road and rail noise and operational noise from the existing CHPP and rail loading infrastructure. Receivers in Singleton Heights, Hunterview, Singleton Heights South and McDougalls Hill (NAGs D, E, F and G, respectively) are characterised by suburban noise environments. Receivers in McDougalls Hill (NAG G) are also suburban in nature but are affected by road noise from the New England Highway, industrial noise from the Maison Dieu Industrial Area and rail noise from the nearby Main Northern Railway line.

The acoustic environment east and southeast of the mine begins to change from suburban to rural in Gowrie (NAG H). The areas south and south-west of the mine, including Long Point (NAG I), Belmadar Way and Maison Dieu Road (NAG J) and Maison Dieu East (NAG K), are rural in character. Receivers in Maison Dieu West (NAG L), Camberwell South (NAG M) and Glennies Creek (NAG O) are also rural but are affected by operational noise from several other mines, including Rix's Creek North, Mount Owen, Ashton SEOC, Hunter Valley Operations and/or Warkworth (depending on weather conditions). Receivers in Camberwell (NAG N) experience those mine noise impacts as well as road noise from the New England Highway.

A review of the mine's attended noise monitoring results between 2014 and 2017 indicates that there were no exceedances of its existing noise criteria. However, the mine continues to receive noise complaints, which reflects its close proximity to Singleton and surrounding suburbs and the large number of potentially affected privately-owned residences and the outdated nature of the mine's existing noise criteria.

A review of complaints received between 2014 and 2017 indicate that they predominantly come from residents located to the south of the mine near Maison Dieu and McDougalls Hill. A lesser number of complaints were also received from Long Point, Camberwell and Bridgman.

In 2016, the number of complaints increased significantly from approximately 15 to 38. Thirty-three of these were from two individual receivers, located in NAGs G and K. Rix's Creek North also recommenced mining operations in 2016 and this may have contributed to the increase in the noise complaints that year. In 2017, the number of noise complaints slightly reduced to 33.

6.2.2 Project Specific Noise Levels or Achievable Noise Criteria

Under the INP, Project Specific Noise Levels (PSNLs) are calculated based on the more stringent of a project's intrusiveness criteria (ie background noise environment + 5 dB) or the general amenity criteria (ie noise criteria specific to land use and associated activities). However, the INP also permits alternate 'achievable' noise criteria (ANC) to be considered for existing operations with predicted exceedances of their PSNLs, following the implementation of all reasonable and feasible noise mitigation measures.

In this case, the Project's PSNLs are based on the intrusiveness criteria. Despite its existing and proposed mitigation measures, Bloomfield has advised that it would be unable to reduce its proposed noise levels to fully meet its PSNLs, particularly during noise-enhancing weather conditions. This is largely due to the urban fringe of Singleton township coming closer to the mine site over the past 10-15 years, together with the stricter noise standards applicable more than 20 years after the mine was first approved. Consequently, Bloomfield has proposed ANC for the Project (see **Table 4**).

***Table 4**: Existing and proposed noise criteria*

	Existing Noise Criteria under DA 49/94		**Proposed Criteria**		
NAG	L_{A10} dB(A) day/night	L_{A10}dB(A) converted to L_{Aeq} dB(A)	**PSNLs** (ie background + 5 dB (A)) $L_{Aeq15\ minute}$ dB(A) day/evening/night	**ANC** $L_{Aeq15\ minute}$ dB(A) in all periods	**Sleep Disturbance Criteria** $L_{A1,1\ minute}$ dB(A)
A	42/40	47/45	38/38/38	42	48
B	42/40	47/45	43/42/37	42	47
C	42/40	47/45	43/42/37	42	47
D	-		36/36/35	40	45
E	-		36/36/35	40	45
F	-		36/36/35	40	45
G	-		39/39/37	40	48
H	-		38/38/37	40	47
I	-		37/37/37	40	47
J	-		39/39/37	40	47
K	38/38	42/42	35/35/35	40	45

Existing Noise Criteria under DA 49/94			Proposed Criteria		
NAG	L_{A10} dB(A) day/night	L_{A10}dB(A) converted to L_{Aeq} dB(A)	PSNLs (ie background + 5 dB (A)) $L_{Aeq15\ minute}$ dB(A) day/evening/night	ANC $L_{Aeq15\ minute}$ dB(A) in all periods	Sleep Disturbance Criteria $L_{A1,1\ minute}$ dB(A)
L	-		37/37/37	40	47
M	-		39/39/38	40	48
N	-		45/42/39	40	49
O	-		35/35/35	40	45

As the mine is an existing operation with legacy noise issues and an encroaching suburban environment to the east and southeast, Bloomfield proposed ANC of 42 dB(A) at NAGs A, B and C and 40 dB(A) at all other receivers in all periods. Although the ANC are generally higher than the calculated PSNLs, they are substantially below (between 2-5 db(A)) than the existing approved noise criteria. Bloomfield has committed to achieving these ANC.

The Department and EPA endorsed the proposed use of ANC instead of PSNLs as target noise limits for the Project. Because compliance with the ANC was modelled on the basis that the CHPP cladding had been completed, the Department recommends that the CHPP is clad before commencement of coal extraction under the Project.

6.2.3 Existing Mitigation Measures

In order to accept the proposed ANC, the INP first requires that all reasonable and feasible noise mitigation measures are implemented. In 2012, the EPA required Bloomfield to implement all reasonable and feasible noise mitigation measures through a PRP applied to the mine's EPL. The PRP led to a number of recommendations to reduce noise emissions from existing operations, including:

- designing the progression of mining to ensure the southern emplacement area continues to shield noise for receivers located to the south of Pit 3 near Belmadar Way and Maison Dieu Road;
- programming overburden emplacement at different locations and varying elevations to increase distance of separation and shield emplacement during noise-enhancing weather conditions;
- redesigning haul roads to shield truck noise;
- constructing noise barriers near the ROM pad and southern side of the haul route;
- cladding part of the CHPP;
- attenuating mobile equipment (eg truck fleet); and
- developing a predictive noise model to proactively manage noise.

All of these measures have been implemented by Bloomfield, except for cladding the CHPP. The EPA was satisfied with Bloomfield's progress and commitments and removed the noise-related PRP from the EPL on 3 August 2017. The Department notes that the PRP was removed prior to cladding the CHPP due to Bloomfield's commitment to implement this cladding under the Project.

Bloomfield proposes to continue to implement its existing noise management system. This includes a range of reactive and proactive mitigation and management measures, including the use of the Environmental Meteorological System. Bloomfield has also acquired an attenuated fleet through its purchase of Rix's Creek North and has commenced integrating this fleet into current operations at Rix's Creek. Bloomfield has committed to continue to operate its existing monitoring network to actively monitor noise levels and establish triggers to make decisions when operations need to be temporarily modified or ceased.

As part of Modification 8 to DA 49/94, conditions were included requiring the mine to establish a representative network of real-time noise monitors, a requirement which the Department applies across all Hunter Valley coal mines. Real-time noise monitoring is a key input to successful adaptive management and therefore it will improve Bloomfield's responsiveness to and avoidance of noise exceedances. Bloomfield has also committed to continue daily attended monitoring at receivers around the mine during the evening and night periods, as well as monthly monitoring for compliance purposes. The Department considers that, subject to cladding the CHPP, Bloomfield will have implemented all reasonable and feasible noise mitigation measures, and that the noise management system would reflect contemporary best practice.

The Department also considers that Bloomfield's existing complaints management procedures are adequate. Upon receipt of a noise complaint, Bloomfield conducts attended monitoring at the location (or in the vicinity) of the complainant, to determine if noise levels are in compliance with its conditions

of consent. Subsequently, details of the complaint are documented and results of attended monitoring are recorded. The complainant is contacted within 24 hours of attended monitoring to discuss the outcome of the investigation.

6.2.4 Predicted Operational Noise Impacts

Modelled Scenarios

The ENA modelled four stages over the life of the development representing Years 1, 4, 7 and 10 of the mine plan. These years were considered representative of the noise emissions for the Project. Modelling was based on the initial production rates described in the EIS. The ENA was not remodelled to reflect the lower production schedule in the Revised RTS.

All modelling scenarios were based on the worst-case situation which included all major open cut and CHPP plant items and rail infrastructure operating simultaneously at maximum sound power (excluding rail locomotives which were modelled as idling on the rail loop). Bloomfield advised that the combined operation of this equipment would be unlikely and this therefore represents a conservative approach to modelling.

Modelling scenarios also included the application of the PRP mitigation measures described above, including future cladding of the CHPP and progressive adoption of an attenuated fleet. It should be noted that the mitigation included in these modelling scenarios did not include staged shutdown of operations.

Predicted Exceedances

The ENA predicts that there would be no exceedances of the ANC across all NAGs under neutral weather conditions. However, under noise enhancing weather conditions, the ENA predicts many exceedances of the ANC across most NAGs in the day, evening and night periods.

Table 5 identifies exceedances of the ANC under noise-enhancing weather conditions. Significant exceedances (shaded in red) are predicted to occur in NAGs G, J, K and N. Moderate exceedances (shaded in orange) area also predicted to occur in NAGs B, C, D, H and O. These predictions are based on the mine operating at maximum sound power levels, and are considered to be conservative. The majority of these exceedances (81%) are predicted to occur in the first five years of the Project.

In general, the number and severity of exceedances is predicted to decrease over the life of the Project as mining progresses away from Singleton. The Department notes that noise levels during Years 5 and 7 are likely to be lower than predicted as a result of the change in the proposed maximum production level from 4.5 Mtpa to 3.6 Mtpa. However, as this change has not been quantified, the Department can only note that predictions during these years now represent conservative predictions that in reality are likely to be lower.

To demonstrate that the predicted exceedances of the ANC could be proactively avoided, Bloomfield modelled a modified operations scenario (Night 2). This scenario excludes the use of coaling equipment and reject haulage. Additionally, in Year 1, the Night 2 scenario excludes an overburden extractor and associated fleet. Under the Night 2 scenario, most exceedances of the ANC are avoided (see **Table 5**).

Under the Night 2 scenario, the Project is predicted to achieve compliance with the ANC at all NAGs, except at NAG J in Years 1 and 4, where a 2 dB(A) exceedance is predicted. No exceedances of the Night 2 scenario are predicted from Year 7 onwards. This shows that progressive or temporary shutdown procedures are capable of reducing noise levels by up to 7 dB(A).

Bloomfield also recognises that it is likely that progressive, or temporary, shutdown of plant and equipment would be required for around thirty per cent of the winter period to achieve compliance with the ANC at all times. Bloomfield has therefore committed to adjusting operations to comply with the ANC and considers that there is sufficient flexibility in its proposed production schedule to accommodate this adaptive management without materially impacting its operations.

Bloomfield advised that further modification of operations may be required to achieve compliance with the ANC at receivers in NAG J. The Department is confident that the predicted 2 dB(A) exceedance of the ANC at NAG J could be avoided with the shutdown of additional equipment on site.

Table 5: *Predicted operational noise levels under noise enhancing weather conditions (90th percentile)*

NAG	Current criteria L_{A10}dB(A) day/night	ANC $L_{Aeq15\ minute}$ dB(A) all periods	Year 1				Year 4				Year 7				Year 10			
			Day	Eve	Night	Night2	Day	Eve	Night	Night2	Day	Eve	Night	Night2	Day	Eve	Night	Night2
A	47/45	42	25-40	27-41 (1)	28-42 (2)	25-38	26-39	23-39	24-40	22-38	22-38	22-38	23-39	23-39	24-38	22-38	22-39	22-38
B	47/45	42	42-43 (1)	42-43 (1)	44-45 (3)	37-40	40-41	40-41	42-43 (1)	36-40	39-40	38-40	40-42	38-41	39-40	39-40	41-42	39-41
C	47/45	42	33-44 (2)	31-44 (2)	33-46 (4)	26-40	31-41	27-42	29-44 (2)	23-41	28-40	25-40	26-42	25-41	30-40	27-40	28-42	25-41
D	-	40	36-42 (2)	34-43 (3)	35-43 (3)	26-35	32-39	33-43 (3)	34-44 (4)	24-37	30-38	29-39	30-40	27-38	30-38	31-39	32-39	29-38
E	-	40	24-39	25-40	29-41 (1)	16-33	21-38	21-39	23-39	15-34	23-36	18-36	20-37	18-35	23-36	22-36	27-37	19-35
F	-	40	34-38	36-39	37-39	23-29	31-36	34-37	35-38	23-31	30-34	29-33	30-33	25-30	29-34	29-34	30-35	25-32
G	-	40	32-45 (5)	35-46 (6)	36-46 (6)	21-40	31-43 (3)	24-42 (2)	25-44 (4)	22-40	28-41 (1)	25-41 (1)	25-42 (2)	22-40	25-40	25-40	26-41 (1)	22-39
H	-	40	31-44 (4)	36-44 (4)	37-45 (5)	29-39	27-42 (2)	28-42 (2)	28-42 (2)	23-39	26-39	26-39	26-40	22-38	24-38	25-38	25-38	22-37
I	-	40	34-39	38-40	37-40	25-33	33-38	30-36	30-35	27-33	27-33	26-33	26-32	21-30	29-34	29-34	30-34	22-32
J	-	40	38-47 (7)	42-48 (8)	42-49 (9)	36-42 (2)	35-45 (5)	31-44 (4)	31-44 (4)	27-42 (2)	30-42 (2)	29-40	29-41 (1)	25-38	31-42 (2)	30-41 (1)	31-42 (2)	26-39
K	42/42	40	37-45 (5)	41-47 (7)	41-47 (7)	31-40	36-42 (2)	38-43 (3)	36-43 (3)	33-37	28-36	33-37	31-38	29-33	32-39	33-37	32-38	27-33
L	-	40	35-40	36-41 (1)	33-39	20-33	33-38	29-38	27-35	19-33	25-36	26-39	23-35	20-34	24-35	22-37	19-33	16-32
M	-	40	37-38	40-41 (1)	39-40	27-30	36-38	33-35	31-34	24-30	28-32	34-34	29-33	28-32	28-33	28-32	26-31	23-30
N	-	40	33-40	39-46 (6)	38-46 (6)	26-35	31-38	31-38	31-38	27-36	25-37	27-39	26-39	23-38	29-37	25-39	24-39	23-38
O	-	40	35-38	38-42 (2)	39-43 (3)	31-34	33-36	33-37	34-38	32-35	33-35	32-35	34-37	33-36	32-35	32-35	34-36	33-36

Legend

	Exceed ANC >5 dB(A)
	Exceed ANC 3 – 5 dB(A)
	Exceed ANC 1-2 dB(A)

Although the Night 2 scenario only reflects modified operations in the night period, Bloomfield has advised that modifications could be also applied during the day and evening periods, on an as-required basis, to ensure that the ANC could be met at all times. Ultimately, the ability of the Project to achieve compliance with its ANC would depend on the modification of operations during adverse weather conditions, particularly for the first 4 years of the Project.

This approach is inherently reliant on the quality and application of the Project's proactive noise management system. The Department considers that the noise management system is adequate in facilitating Bloomfield's approach to modify operations, particularly with the use of real-time and predictive modelling. Bloomfield has demonstrated compliance with its existing noise criteria using the same system. However, to ensure that the procedures for modifying operations are well understood and communicated, the Department recommends that Bloomfield prepare a Noise Management Plan which includes a detailed description of the staged and temporary shutdown procedures that would be implemented to achieve compliance with the ANC.

Overall, the Department considers that the Project would achieve a beneficial reduction in noise impacts, particularly for a legacy mine in a rural-suburban environment. The Department is satisfied that Bloomfield could achieve its ANC by adhering to strong noise management and monitoring conditions, including:

- cladding the CHPP prior to commencement of the Project;
- predictive noise modelling;
- real-time and attended noise monitoring; and
- application of adaptive management under noise enhancing weather conditions, including staged and temporary shutdown.

In accordance with relevant provisions in both the INP and the VLAMP, the Department does not recommend any noise-related mitigation or acquisition rights be afforded to sensitive receivers as a result of the Project.

6.2.5 *Other Noise Impacts*

Vacant Land Assessment

The ENA also assessed noise impacts to potentially affected vacant land in relation to the amenity criteria. Three properties located adjacent to the western boundary of the Project area are predicted to be affected by noise impacts as mining and overburden emplacement moves in this direction. Lot 1 DP 121623 and Lot 1 DP 1136411 would experience night-time noise levels that exceed the relevant amenity criterion of 45 dB(A) across 53% and 81% of the properties, respectively. Both of these properties already benefit from acquisition rights under the Ashton SEOC approval. Lot 54 DP 252692 is also predicted to experience noise levels that would exceed the relevant amenity criterion of 55 dB(A) across 33% of the property during the day-time period.

As a result, the Department considers that these properties should qualify for acquisition rights under the Project in the event that existing acquisition rights under other approvals (eg Ashton SEOC) are no longer available.

Additionally, in accordance with the VLAMP, these acquisition rights would also apply to Lots 52 and 53 DP 252692, which are contiguous to Lot 54 DP 252692 and are owned by the same landowner. Similar recommendations were made for these three properties due to air quality impacts (see **Section 6.1**).

Two other properties (Lots 32 and 33 in DP 634692) were identified in a public submission as being potentially affected by Project-related noise. The submission identified that these properties were subject to a planning proposal to rezone land to residential uses and stated that this had not been adequately considered in the EIS.

In the Revised RTS, Bloomfield provided revised noise contour maps, which indicated that noise from the Project would not exceed the amenity criteria at these two properties under the INP during all periods, subject to adaptive management under noise enhancing weather conditions. On this basis, the Department is satisfied that these two properties would not be unduly affected by Project-related noise and no mitigation or acquisition rights would be applicable under the VLAMP.

Construction Noise

Construction activities associated with the Project include cladding the CHPP, construction of an earth bund on the southern side of the coal haul route and a second cut and cover tunnel beneath the New England Highway. The ENA did not quantitatively assess construction noise from these works because it considered that these activities would not be audible over and above the noise generated by mining operations. The ENA therefore considered that the proposed ANC would be sufficient to regulate these activities.

However, the Department considers that the construction of the cut and cover tunnel should be managed under the *Interim Construction Noise Guidelines* (ICNG) and that a condition of consent should be recommended to ensure Bloomfield adheres to the noise management levels defined in this policy. Other construction works are expected to be within operational noise limits as they are temporary and would occur during daytime hours.

Sleep Disturbance

In accordance with the INP, the sleep disturbance criterion is based on noise emissions ($LA_{1\ minute}$) not exceeding the background noise levels by more than 15 dB(A) (see **Table 4**). The ENA applied a worst-case scenario to assess the potential for the Project to exceed sleep disturbance criteria. This involved applying maximum sound power levels to sources likely to generate noise that may stand out above the general noise continuum, such as excavator buckets or rocks impacting truck bodies, dozer track slap and exhaust surges in haul trucks.

While no exceedances were predicted under neutral conditions, there were several minor exceedances predicted at night-time under noise enhancing weather conditions at receivers in NAG J and K. These exceedances are predicted to occur during the early years of the Project (ie Years 1 to 4). Modelling under the Night 2 scenario predicted that Bloomfield could avoid these exceedances and achieve compliance with sleep disturbance criteria.

The Department is satisfied that, subject to careful and adaptive management by Bloomfield, the Project would not result in exceedances to sleep disturbance criteria.

Low Frequency Noise

The ENA adopted two methodologies to assess the low frequency noise emissions from the Project, being:

- an assessment of whether the difference between C-weighted and A-weighted predicted total noise levels is greater than or equal to 15 dB(A), in accordance with the INP; and
- a comparison of total predicted C-weighted levels at receiver locations with an upper limit criterion, in accordance with *A Simple Method for Low Frequency Noise Emission Assessment* (Broner, 2010).

Whilst the INP continues to apply in all other noise aspects, the transitional arrangements of the NPI require the immediate implementation of Fact Sheet C, which reflects a more current understanding of the impact of tonal and low-frequency noise on the community. The C-weighted minus A-weighted methodology continues to apply in Fact Sheet C. Bloomfield would be required to monitor low frequency noise and achieve compliance in accordance with Fact Sheet C.

No exceedances of the Broner Method were predicted. However, in applying the INP's methodology, the ENA predicted differences greater than 15 dB for C-weighted minus A-weighted noise levels. The CHPP was identified as the greatest contributor of low frequency noise. Bloomfield has committed to clad two sides of the CHPP to minimise low frequency noise affecting nearby receivers, in particular, those at NAG B. Subject to this, the ENA predicts that the Project would not exceed relevant C-weighted minus A-weighted noise criteria and that modifying factors are not required.

On the basis that the CHPP is clad prior to the commencement of the Project, the Department considers that the low frequency noise impacts of the Project are acceptable.

Rail and Road Noise

The ENA assessed noise impacts arising from the section of the Integra rail loop that extends beyond the Project area to the Main Northern Railway line (a distance of around 2 km). Coal trains are not predicted to exceed the relevant night criterion of 40 dB(A) under worst-case conditions (ie a train idling on the track at night), when measured at the closest receiver.

The ENA predicted a negligible change in road noise from the increase in vehicles accessing the site from additional employees, deliveries and construction equipment.

Cumulative Noise

Rix's Creek Mine is surrounded by a number of other coal mining operations. As such, the ENA assessed the Project's potential cumulative noise impacts. Some of these other mines, including Mount Thorley/Warkworth, Hunter Valley Operations, Ashton SEOC and Mount Owen are located a significant distance from Rix's Creek Mine. At these distances, the direction of prevailing winds would be unlikely to lead to cumulative noise impacts.

However, noise from Rix's Creek North is likely to result in exceedances of the INP's acceptable night-time rural amenity criteria of 40 dB(A) at five receivers (R175, R176, R177, R178 and R179). These exceedances range between 1 and 5 dB(A) above the rural amenity criteria and are predicted to occur under worst-case conditions during the early years of the Project. All of these receivers have acquisition rights under the Rix's Creek North project approval. As such, the maximum potential treatments under the VLAMP have already been afforded to these receivers.

The Department notes that the cumulative noise predictions were based on both sites (ie Rix's Creek and Rix's Creek North) operating at maximum plant capacity, which in reality is a rare occurrence. As such, Bloomfield considers the cumulative noise impact predictions to be conservative.

Nevertheless, the Department considers that Bloomfield's Noise Management Plan should include a program to determine the contribution of the Project to the cumulative noise levels in the region, to guide the management of noise emissions on site. The Department considers that Bloomfield's proposed proactive monitoring program and modified operations could avoid cumulative noise exceedances, particularly as both sites contributing to the predicted exceedances are managed by Bloomfield.

6.2.6 Conclusion

The Department and the EPA are satisfied that, following the cladding of the CHPP, Bloomfield will have implemented all reasonable and feasible mitigation measures, as required by the INP. Bloomfield has committed to implementing a range of noise management measures including adaptively modifying operations for the life of the Project to meet to ANC, daily attended monitoring during the evening and night periods, constructing a number of earthen bunds and utilising topography to maximise shielding.

Although the mine is unable to reduce its existing noise levels to meet desirable PSNLs, it has committed to noise reductions that allow the current noise criteria to be reduced by between 2-5 dB(A). Therefore, in accordance with the legacy noise provisions of the INP and VLAMP, the Department and the EPA are satisfied that the Project would achieve a beneficial change to existing noise impacts and that no mitigation or acquisition rights should be applied to receivers affected by intrusive noise.

The Department considers that noise associated with the Project could be managed through the development of contemporary conditions, including a robust Noise Management Plan which outlines how management measures would be implemented over the life of the mine to achieve the ANC. Additionally, the Department recommends the ongoing review and implementation of all reasonable and feasible noise management measures. On this basis, the Department is confident that the noise management system could be operated to minimise the likelihood of adverse noise impacts, especially during adverse meteorological conditions.

The Department considers that the three properties located on the western boundary of the Project with predicted cumulative noise exceedances of the amenity criteria over more than 25% of this area should receive acquisition rights in the event that existing rights under other mine consents/approvals are no longer available. The same three properties trigger acquisition due to air quality impacts.

Subject to these conditions, and other stringent conditions requiring the mine to implement careful adaptive management and to operate in accordance with best practice management over the life of the Project, the Department considers that the noise impacts of the Project are acceptable.

6.3 Blasting

The EIS included a Blast Impact Assessment (BIA), prepared by Terrock Consulting Engineers in October 2015, that assessed the potential ground vibration, airblast overpressure and flyrock impacts

of the Project's blasting events on nearby sensitive receivers. Sensitive receivers considered in the BIA included privately-owned residences, historic items and linear infrastructure. Potential blast fume impacts have been addressed in **Section 6.1.4**.

The BIA was revised in March 2017 as part of the Revised RTS and more recently in February 2018 as a result of changes to blast monitoring locations. The Department's assessment relies on the February 2018 version of the BIA.

Bloomfield proposes that blasting activities would continue in a similar manner to Rix's Creek Mine. Bloomfield is currently permitted to undertake blasts between 9 am and 5 pm Monday to Saturday, with no limit on blast frequency. In practice, Bloomfield undertakes approximately 10 blasts per week, commonly around 11 am in the morning or 2 pm in the afternoon.

Existing blasting criteria under DA 49/94 and EPL 3391 are tabulated in **Table 6** below. These criteria must not be exceeded unless Bloomfield has a written agreement with the relevant landowner or infrastructure owner to exceed them. These criteria remain the best practice standard for open cut mining operations and Bloomfield proposes to retain them for the Project.

***Table 6**: Existing blasting criteria*

Location	***Guideline or Standard***	***Blasting criteria***	
		Airblast overpressure (dB (Lin Peak))	*Ground vibration peak particle velocity (mm/s)*
Residence on privately-owned land	*Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZECC) and clauses 12AB(5) and 12AB(6) of the Mining SEPP	115 for 95% and 120 for 100% of blasts/year	5 for 95% and 10 for 100% of blasts/year
Historic Coke Ovens*	Site specific assessment based on ANZECC Guideline	-	5 for 95% and 10 for 100% of blasts/year
Main Northern Railway Line	As agreed with ARTC	-	25 for 100% of blasts/year
Public roads	*Australian Standard AS 2187-1993 Explosives – Storage, Transport and Use*	-	100 for 100% of blasts/year
All other public infrastructure	-	-	50 for 100% of blasts/year

**criterion under EPL 3391 only*

In addition to these criteria, Bloomfield must not blast within 500 m of the New England Highway, unless it has approval under a Road Occupancy Licence from RMS to close the Highway to through traffic, or the Main Northern Railway, unless it has a Blasting Deed with ARTC.

A review of the mine's blast monitoring results between 2014 and 2017 indicates that there have been no exceedances of the blast criteria. Occasional blasts exceed the 115 dB criterion, but these have not exceeded 5% of blasts per year. This successful performance is reflected in the mine's complaints history, with Bloomfield commonly receiving less than five blast-related complaints per year. This compliance and complaints history indicates that Bloomfield operates an effective blast management system. This is important as Bloomfield proposes to undertake Project-related blasts using the same system.

6.3.1 Existing Mitigation Measures

Bloomfield currently implements a blast management system to mitigate blast impacts and ensure compliance with its blasting criteria. The blast management system utilises the Environmental Meteorological System to model potential ground vibration and airblast impacts of planned blasts. Each blast design is tailored to the specific geological setting and proximity to sensitive receivers. This includes varying blast hole spacing, angles and depth, stemming height, explosive product selection, charge mass, loading and sequencing depending on rock thickness, rock blastability and distance to nearby sensitive receivers. Special precautions are also taken when blasting near historic underground workings to avoid breaking through to old tunnels.

Bloomfield also uses predictive systems for overpressure, dust and fumes to schedule blasts to avoid blasting in unfavourable weather conditions. Meteorological data, particularly wind speed and direction, are further reviewed in the lead up to blast initiation.

Prior to initiation, Bloomfield establishes safety exclusion zones for on-site personnel, equipment and sensitive receivers around each blast site. This includes temporary closure of the New England Highway when blasting occurs within 500 m of the highway, with prior approval from RMS.

All blasts are monitored and video recorded to assess dust and fume behaviour. Blast performance is reported monthly on Bloomfield's website and annually in the mine's Annual Review. Bloomfield also operates a 24-hour blasting hotline for blast-related enquiries or complaints.

These measures are further detailed in the mine's Blast Management Plan.

6.3.2 Predicted Blasting Impacts

Privately-owned Residences

The BIA predicted maximum airblast overpressure and ground vibration levels at the four current monitoring locations, which are considered to be representative of all privately-owned residences (see **Figure 9**). Two scenarios were modelled using a centroidal contour approach to reflect blasting activities in the two proposed mining areas. These are the extended Pit 3 (West Pit), using a charge mass of 1500 kilograms (kg) and the North Pit Area using a lesser charge mass of 500 kg.

The maximum predicted airblast overpressure and ground vibration levels are tabulated in **Table 7**. These show that blasts would comply with the 95% criteria for airblast overpressure and ground vibration at all four locations. The highest levels would be experienced by receivers south-southeast of the Project (represented by Wright) due to the shortest separation distance from Pit 3.

Overall, the Department recognises that, as is the case with air quality and noise impacts, blasting effects would generally shift away from Singleton (represented by Mines Rescue Station, MRS) and towards Camberwell (represented by Watling) as mining progresses to the northwest in the later years of the Project. Receivers to the east (represented by Retreat) are most affected by blasting in the North Pit Area, but would also experience on-going effects from Pit 3 blasting. Receivers to the east-southeast, near Maison Dieu, would similarly experience on-going effects from Pit 3 blasting.

***Table 7**: Blasting predictions – impacts at nearest receivers*

Criteria	***Minimum separation distance (m)***		***Airblast overpressure (dB (Linear peak))***		***Ground vibration (Peak particle velocity (mm/s))***	
95% criteria	-		115		5	
100% criteria	500		120		10	
Receiver	***Pit 3***	***North Pit Area***	***Pit 3***	***North Pit Area***	***Pit 3***	***North Pit Area***
Watling (NW)	3662	4895	101	99	1.45	0.38
Retreat €	3577	2284	104	97	1.33	1.13
MRS (SE)	3883	3110	101	89	1.41	0.84
Wright (SW)	2089	3451	112	100	4.10	0.76

All privately-owned residences would be situated more than 500 m from blasting activities and are therefore unlikely to be impacted by flyrock. Bloomfield would continue to implement controls for blast design and loading practices to minimise flyrock generation.

The Department is satisfied that the proposed blasting activities would comply with relevant amenity guidelines for privately-owned residences. Further, blasting is unlikely to result in any material impacts to built structures on privately-owned land, since buildings can sustain a higher level of ground vibration than the amenity criteria, which relate to human comfort. The amenity criteria are therefore considered more than adequate to avoid structural damage, except in the case of heritage structures.

The Department also acknowledges that the BIA's predictions represent normal blasting practice and there remains further opportunity to modify blast design and scheduling to reduce impacts. Bloomfield

would be required to prepare and implement a Blast Management Plan to describe all blast practices, including design, implementation, initiation and performance evaluation.

Infrastructure

The New England Highway traverses the mine site. Blasting is currently restricted within 500 m of the Highway unless approved by RMS. Bloomfield states that it would design blasts to minimise the potential for flyrock when blasting close to the New England Highway. Additionally, Bloomfield would be required to meet any requirements of the RMS during blasting within 500 m of the Highway, which in the past have involved temporarily stopping traffic and implementing traffic control measures. Recent mining operations at Rix's Creek Mine have occurred as close as 100 m to the New England Highway because of stable underlying rock structure. The Project's future mining areas are generally within this stable rock structure; however, there may be limited areas of steeply sloping strata where blast designs would need to be further modified.

A similar restriction applies to blasting within 500 m of the Main Northern Railway line. However, no future blasting would occur this close to the railway line.

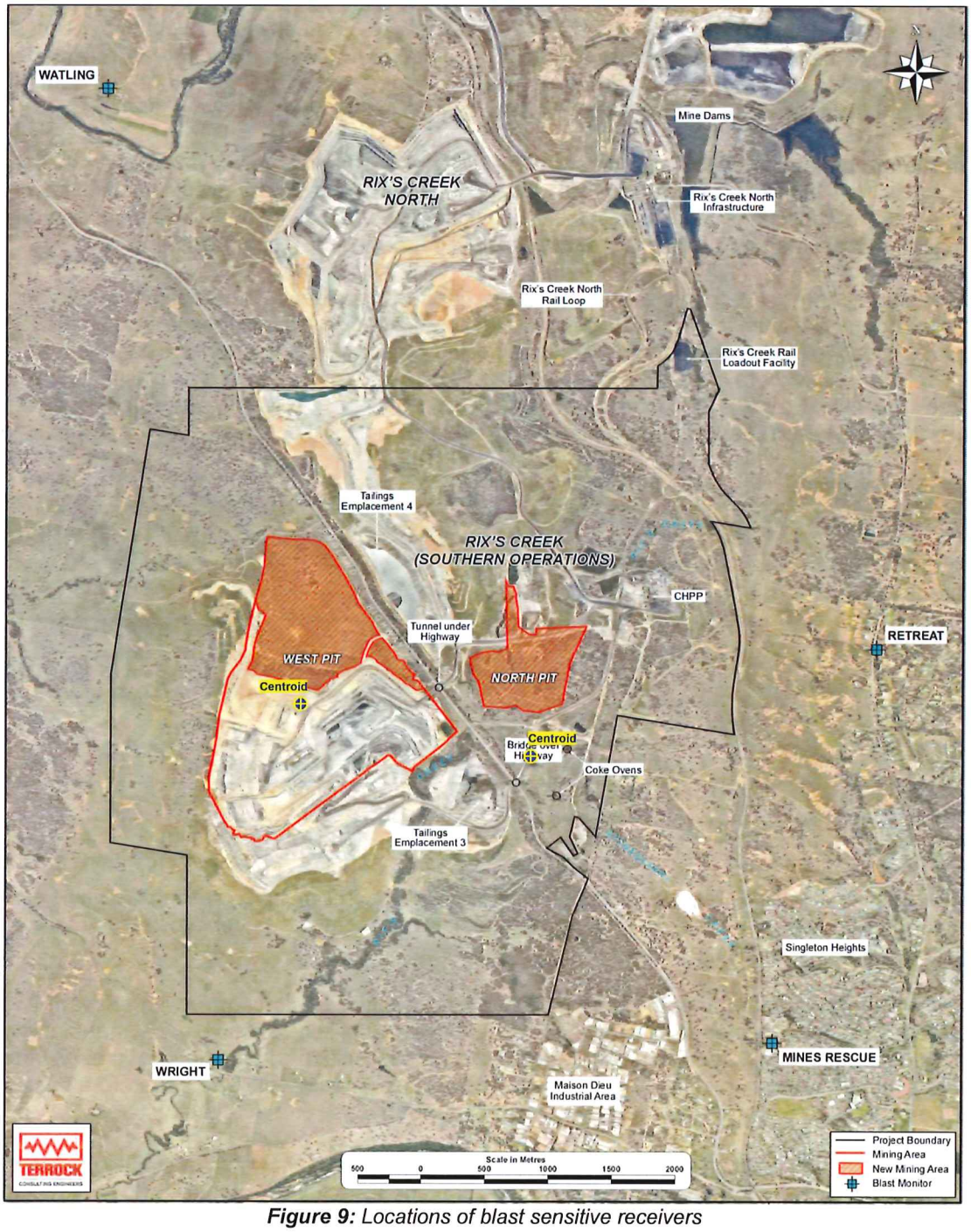

Figure 9: *Locations of blast sensitive receivers*

Considering the proximity of the North Pit Area to historic underground workings, Bloomfield should also continue to implement its existing special precautions to avoid intersecting these workings.

Other infrastructure addressed in the BIA included the Powertel-owned fibre optic cable that runs parallel to the New England Highway, the Ausgrid-owned 66 Kv powerline that runs from the Maison Dieu Industrial Area to the mine's infrastructure area and nearby dams. No exceedances of the relevant blast criteria in **Table 5** are predicted. The Department considers the proposed blasting activities have a low risk of impacting nearby infrastructure subject to Bloomfield continuing to implement measures to avoid and mitigate potential impacts as part of its Blast Management Plan.

Heritage Items

The BIA assessed the potential impacts of blasting on the Rix's Creek Coke Ovens and Associated Works (Coke Ovens), which is a local historic heritage item listed under the Singleton LEP. In lieu of specific criteria for protecting heritage structures, Bloomfield currently applies the amenity ground vibration limit of 5 mm/s for 95% of blasts and 10 mm/s for all blasts each year. However, no recent monitoring has been undertaken in the vicinity of this site to confirm that blasting has been within these limits. Bloomfield initially proposed adjusting future blast designs to mitigate impacts to the Coke Ovens rather than to directly monitor the site.

Heritage NSW raised concerns with the proposed monitoring measures for the Coke Ovens and recommended that the site be monitored for both ground vibration levels and visual damage. The Department agrees with Heritage NSW's advice that the Coke Ovens should be more closely monitored, particularly while undertaking blasting activities in the North Pit Area. In its Revised RTS, Bloomfield committed to establishing tailored ground vibration limits for the Coke Ovens and undertaking monitoring to demonstrate compliance with these limits.

The Department considers that this monitoring program should be further detailed in the Blast Management Plan. As recommended by Heritage NSW, this monitoring program should include both pre- and post-mining dilapidation studies of the Coke Ovens.

Public Safety and Equipment

The BIA included an assessment of potential flyrock trajectories based on different blast scenarios (behind face vs front of face, deep vs shallow, angled vs vertical holes). Across the different scenarios, the maximum flyrock throw distance was predicted to be 50 m. Using Bloomfield's safety factors of x2 for plant and equipment and x4 for personnel, this would result in minimum exclusion zones of 100 m and 200 m, respectively.

This Department is satisfied that continued implementation of on-site exclusion zones during blasts would prevent injury to site personnel and damage to the mine's plant and equipment.

Cumulative Impacts

Cumulative effects of blasting concurrently with neighbouring mines were not considered in the BIA. However, the Department considers that cumulative blasting impacts could be easily avoided by liaising with nearby mines to avoid concurrent blasting. This risk will be further reduced now that Bloomfield owns and jointly manages Rix's Creek North Mine. The Department would recommend that this procedure be further detailed in the Project's Blast Management Plan.

6.3.3 Conclusion

The Department is satisfied with Bloomfield's assessment of potential ground vibration, airblast overpressure and flyrock impacts, and is satisfied that the Project would be unlikely to result in material impacts to nearby privately-owned residences, heritage items or infrastructure. The additional studies proposed by Bloomfield for the Coke Ovens are expected to ensure that an appropriate ground vibration criterion is selected and applied to protect the heritage item.

Bloomfield's prior operational experience at Rix's Creek Mine further demonstrates that it is capable of complying with contemporary airblast overpressure and ground vibration criteria, and minimising the release of flyrock, dust and noxious fumes. Bloomfield has a well-developed blast management system in place that utilises predictive modelling to both design and schedule blasts to minimise blasting impacts. Bloomfield has committed to continue implementing this system.

The Department therefore considers that the blast impacts of the Project could be appropriately managed through the ongoing application of existing practices, and the preparation and implementation

of a contemporary Blast Management Plan. This plan should describe the controls to be applied to ensure the safety of site personnel and the public, to protect public and private infrastructure and heritage items and to manage and minimise the release of dust and noxious fumes.

6.4 Water Resources

The EIS included surface water and groundwater assessments that investigated the potential impacts of the Project on water resources and other water users. Submissions from the public, the EPA, DoI - Water and NSW Health raised concerns over potential contamination of groundwater aquifers, sufficiency of water entitlements, changes to surface water catchments and flood risks. Bloomfield provided additional information in its Revised RTS to respond to these issues and other issues raised by the Department.

6.4.1 Existing Hydrological Setting

The Project area spans three surface water catchments that drain to ephemeral watercourses and eventually to the Hunter River. These catchments are the Rixs Creek catchment (67% of the Project area), an unnamed tributary (commonly referred to as 'Dead Mans Gully') catchment (25% of the Project area) and the Station Creek catchment (8% of the Project area). These catchments have been modified by past mining operations, including reductions in areas and minor changes to flow rates.

Rixs Creek crosses the southern portion of the mine site, between the existing Pit 3 and Pit 2, and then under the New England Highway and to the south of the proposed North Pit Area. The existing mine layout and the proposed project layout have been generally designed to avoid the need for diversions of Rixs Creek and its smaller tributaries. In particular, the extent of Pit 3 was designed in the EIS to avoid Dead Mans Gully to the north and the extent of the North Pit Area was redesigned in the Revised RTS to avoid Stonequarry Gully to the south.

The Project area is located outside of the Hunter River floodplain and Bloomfield reports that the mine has not previously been impacted by flooding.

Existing Surface Water Management

Bloomfield's existing water management system utilises mine voids, dams and historical underground mine workings for water storage. To date it has not required an EPL licensed discharge point or mine-affected water discharges under the Hunter River Salinity Trading Scheme (HRSTS). As such, all water released from the site must be non-polluting, in accordance with section 120 of the POEO Act.

Clean water (runoff from undisturbed areas) is largely diverted away from the site or captured in clean water dams which overflow into the off-site environment. Sediment-laden water (runoff from overburden emplacement areas) is captured in sediment dams, treated as necessary, and released to the environment when water quality objectives can be met. Mine-affected water (saline runoff from disturbed areas and groundwater seepage/inflow) is captured in dirty water dams for treatment and re-use in processing or dust suppression. Tailings, contaminated water and sewage are separately managed on site.

Both clean water and sediment dams are designed in accordance with *Managing Urban Stormwater Soils and Construction including Volume 2E Mines and Quarries* (known colloquially as 'the Blue Book'). They are designed as passive management systems, overflowing via spillways when runoff volumes exceed the available storage or else are dewatered after large runoff events. To be of suitable quality to be released off site, sediment dam water must not exceed the trigger levels in the *Australian and New Zealand Environment and Conservation Council Guidelines for Fresh and Marine Water Quality 2000* (ANZECC Guideline). For most sediment dams, the constraining trigger level for stock water supply under the ANZECC Guideline is 50 mg/l total suspended solids (TSS). Sediment dam water is commonly flocculated to meet this criterion before it is released off site. Alternatively, it is pumped into the mine-affected water management system to maintain sufficient run-off capacity.

Tailings have historically been pumped as a slurry to designated tailings emplacement areas for drying and disposal. Decant water is recovered and then re-used in processing. Tailings have a higher concentration of contaminants and therefore require a higher level of protection. Tailings are therefore stored below the natural ground level to prevent overflows. In 2014, Bloomfield installed a tailings centrifuge dewatering system at the CHPP. This system improves water recovery for re-use and enables tailings cake to be co-disposed with coarse reject material in OEAs. Nevertheless, Bloomfield continues to use Tailings Emplacement 4 (also referred to as DWD 9) in part of the Pit 1 void for backup tailings disposal.

The water management system is further detailed in the mine's Water Management Plan. This plan includes a strategy to manage surface water including erosion and sediment controls, a groundwater and surface water monitoring program and a response plan to mitigate potential impacts on surface and groundwater. This plan also includes a site water balance, which is used by Bloomfield to manage water supply and demand across the site and to ensure that there is sufficient storage capacity to prevent uncontrolled discharges from the site.

Bloomfield has asserted that the monitoring results to date show that there have been no observable impacts on off-site water quality and that water sourced from the site provides sufficient supply to satisfy the mine's needs.

6.4.2 Predicted Surface Water Impacts

Surface water impacts were assessed in a Surface Water Study prepared by JP Environmental in November 2014. The Revised RTS also included specialist responses from JP Environmental and RPS Group.

Catchment Areas

Current mining activities have resulted in approximately 750 ha (12%) loss in the area of the three affected catchment areas within the site (see **Table 8**). The catchments would continue to be disturbed over the life of the Project, but the total area of catchment loss would not increase from current levels because of progressive rehabilitation. Post-mining, only 160 ha (3%) would be permanently lost from the catchments. The majority of this would be the 140 ha internally draining final void that largely sits within the unnamed tributary catchment. Overall, the pre-mining catchment areas would be largely returned post-mining. The residual catchment loss represents a <1% reduction in the entire Hunter River catchment area.

Table 8: *Changes in catchment areas*

Catchment	Pre-mining (ha)	Current mining (ha)	Worst-case Year 1 (ha)	Post-mining approved under DA 49/94 (ha)	Post-mining (ha)
Rixs Creek	2,562	1,986	2,036	2,534	2,475
Unnamed tributary	1,387	1,321	1,319	1,261	1,261
Station Creek	2,413	2,305	2,305	2,466	2,466
Total	**6,362**	**5,612**	**5,660**	**6,261**	**6,202**
Difference compared to pre-mining	-	**-750 (12%)**	**-702 (11%)**	**-101 (2%)**	**-160 (3%)**

During mining, the catchment loss would be equivalent to approximately 45 megalitres per year (ML/year) of runoff. Bloomfield has existing Water Access Licences (WALs) for the Hunter Unregulated and Alluvial Water Source – Singleton, administered under the *Water Management Act 2000*, to account for this loss.

As the affected creeks have limited flows throughout the year, Bloomfield considers the proposed reduction in catchment areas/runoff would not significantly affect hydrological values or geomorphological or riparian regimes. Overall, the Department accepts that the Project is not expected to significantly increase the existing scale and extent of impacts to surface water catchments or watercourses and that Bloomfield has sufficient WALs to account for these minor losses.

Bloomfield currently maintains a 20-m buffer between mining operations and Rixs Creek to prevent and/or minimise any direct damage to Rixs Creek. As mining would generally progress away from Rixs Creek in the future, the Department would recommend that this buffer is maintained.

Water Supply

Mine-affected water (captured runoff, groundwater inflow, recycled water and recovered tailings decant water) has historically satisfied the mine's water requirements. This is primarily due to the use of large pit voids which maintain water supply in both extreme wet and dry climatic conditions. However, water management would be further constrained under the Project as demand increases for coal processing

and onsite water supply decreases with progressive rehabilitation. Rehabilitation would include the backfilling of mine voids (ie reduced water storage) and a decrease in internally draining catchments (ie less harvesting capacity).

Mine-affected water is expected to supply all water requirements up to 50th percentile dry conditions over the life of the Project. Supplementary water supply (average 36 ML/year) is therefore likely to be needed for the first ten years of the Project.

Bloomfield has unused WAL capacity under the Hunter Regulated River Water Source that could be used to fill this supply gap. If this option is pursued, a pump and pipeline to the Hunter River would need to be established, this would require separate approval as it has not been considered in this proposal. In its Revised RTS, Bloomfield clarified that, if the Project requires off site water, it would investigate options to:

- negotiate water sharing agreements with neighbouring mines to import their surplus water;
- purchase additional units on the open market; or
- approach other WAL holders for a term transfer.

The Department notes that there may also be further opportunity to source water from Rix's Creek North mine which currently has an agreement with Glencore to receive water take from the Integra Underground mine. Both the Department and DoI - Water are satisfied that water supplies could be sufficiently sourced and managed by Bloomfield. Despite this, the Department recommends that the Project be operated commensurate with its available water supply.

Flooding

The EIS stated that the mine was not affected by flooding associated with the Hunter River and that mine planning had considered the need to prevent inundation from flooding of Rixs Creek during a 100-year Annual Recurrence Interval (ARI) event. However, OEH was not satisfied that flood risks had been adequately considered in the EIS.

Bloomfield subsequently provided a flood report in the Revised RTS. This analysis concluded that the Project would not exacerbate the existing flood risk to surrounding private properties but identified potential impacts to mine assets. Flood modelling predicted inundation of the Pit 3 and Pit 2 (Tailings Emplacement 3) due to flooding of Rixs Creek at the nearby culvert crossings during a 1% Annual Exceedance Probability (AEP) Upper Limit flood.

In order to minimise this risk, Bloomfield committed to reviewing the adequacy of existing flood protection measures to ensure that containment berms are of adequate height and integrity to withstand a 1% AEP Upper Limit flood in Rixs Creek. Bloomfield has since constructed a continuous 71 m AHD embankment between Rixs Creek and Pit 2 to satisfy this commitment.

OEH was generally satisfied with the findings of the flood report; however, it suggested further assessment be undertaken post-determination to ensure that appropriate levels of flood protection and freeboard are in place to protect privately-owned land, the mine and its employees. The Department agrees with OEH's comments and would recommend that conditions are imposed to further identify and minimise flood risks over the life of the Project.

Surface Water Quality

Land disturbance associated with mining has the potential to adversely affect the quality of surface runoff in downstream receiving waters through increased sediment loads, salinity and other pollutants. Bloomfield proposes to manage surface water in a similar manner to the existing mine site to avoid impacts to receiving waters. All dams and water management structures would continue to be designed and constructed in accordance with the Blue Book, based on an 85th percentile 5-day rainfall event, to minimise uncontrolled discharges and erosion. Regular testing of the key dams would be conducted to ensure that water released off site is in accordance with regulatory standards, including the ANZECC Guideline. If sediment dam water is identified to not be suitable for release, it would be pumped into the mine-affected water management system. Water balance modelling did not predict any mine-affected water storages overflowing over the life of the Project.

Water monitoring results, to date, show that maintaining the status quo would generally lead to continued acceptable outcomes. However, these results do show elevated dissolved metals across all water classes compared to the ANZECC Guideline trigger levels for ecosystem protection. The EPA and the Department requested that Bloomfield further investigate these elevated levels, particularly the

elevated aluminium content. Two submissions from downstream landowners in Dead Mans Gully (ie unnamed tributary catchment) raised similar concerns with potential water quality impacts from sediment dam overflows and runoff.

Bloomfield addressed these specific submissions in its Revised RTS, supported by specialist responses from both JP Environmental and RPS Group. With regards to the sediment dams in Dead Mans Gully, Bloomfield confirmed that runoff collected in dams from either mined or un-mined catchments in this area contain appreciable levels of sediment (and turbidity). This is due to the presence of highly erodible soils containing substantial amounts of colloidal material (ie clays and fine silts).

The high aluminium levels are attributable to these clays and suspended solids. Ingestion of suspended clays by cattle from sediment dam overflows was considered to pose little or no risk to the livestock. Comparable water quality conditions exist on adjacent farm lands and water quality results generally indicate acceptable levels of heavy metals and other toxicants with respect to ANZECC Guideline trigger levels for stock water. Further analysis of the aluminium confirmed that it would not pose a toxicological danger to the environment and, on this basis, it is not anticipated that adverse health effects would occur for either humans or livestock.

No additional management measures for managing risks associated with dissolved aluminium are proposed. However, the Department would recommend that Bloomfield notify its neighbours in the event of any elevated water quality results so that they may make informed decisions about the use of water in the catchment for stock watering. Additionally, any loss in flow or impact to water quality attributed to mining operations should be compensated for through an alternate water supply.

Mitigation and Management

Bloomfield has proposed a range of mitigation and management measures to minimise surface water impacts. Water management structures would continue to be designed in accordance with the Blue Book and Bloomfield would continue to manage sediment-laden water to minimise risks to the receiving environment and downstream water users. Bloomfield has also committed to reviewing and upgrading existing flood mitigation works.

Surface water monitoring would include upstream and downstream monitoring of watercourse flow rates and quality and monitoring of key water storages (see **Figure 10**). Routine monitoring would continue to be undertaken on a monthly basis for storage volume, pH, electrical conductivity (EC), total dissolved solids (TDS), and TSS, and annually for major ions and dissolved metals. Given the likelihood of sediment dam discharges/overflows, the EPA recommended that Bloomfield undertake water quality monitoring of each dam discharge event. The Department supports EPA's rationale but considers that monitoring of every dam may be excessive and monitoring locations could be strategically selected to maximise representativeness.

In addition to the surface water monitoring, data would be collected at least annually to update and validate the water balance model. The model would be used to continually improve the water management system to maximise the use of mine-affected water.

Bloomfield has also committed to developing a Trigger Action and Response Plan (TARP) which documents responses, actions and reporting requirements in response to abnormal monitoring results or undesirable trends in water quality. The Water Management Plan would be updated to include these proposed mitigation and management measures.

Conclusion

The Department is satisfied that the Project would not lead to significant surface water impacts beyond those already experienced, subject to implementation of the mitigation and management measures proposed. The Department is also satisfied with Bloomfield's investigation into potential impacts to two downstream water users and that compensatory water supply could be provided in the event of unexpected impacts to their water quality. Bloomfield would continue to be required to prepare and implement a Water Management Plan, which would include a surface water monitoring program and TARP to monitor water quality over the life of the mine and respond to any unforeseen impacts.

The Department considers that Bloomfield has proposed a range of suitable mitigation, management and monitoring measures in its EIS and Revised RTS. With these measures in place, the Department considers the risks of impact to surface water resources is low and that the Project could be suitably managed through imposing performance measures and strict conditions of consent.

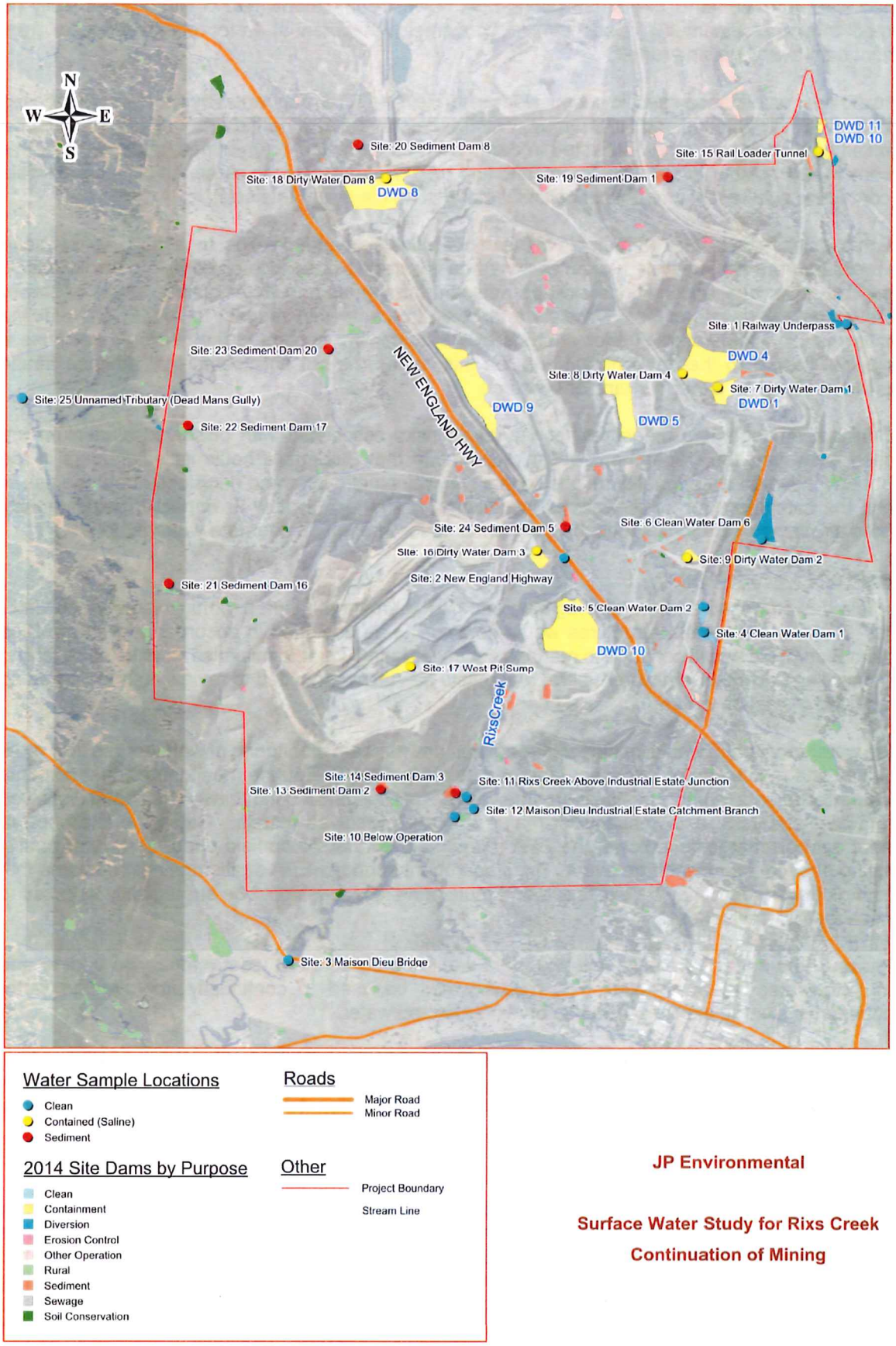

Figure 10: *Proposed surface water quality monitoring program*

6.4.3 *Existing Hydrogeological Setting*

The surrounding groundwater environment is characterised by a porous and fractured hard rock groundwater system within the Permian coal measures and a shallow groundwater system within the

unconsolidated regolith/ alluvium (where present). A small area of alluvium associated with Rixs Creek is present in the south of the Project area. Rixs Creek generally has negligible to small quantities of baseflow and the associated alluvium is thin and poorly developed. The two groundwater systems are believed to be hydraulically disconnected due primarily to the local basin structure.

The proposed extraction areas sit within a basin-like geological structure that reflects a north-south trending syncline. The hard rock groundwater system is within this basin, and the primary water-bearing zones are the coal seams, which are separated by layers of sandstone and siltstones that act as low permeability barriers or aquitards. As the limbs of the syncline rise, basement layers of siltstone and sandstone isolate the coal measures from the broader regional hydrogeological regime and effectively limit the extent of groundwater impacts from mining to this local basin structure (see **Figure 11**). The basin is easily defined by the outcropping Hebden Seam to the south. Importantly, the alluvium is outside of this structure.

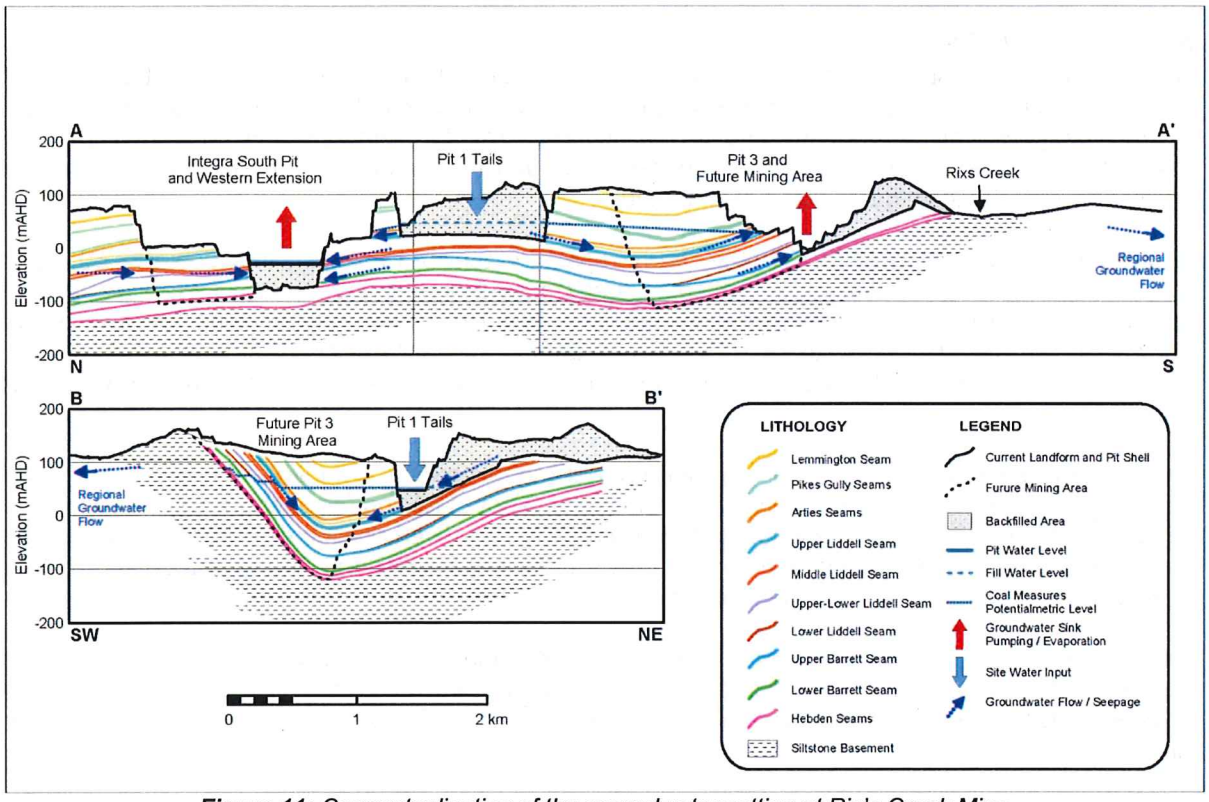

Figure 11: *Conceptualisation of the groundwater setting at Rix's Creek Mine*

Consistent with the regional characterisation of groundwater in the Hunter Valley, the deeper porous and fractured hard rock groundwater source is brackish to saline and is classified as 'less productive' under the AIP. The alluvial groundwater source in the vicinity of Pit 3 is also classified as 'less productive' due to poor water quality and low yield.

Existing Groundwater Management

Bloomfield's water management system includes the management of groundwater inflow. Due to its high salinity content, groundwater is managed as 'mine-affected water' and is contained and used on site. Mine-affected water is not discharged from the site.

Bloomfield's existing Water Management Plan includes a specific Groundwater Monitoring and Groundwater Response Plan. Groundwater monitoring has been undertaken (either monthly or quarterly) since 2010. Results to date show that, outside the mine site, mining has had little impact on groundwater levels and quality.

The Groundwater Response Plan states that in the event of any unexpected adverse impacts or water quality degradation, Bloomfield will commission an assessment of the causes, develop a staged response program to mitigate adverse impacts, and attempt to establish and implement measures to limit further adverse impact. The Department understands that no such incidents have occurred to date.

6.4.4 Predicted Groundwater Impacts

The EIS included a Groundwater Impact Assessment (GIA), undertaken by RPS Group, which investigated potential impacts of the Project on groundwater resources, both incrementally and cumulatively. GIA relied on a numerical groundwater model to predict groundwater inflow, drawdown and quality during mining, and post-mining and impacts on other groundwater users, in accordance with the AIP Level 1 minimal impact considerations.

DoI - Water considered that the broad impacts of the proposal were likely to be acceptable but requested further information and data to address the requirements of the AIP and to support the GIA's conclusions. Bloomfield answered a number of DoI – Water's questions during a site visit on 21 January 2016 and provided further information in the Revised RTS. The Revised RTS included a specialist response prepared by RPS Group and a copy of a peer review by Dundon Consulting. Following review of the Revised RTS, DoI - Water was satisfied with the GIA.

Drawdown in Hard Rock Aquifers

Mining in Pit 3 has resulted in localised drawdown levels exceeding 50 m in and around the centre of the pit. The extent of drawdown has been constrained by the outcrop of the Hebden Seam to the south and the steep rise of the western limb of the syncline. The GIA predicts that the remaining coal measures would be depressurised and dewatered but that this impact would continue to be locally contained within the local geological basin structure.

As a result, the groundwater model predicts the spatial extent of maximum drawdown (> 50 m) to increase slightly, but continue to be limited to areas in and around the centre of Pit 3. As mining progresses to the north, drawdown ranging between 20-50 m would extend along the axis of the syncline toward Rix's Creek North's Camberwell Pit and, to a lesser extent, to the east towards Pit 1. This drawdown is expected to occur within the Project area, where there are no other groundwater users or GDEs.

Beyond the Project area to the north, the groundwater model predicts low levels of drawdown, initially between 2-5 m but increasing up to 10-15 m in the final years of mining (see **Figure 12**). These levels are expected to combine with the existing drawdown and groundwater sink created by the Rix's Creek North Camberwell Pit (which has been mined down to the deeper Hebden Seam) and contribute to a predicted decline of up to 50 m in the water table.

Post-mining, the hard rock groundwater system would continue to be affected by drawdown of more than 50 m around backfilled areas and the final void in Pit 3. Lower levels of drawdown (< 2 m) are predicted outside of the Project area, albeit within land owned by Bloomfield for the Rix's Creek North mine.

Overall, there would continue to be significant localised impacts to the hard rock groundwater system. These impacts are considered acceptable as they are largely contained within the Project area and limited to a less productive groundwater source. No groundwater users or GDEs would be affected and impacts are unlikely to restrict post-mining beneficial land use options.

Drawdown in Shallow Aquifers

Monitoring results from bore BH 4, which was installed in 2010 in the Rixs Creek alluvium, indicates that it has remained largely unaffected by mining over the past eight years. The GIA predicts this to continue as the shallow aquifer is located outside of the basin structure and should not be affected by drawdown and depressurisation of the hard rock groundwater system.

Overall, the GIA predicts that there would be negligible impacts to the shallow aquifers associated with Rixs Creek. These impacts are considered acceptable as there are no groundwater users or GDEs dependent on the alluvium. No impacts are expected to the Hunter River alluvium.

Final Void Water Quality

The proposed final void would continue to function as a groundwater sink, with inflows exceeding outflows and evaporation exceeding rainfall. This would generally prevent the release of saline water into the surrounding environment, but as a result the salinity of the pit lake would rise over time. The groundwater model predicts the final void would fill with water and stabilise at around 50 m AHD around 100 years post-mining. This equates to a pit lake surface area of approximately 80.7 ha. As the primary source of water inflow to the void is from groundwater seepage, the GIA has conservatively predicted a final void salinity level of approximately 11,000 microsiemens/centimetre (µS/cm) at the end of mining.

Over time, the salinity of water in the final void would slowly increase and has been modelled to reach 31,000 µS/cm after 2,000 years. Remaining lower than the salinity of sea water which is approximately 50,000 µS/cm.

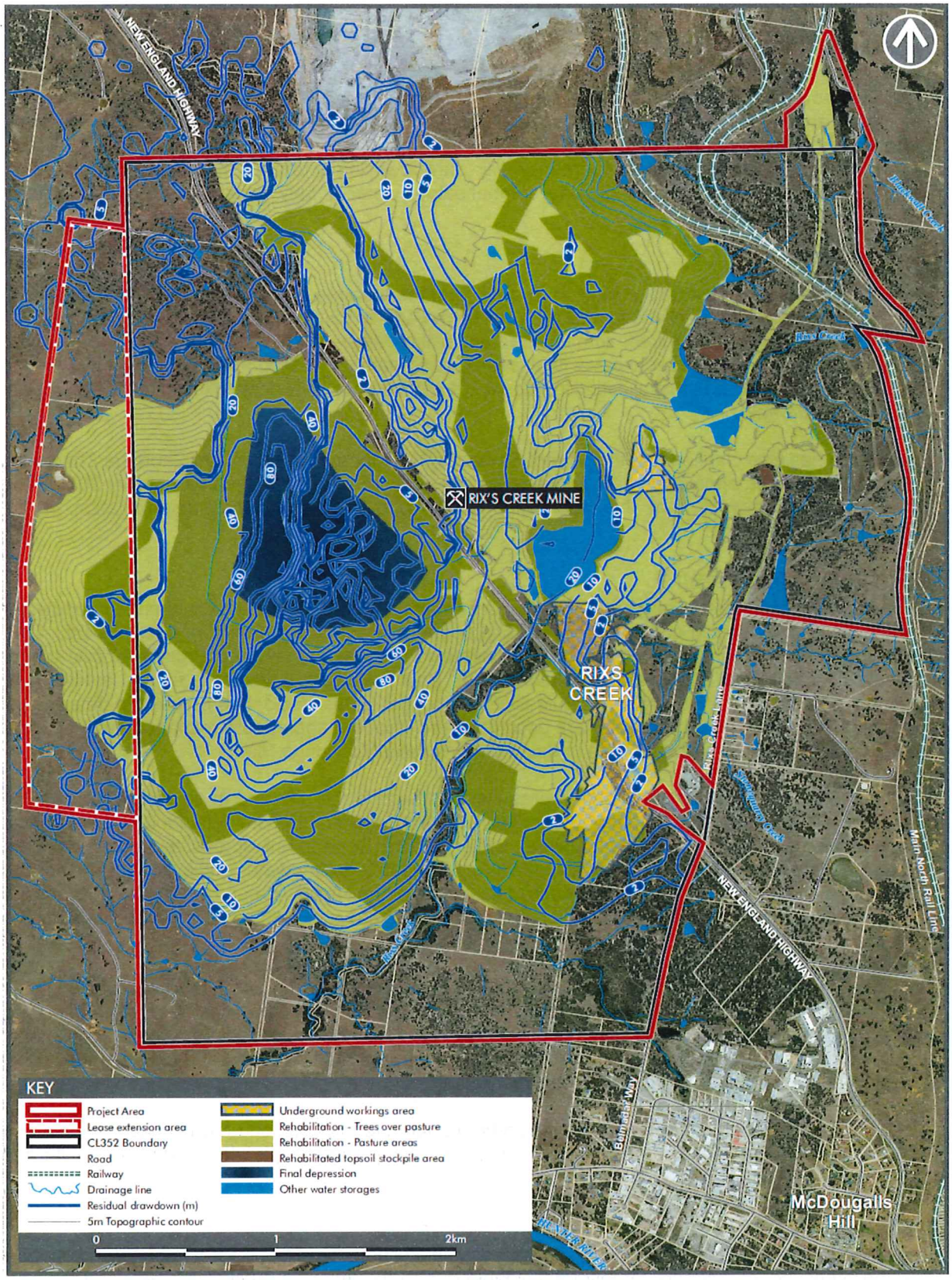

Figure 12: *Groundwater drawdown, Year 21*

Some minor seepage into the groundwater system (ie subsurface outflow) is predicted. Bloomfield considers that the long-term impact of these outflows on off-site groundwater quality is negligible. Monitoring in downstream locations would be required to ensure that this is the case. The final void design is further discussed in **Section 6.6**, below.

Groundwater Users

Registered groundwater bores are generally located more than 4.5 km from the centre of the Project area. One bore (GW052121) is situated 2.4 km east of the mine and targets a coal measure within the Darlington anticline. No impacts are anticipated to this bore as the target formation is hydraulically disconnected. The outcrop of the Hebden seam, at the edge of the local syncline, is some 2.2 km west of the bore and is believed to limit groundwater drawdown impacts from the Project. Despite this, Bloomfield would be required to provide compensatory water supply to any affected landowner if unexpected impacts occur.

Groundwater Licensing

Groundwater take is estimated to peak in Years 4-5 of the proposed mining, with a total inflow of 305 ML/year predicted. This declines to 126 ML/year by the end of mining. Bloomfield currently holds 100 ML/year in groundwater licences, administered under the *Water Act 1912*, and therefore requires an additional 205 ML/year in order to cover its expected peak water take. Bloomfield clarified in its Revised RTS that it had submitted an application in August 2015 to increase its allocation to ensure that sufficient entitlements are held.

DoI - Water has also clarified that the current Embargo Order for the Hunter Water Shortage Zone does not affect the lodged application as it predates the date the order took effect (ie 5 February 2016). The Department understands that this application is likely to be granted post-determination of the development application.

Mitigation and Management

Bloomfield has proposed a range of mitigation and management measures to minimise groundwater impacts. Bloomfield would continue to undertake quarterly groundwater monitoring for pH, EC, TDS, major ions, nutrients and dissolved metals. Bloomfield proposes to develop Project-specific trigger values using statistical analysis of monitoring data. Until these are developed, trigger levels would continue to be based on the ANZECC Guideline. The trigger levels would then be used to determine if mine-related impacts on groundwater are occurring, and if so, the appropriate management response. These details would be included in an updated Groundwater Monitoring Plan.

Bloomfield currently has six monitoring bores installed around the site and is amenable to installing more. DoI – Water recommended that Bloomfield expand its monitoring bore network to target both the deeper hard rock and shallow groundwater systems. The Department agrees that the monitoring network could be strengthened to better identify and quantify groundwater outflows both during and post-mining, and to validate Bloomfield's understanding that the shallow groundwater system is outside of the basin structure, not hydraulically connected to the hard rock source and not affected by the Project.

Bloomfield has committed to undertaking an annual review of monitoring data by a hydrogeologist in order to assess the impacts of the Project on the groundwater environment, and to reconcile observed versus predicted impacts. Bloomfield has also committed to routinely updating its groundwater model two years after commencement of the Project and every five years thereafter, and updating the model if observed and predicted impacts differ significantly.

A separate Final Void Management Plan would be prepared to manage long-term impacts to local and regional groundwater systems, residual pit voids, spoil dump storage, pit lake ecosystem health and salinity levels.

Conclusion

The Department is satisfied with Bloomfield's assessment of potential groundwater impacts and accepts that the predicted impacts are largely unavoidable due to the inherent relationship between the coal seams to be extracted and the hard rock aquifers contained within them. Fortunately, the groundwater impacts are predicted to be localised and limited to 'less productive' groundwater sources. No groundwater users or GDEs would be affected. Further, post-mining drawdown is unlikely to restrict beneficial land use options.

The Department considers that Bloomfield's proposed mitigation, management and monitoring measures in its EIS and Revised RTS would ensure that groundwater impacts are minimised and/or promptly identified and responded to.

If the Project is approved, then Bloomfield should prepare an updated Groundwater Monitoring and Response Plan in consultation with DoI-Water. This plan should incorporate appropriate groundwater monitoring and TARPs to manage any unforeseen interactions between the hard rock and alluvial groundwater systems. Long-term management of the final void, including further assessment of groundwater outflows to the receiving environment, should also be included in this plan.

With these measures in place, the Department considers the risks of impact to groundwater resources are low and that the Project could be suitably managed through imposing performance measures and strict conditions of consent.

6.5 Biodiversity

The EIS included an assessment of the Project's biodiversity impacts, prepared by Eastcoast Flora Survey and undertaken in accordance with the UHSA. This included a specialist ecological assessment based on surveys for targeted flora and fauna species and vegetation communities and a desktop review of ecological databases, surrounding developments and previous studies relevant to the Project area. This assessment investigated the type and condition of vegetation communities on the site; the Project's potential impacts on native flora, fauna and vegetation communities; and a range of measures to mitigate and offset these impacts.

As a result of the Court's consent orders (see **Section 1.3**), the Department requested Bloomfield to provide a revised biodiversity assessment to reflect the newly agreed disturbance area. Additionally, due to the uncertainty associated with finalisation of the UHSA (see **Section 3.2)**, the Department requested Bloomfield to provide a supplementary assessment of the likely biodiversity offset requirements for the Project, prepared in accordance with the FBA. In its Revised RTS, Bloomfield provided a revised Biodiversity Assessment, including an assessment of the newly agreed disturbance area, prepared under the UHSA Interim Policy and prepared under the FBA, for offsetting purposes only.

OEH identified some gaps in the revised Biodiversity Assessment in respect of its UHSA and FBA assessments, which were likely to require a recalculation of required ecosystem credits. Following consultation with OEH, in March 2018. Bloomfield provided a further revised Biodiversity Assessment (BA 2018). OEH was satisfied that the BA 2018 adequately assessed the Project's impacts in accordance with both the UHSA Interim Policy and the FBA. Accordingly, the Department has based its assessment on the BA 2018.

On 25 August 2017, the *Biodiversity Conservation Act 2016* (BC Act) commenced. As the Project's development application was lodged before commencement of the BC Act, the Act's transitional arrangements stipulate that previously applicable planning provisions continue to apply. Accordingly, the biodiversity impacts of the Project have been assessed in accordance with the UHSA and FBA, as outlined above.

6.5.1 Existing Project Setting

The Project area is characterised by a naturally undulating landscape comprising remnant woodland vegetation, woodland communities and derived native grassland (DNG). Due to the preponderance of DNG, arboreal habitats within the site are highly fragmented and have limited potential for wildlife connectivity. The proposed disturbance area to the north of Pit 3 has been identified as a highly modified landscape, due to past grazing activities. Specifically, vegetation in this area is low condition DNG with scattered paddock trees. In general, the limited areas of remnant woodland vegetation are in a moderate to good condition.

While some of the site is subject to active disturbance and ongoing mining activities, several areas have been rehabilitated with trees and grassland communities.

Under DA 49/94, Bloomfield is required to establish and secure a biodiversity offset of 118.32 ha in the eastern part of the site, to compensate for the proposed biodiversity impacts of Mod 5 (which approved an as-yet unbuilt rail loop and associated loading facilities). This offset area includes a mix of woodland and forest endangered ecological communities (EECs), as well as DNG. However, since the purchase of Rix's Creek North and its existing rail infrastructure, Bloomfield is no longer proposing to construct

the rail loop at Rix's Creek. Consequently, the associated disturbance and offset is no longer required and Bloomfield has committed to surrendering the approval inherent in Mod 5 as part of this Project.

6.5.2 Flora Impacts

Potential impacts to flora are generally limited to threatened ecological communities, as there were no threatened flora species or populations identified on the site. This is consistent with ecological field work undertaken in 2012 and reflects the modified nature of the Project area due to past agricultural activities.

Threatened Ecological Communities

The Project would disturb an additional 212.8 ha of land. Of this, 48.2 ha is woodland or forest vegetation and 164.58 ha is DNG. Some of this vegetation conforms to the definition of an EEC under the BC Act, including:

- 0.22 ha of Hunter Lowlands Redgum Forest; and
- 0.76 ha of Central Hunter Grey Box-Ironbark Woodland.

Bloomfield also identified that 47.12 ha of vegetation in the disturbance area conforms to CHVEFW CEEC, listed under the EPBC Act. This includes:

- 17.62 ha of Narrow-leaved Ironbark – Native Olive shrubby open forest; and
- 29.5 ha of DNG linking large woodland or forest patches.

Figures 13 and 14 depict the location of these communities within the Project's proposed disturbance area.

In the BA 2018, Bloomfield reported on revisions to the calculation of CHVEFW based on further detailed consultation with OEH. These changes primarily reflect differences between Commonwealth and State definitions of remnant vegetation. In addition, the growth of saplings between the time of the EIS's original surveys (2013) and preparation of the BA 2018 meant that there was a larger area that satisfied the Commonwealth's definition of CHVEFW. OEH advised that it was satisfied with the revised calculation of CHVEFW presented in the BA 2018 and that a total of 47.12 ha had been correctly identified.

The Department notes that the BA 2018 identifies a significantly greater area of CHVEFW than initially identified in the EIS (19 ha). The Department recommends that Bloomfield consult further with DoEE regarding this increase.

In summary, the Department notes the Project would involve the clearing of small areas of State listed EEC which would be unlikely to impact on the survival of these communities. Additionally, the Project would involve clearing a more substantial amount of the Commonwealth-listed CHVEFW CEEC. Bloomfield has proposed to offset the residual impacts to these communities in accordance with the either the FBA or UHSA (if finalised). This is discussed further in **Section 6.5.5**.

Threatened Flora Species and Populations

In 2015, after lodgement of the EIS, a small sub-population of Pine Donkey Orchid was recorded near Belford, south-east of the Project area. Consequently, Bloomfield conducted additional targeted surveys for the species during October 2017. Over a transect of 78 km in length within the new disturbance area, no Pine Donkey Orchids were observed. Bloomfield considered it unlikely that the species would occur within the proposed disturbance area, due to its primary composition of heavily grazed pasture.

The Department further notes that no other threatened flora species were identified in the proposed disturbance area and therefore the likelihood of adverse impacts is low. The Department considers the existing practice of undertaking pre-clearance surveys would be sufficient for avoiding and minimising any unexpected impacts to flora species and populations.

Groundwater Dependent Ecosystems

The potential for groundwater dependent ecosystems (GDEs) to be affected by the Project was considered as part of the EIS. This involved the review of the relevant Water Sharing Plan, the GDE Atlas (Bureau of Meteorology, 2012) and advice from an ecological specialist.

Based on this information, Bloomfield concluded that there are no GDEs within the vicinity of the Project area that are predicted to be affected by groundwater drawdown, or loss in surface or base flows of watercourses, such as Rix's Creek.

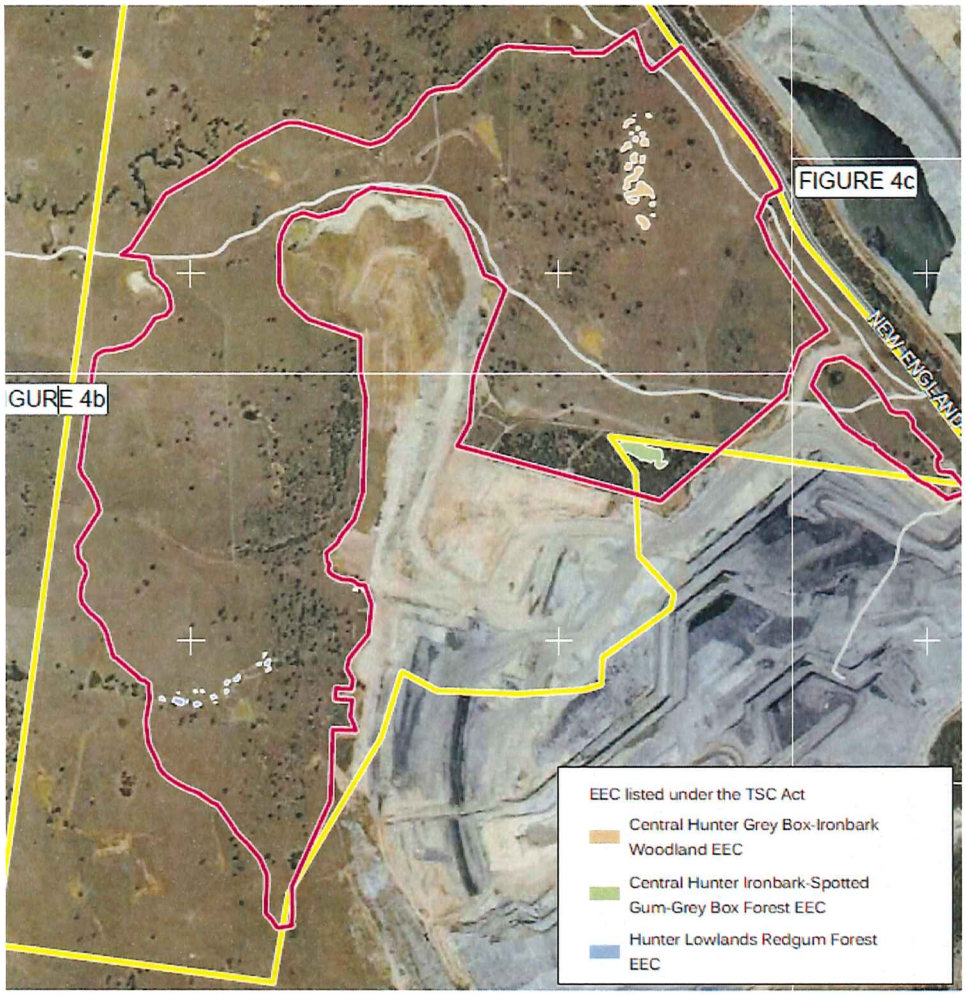

Figure 13: *Location of EECs listed under the TSC Act*

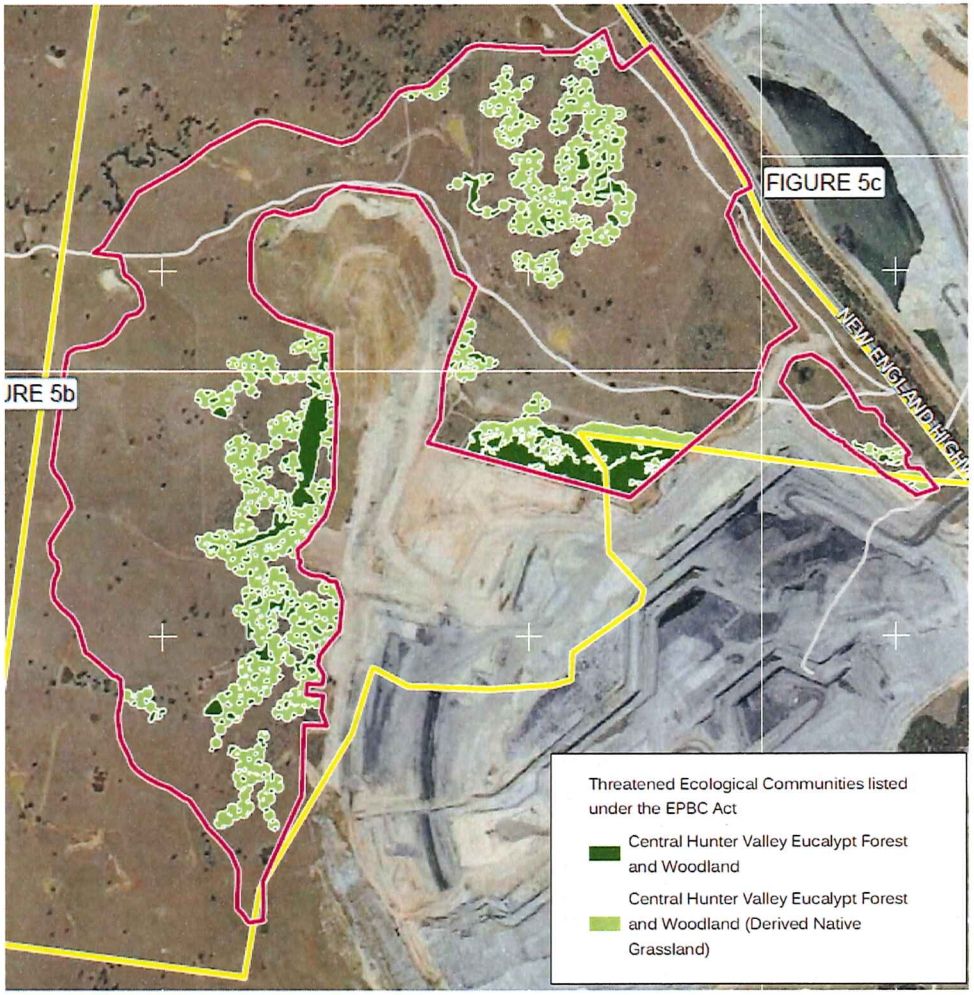

Figure 14: *Location of CEEC listed under the EPBC Act*

6.5.3 Fauna Impacts

The EIS identified that 16 threatened fauna species have the potential to occur within or in close proximity to the proposed disturbance area. Three of these species, Brush-tailed Phascogale, Squirrel Glider and Green-thighed Frog, required targeted survey. No suitable habitat was identified within the Project area for the other potentially occurring fauna species. A number of public submissions raised concern with the potential impact of the Project on threatened fauna species, in particular, Squirrel Glider.

Squirrel Glider

Squirrel Glider was the only threatened fauna species recorded within the Project area during the targeted surveys. The EIS identified that the Project would remove 17.6 ha of Squirrel Glider habitat. This area was based on the amount of woodland vegetation present in the proposed disturbance area. The EIS also concluded that no direct impacts to potential or actual den sites would occur as a result of the Project, however, some minor displacement of individuals may occur following removal of mature trees.

Bloomfield considers that the removal of 17.6 ha of Squirrel Glider habitat would not significantly impact the species, as:

- the vegetation consists of a low diversity of tree species, which is likely to have limited foraging resources such as pollen, nectar and invertebrates;
- there are other areas within the site that would not be disturbed that feature higher quality habitat for the Squirrel Glider; and
- there are patches of habitat adjacent to the proposed disturbance area, which would limit impacts to connectivity and avoid isolation and fragmentation.

The Department has considered Bloomfield's analysis, which addresses the seven-part test and the *Threatened Species Assessment Guidelines* and considers that a significant effect on the Squirrel Glider is unlikely. The Department notes that Bloomfield has committed to engage a qualified ecologist to undertake pre-clearance surveys of any potential habitat sites and ensure the safe relocation of any Squirrel Gliders found.

The BA 2018 did not update the amount of Squirrel Glider habitat in the new disturbance area. The amount of woodland vegetation in the new disturbance area is 18.7 ha. This amount is quite similar to that identified in the EIS, albeit the location of some areas has changed. Assuming that the woodland areas are interchangeable, the outcomes of the EIS remain generally the same. This should be further clarified prior to the determination of the Project.

Other Fauna

The Brush-tailed Phascogale and Green-thighed Frog were not recorded in targeted searches and the particular habitat characteristics for these species were not identified on the site. This may result from several reasons, including the highly disturbed nature of the site, the lack of habitat connectivity (New England Highway) and lack of suitable frog habitat in dams. Bloomfield therefore concluded that impacts to these two species would be negligible.

Conclusion

Overall, the Department is satisfied that the Project would not significantly increase impacts on threatened fauna species beyond those associated with existing approved operations and that any incremental impacts could be appropriately managed through conditions of consent for pre-clearance surveying and the preparation and implementation of a Biodiversity Management Plan.

6.5.4 Avoidance and Mitigation

To limit impacts on biodiversity, Bloomfield has advised that the Project was designed to avoid disturbing areas north of Dead Mans Gully, which contain denser forested areas. This reduced the Project's disturbance footprint by 67 ha. Further opportunities to avoid biodiversity impacts are limited due to the resource location.

Bloomfield has committed to mitigate impacts on biodiversity by:

- staging the removal of vegetation;
- undertaking pre-clearance surveys; and
- reinstating hollow-bearing trees on rehabilitated lands.

OEH was satisfied with the avoidance measures applied in designing the Project and the proposed mitigation measures. The Department notes that, under DA 49/94, Bloomfield is required to prepare and implement a Biodiversity Management Plan in relation to impacts of the proposed rail loop (which is subject to an approval to be surrendered under this Project). The Department considers that the proposed mitigation measures should be reflected in any recommended conditions of consent. This could include contemporary revisions to the requirements of the site's Biodiversity Management Plan, and applicability of this plan to the entire Project area.

6.5.5 *Biodiversity Offsets*

In considering Bloomfield's approach to biodiversity offsets, it is important to recognise that the Project's SEARs (issued in March 2014) allowed for the Project's offset obligation to be met by contributing to the Upper Hunter Offsets Fund, which was to be established under the UHSA. If this option was advanced, the SEARs required:

- an assessment of impacts on NSW threatened species under the TSC Act and matters of national environmental significance under the EPBC act; and
- use of the Biodiversity Certification Assessment Methodology (BCAM) and consistency with the draft UHSA Biodiversity Plan.

Bloomfield chose to undertake its biodiversity assessment in the EIS in accordance with the UHSA Interim Policy, on the assumption that the draft USHA Biodiversity Plan would be publicly exhibited and finalised prior to determination of the proposal. However, ongoing delays in public exhibition of the draft UHSA Biodiversity Plan have meant that this process is yet to be finalised.

While there is still potential for the UHSA process to be completed prior to determination, reliance on the UHSA alone would result in residual uncertainty over the adequacy of biodiversity offsets for both Bloomfield and the community. To address this uncertainty, the BA 2018 not only included a response to issues raised in relation to the UHSA, but also provided a stand-alone assessment of biodiversity impacts and offset requirements, undertaken in accordance with the FBA.

The Department has based its consideration of the adequacy of the proposed biodiversity offset package on the information provided in the FBA assessment.

Biodiversity Offset Package

The Project would result in the disturbance of 212.8 ha of vegetation. **Table 9** identifies the various plant community types proposed for disturbance and their associated ecosystem credit values.

Table 9: *Plant community types within the disturbance area and ecosystem credits required*

Plant community	***Disturbance area (ha)***	***Ecosystem credits required (FBA)***
HU812 - Moderate / Good - Zone 1 *Forest Red Gum grassy open forest on floodplains of the lower Hunter*	0.22	13
HU906 – Moderate / Good – Zone 2 *Bull Oak grassy woodland of the central Hunter Valley*	0.1	4
HU819 – Moderate / Good – Zone 4 *Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter*	17.62	872
HU962 – Moderate / Good – Zone 5 *Grey Box grassy open forest of the Central and Lower Hunter Valley*	0.76	28
HU819 Moderate / Good Zone 7 *Derived native grassland (Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter)*	164.58	4,057
HU819 Moderate / Good Zone 8 *Derived native grassland (Narrow-leaved Ironbark – Native Olive shrubby open forest of the central and upper Hunter, CHVEFW)*	29.5	834
Total vegetation	***212.8***	***5,808***

Bloomfield has considered various options to offset these credit requirements, including:

- paying into the Biodiversity Conservation Fund (BCF);
- purchasing suitable credits on the market; and
- creating land-based offset sites with suitable biodiversity values.

Credit Availability

On 14 March 2016, Bloomfield listed its 'EIS' credit requirements on the Credits Wanted Register. Although the quantum of credits has changed as a result of the revised disturbance area and revised calculation methodology in the BA 2018, no suitable credits have been identified to date.

Land-Based Offsets

OEH requested that Bloomfield demonstrate that 'reasonable steps' were undertaken to investigate the provision of land-based offsets before alternative options were considered. This request was made prior to the commencement of the BC Act in August 2017 and the establishment of the BCF.

Bloomfield investigated 18 sites in the local area (including some sites owned by Bloomfield) to determine if suitable credits could be generated. Nine sites were excluded due to their unsuitable biodiversity values, and the remaining nine were subject to further investigation. Existing vegetation mapping was available for some sites, and the remainder were mapped by an ecologist during October 2017.

These sites generated a surplus amount of credits for plant community types with a low credit requirement (HU906, HU962 and HU812). However, only a low number of credits were identified for HU819, resulting in a significant deficiency of 5,223 credits. **Table 10** identifies the total number of credits generated within the nine offset sites in comparison to the credits required for each plant community type under the Project.

Table 10: *Credit balance*

Plant Community Type	***Land-based Credits Identified***	***Credits Required***	***Surplus / Deficiency***
HU906	549.5	4	545.5
HU819	540	5,763	- 5,223
HU962	1544	28	1516
HU812	348	13	335

Bloomfield advised that a large area (214 ha) of DNG exists within the potential offset sites that is not assigned to a plant community type. Under the best-case assumption that this DNG conformed to HU819, there would still be a deficit of 3,190 credits. Accordingly, Bloomfield recognises that the identified areas could not generate enough credits to offset the biodiversity impacts of the Project; however, it could form a part of an overall offset package.

Payment into the BCF

The Department notes that, since the commencement of the BC Act, applicants are no longer required to preferentially pursue retiring credits or land-based offsets before considering paying into the BCF. In the BA 2018, Bloomfield identified that payment into the BCF is its preferred offset mechanism, subject to credit price fluctuation.

In accordance with OEH's *Biodiversity Offset Payment Calculator* (as at 28 February 2018), Bloomfield calculated that the required number of credits generated under the FBA would equate to approximately $9,817,606.

The Department notes that, in order to retire credits under the BC Act's Biodiversity Offset Scheme, credits must be calculated under the Biodiversity Assessment Methodology (BAM). OEH is currently finalising development of a conversion calculator to convert FBA credits to equivalent BAM credits. This conversion would affect the amount required to be paid into the BCF. The Department also notes that the market value of credits could fluctuate between now and determination of the Project, which could also affect the value of any payment into the BCF.

Bloomfield has advised that, due to uncertainty regarding the cost of payment into the BCF, it would continue to investigate other means to secure offsets.

Staged Offsetting

In the BA 2018, Bloomfield proposed to stage its offsetting obligations in line with the staging of impacts. Bloomfield has proposed two general stages for credit retirement based on the progression of operations to the northwest in Pit 3. Bloomfield has outlined an indicative number of credits that would

be retired for each stage. However, the associated area of disturbance for each stage has not yet been provided.

The Department considers that a staged approach to offsetting may be acceptable in light of the progressive impacts on biodiversity over the 21-year mine life. However, further clarification would be required on the associated disturbance areas for each of Bloomfield's proposed stages. The Department also considers that the credit requirements for each stage must be:

- retired before the commencement of clearing in the associated disturbance area, if paying into the fund or purchasing from the market; or
- identified before the commencement of clearing in the associated disturbance area, if utilising land-based offsets, and secured within 18 months.

This approach would ensure suitable offsets are secured, prior to or (at worst) soon after impacts occur. The Department recommends that Bloomfield provides additional information on its proposed staged offsetting approach and consult further with OEH on this matter, prior to determination of the Project.

6.5.6 Conclusion

The Project would disturb approximately 213 ha of vegetation, of which 48.1 ha conforms to a State or Commonwealth listed EEC or CEEC. Bloomfield has sought to avoid and minimise impacts to biodiversity by excluding areas north of Dead Mans Gully. It has also proposed mitigation measures to minimise the impacts of clearing and to avoid unexpected impacts to fauna. Bloomfield proposes to offset the residual impacts of the Project in two stages, and has proposed a number of options to retire the credits required for the Project, with a current preference to pay into the BCF.

Overall, the Department is satisfied that the Project has been designed to avoid, mitigate and manage biodiversity impacts where practicable, and that the required ecosystem credits could be obtained and that the retirement of these credits would sufficiently compensate for residual biodiversity impacts. The Department considers that biodiversity impacts on the site could be effectively managed under a contemporary Biodiversity Management Plan. OEH was satisfied that the biodiversity impacts of the Project have been adequately assessed and has advised that no further assessment is required.

Although a definitive offset strategy has not yet been identified, the Department considers that the identification and/or retirement of suitable credits prior to the commencement (in stages) of clearing under the Project, would significantly lower the risk of adverse impacts to biodiversity. The Department is satisfied that, subject to conditions, the Project could be undertaken in a manner that would result in acceptable short-term impacts on biodiversity and improved biodiversity outcomes in the medium to long-term.

6.6 Final Landform, Final Land Use and Rehabilitation

The Project would include responsibility for rehabilitating the entire mine site (ie both existing and proposed disturbance). Rehabilitation of the Project would generally be managed in a similar manner to the existing Rix's Creek Mine. However, a number of changes to the currently approved final landform are proposed to better integrate with the surrounding natural landscape and to facilitate the continuation of mining operations until 2038.

6.6.1 Existing Landform and Rehabilitation

The existing approved final landform at Rix's Creek Mine was designed to reinstate pre-mining land capability, ie grazing land with stable landforms, compatible with the surrounding landscape, and allow for a range of possible post-mining landuses. The proposed landform, as depicted in the 1995 EIS and shown in **Figure 15**, was generally based on the following mine plan:

- west-northwest progression of Pit 1, leaving behind a large north-south out-of-pit OEA constructed to a height of RL 140 m and a 42-ha final void in the northern end of Pit 1;
- completion of mining and subsequent backfilling of Pit 2, leaving behind an OEA constructed to a height of RL 110 m; and
- establishment and northern progression of Pit 3, leaving behind a large east-west out-of-pit OEA constructed to a height of approximately RL 120 m and a 79-ha final void in the middle of Pit 3.

The shape of this proposed final landform has evolved over time, but remains generally consistent with the original objectives. The contemporary final landform design is further detailed in the mine's 2013-2020 Mining Operations Plan (MOP) and Rehabilitation Management Plan.

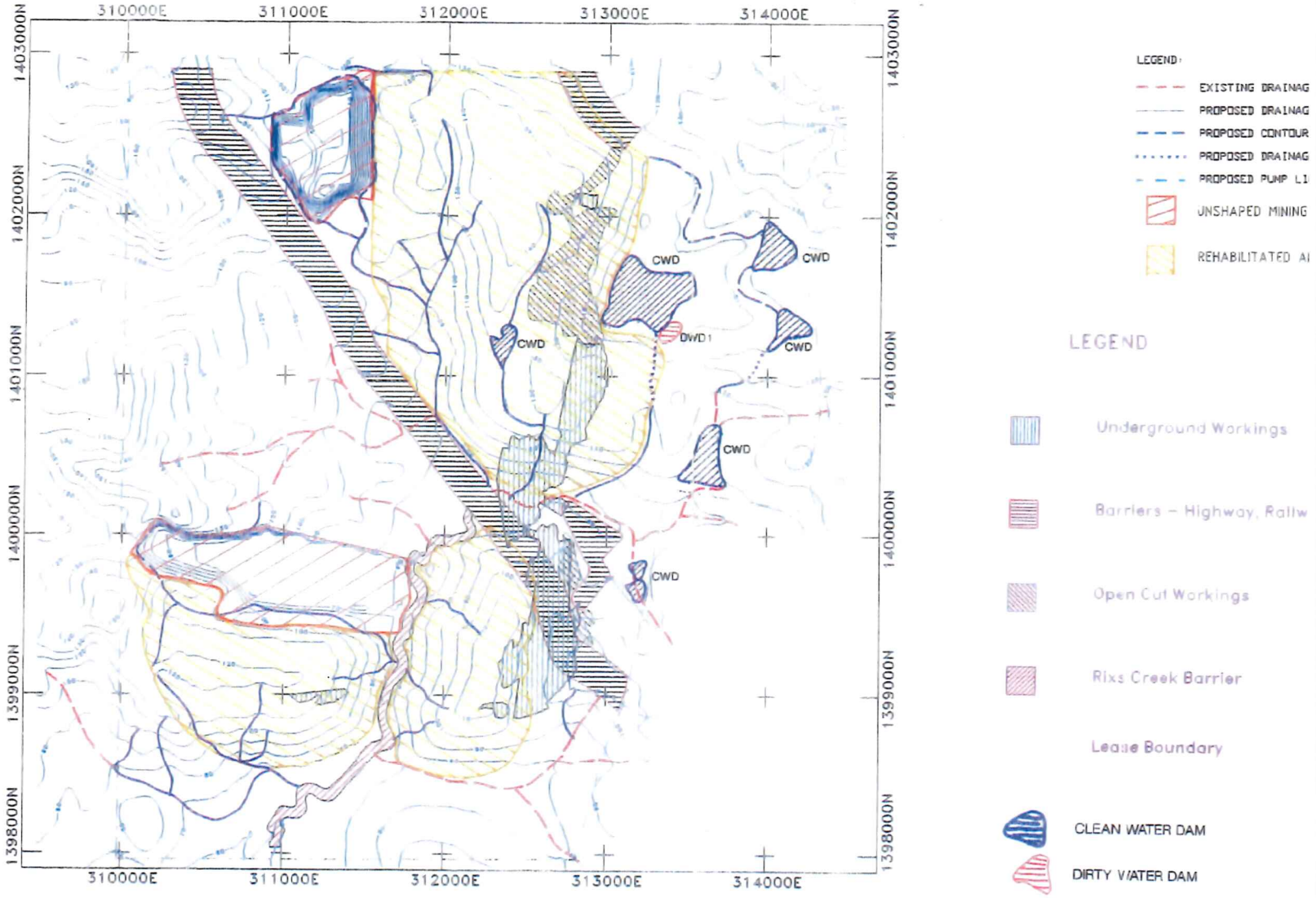

Figure 15: *Approved conceptual final landform*

As of today, the current landform generally contains one active pit (Pit 3), two partially backfilled pits (Pits 1 and 2) and two large out-of-pit OEAs that are being progressively established, shaped and rehabilitated. Mining was completed in Pit 1 in 2014 and it continues to be backfilled with material from Pit 3. The remaining depressions are currently used for water and tailings storage (Tailings Emplacement 4). Pit 2 was mined between 1997 and 2003 and the void was used for tailings storage (Tailings Emplacement 3) until it reached capacity in 2014. Tailings Emplacement 3 is currently being dewatered and will eventually be capped and rehabilitated.

Compared to other large Hunter Valley coal mines, the current landform is relatively low-lying and compatible with the surrounding undulating landscape. However, due to its high visibility from the New England Highway and close proximity to Singleton, the visual aesthetics of the mine remain under close scrutiny.

Rehabilitated land is currently returned to a combination of pasture areas and trees over grass (agri-forest). Pasture areas consist of a range of both native and introduced pasture species which are designed to sustain grazing activities. Areas of trees over grass use local native tree and shrub species and are designed to increase biodiversity values through enhanced habitat and wildlife connectivity. Bloomfield continues to use biosolids to enhance soil quality for revegetation. These rehabilitation measures are further detailed in the mine's current MOP and Rehabilitation Management Plan and are regularly reported on in the mine's Annual Review.

According to the mine's 2017 Annual Review, the mine's total disturbance footprint currently encompasses 569.6 ha of active disturbance, 9 ha of land being prepared for rehabilitation, 5.4 ha of land under active rehabilitation and 427.5 ha of completed rehabilitation. The rehabilitation to date has focused on pasture areas and Bloomfield has successfully demonstrated that establishing productive pasture is achievable. Post-mining agricultural potential is further discussed in **Section 6.9**.

6.6.2 Proposed Mine Plan and Final Landform

As part of its EIS, Bloomfield undertook an integrated mine planning and final landform design process for the Project. This included an initial Mine Options Strategy Review to assist with identifying feasible mine plan options for the Project. Five options were examined for scheduling purposes and flow-on effects for the final landform design and environmental impacts. All options took into account standard engineering constraints and assumed that Bloomfield would continue mining in a similar manner to Rix's Creek Mine, ie multi-seam bench open cut techniques using the truck and shovel mining method. Bloomfield's preferred option (progressing Pit 3 in a north-westerly direction) was selected because it was considered to be a practical and cost-effective option (see **Figure 4**). As described in the Revised RTS, the distinguishing features of the selected mine plan included:

- safeguarding access to an underground coal resource via the North Pit highwall for potential future development;
- minimising geotechnical risks associated with mining near the New England Highway and mining steeply dipping seams outcropping to the west;
- removing 'highwalls' from the final landform, and instead restricting the maximum slope to 18 degrees to aid revegetation success and reduce safety risks (ie permitting people and stock to climb safely by foot);
- avoiding significant increases in OEA heights to control noise, air quality and visual amenity impacts;
- incorporating micro / macro relief (ie small / large scale topographic variations) into the final landform to assimilate with the surrounding natural landscape and drainage patterns; and
- backfilling the final void in Pit 1 and ensuring that the final void in Pit 3 is not readily visible from the New England Highway.

Bloomfield later clarified that the Project does not include an access portal to its potential future underground resource. It only recognises that this future potential exists. Any use of open cut voids to gain access to the underground resource or retention of existing surface infrastructure to process such coal would be the subject of a separate future application, or modification to the Project.

Key proposed physical changes to the final landform include backfilling of Pit 1 and removal of the 42-ha final void, leaving behind a contoured landform that would reach RL 155 m in places. The Pit 3 final void would be enlarged (from 79 to 140 ha) and moved slightly to the north. The Pit 3 landform would include the proposed western OEA and would reach RL 165 m in places. The placement of the western OEA is strategically located to focus emplacement activities away from the majority of sensitive receivers in Singleton and to reduce overburden haulage distances (see **Figure 16**).

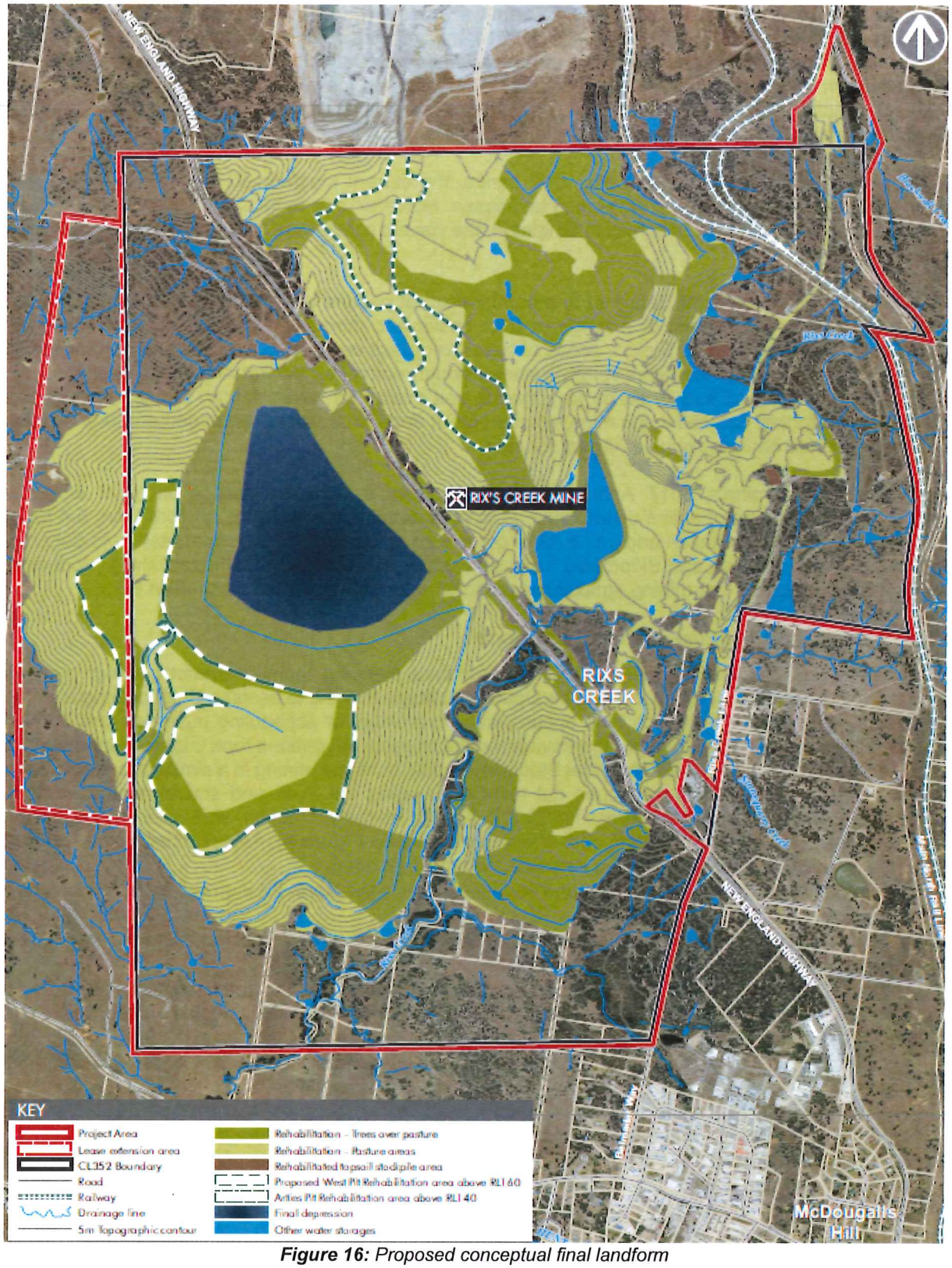

Figure 16: *Proposed conceptual final landform*

The Department recognises that Bloomfield has made three fundamental improvements to the final landform design. Firstly, Bloomfield has sought to incorporate best practice micro / macro relief to replicate natural landscapes and natural drainage patterns in order to both improve visual aesthetics and manage run-off and prevent erosion. However, the Department notes that the Project would not re-disturb previously rehabilitated land, therefore micro / macro relief contouring would only focus on future rehabilitation.

Secondly, Bloomfield has reduced the number of final voids in the post-mining landscape (from two to one). While the overall void area would increase by 19 ha, Bloomfield predicts that the area of land inundated by water in the final void would not increase compared to that currently approved (80.7 ha). The Department acknowledges that a number of submissions from the public objected to a final void as part of the post-mining landscape and that Council also noted that expectations for post-mining landforms and voids are changing and as such, some flexibility is required in the design. In response, Bloomfield has committed to continually evaluate design alternatives for the final void.

Similarly, the third key improvement is the organic shape and gentle slopes of the final void. Bloomfield has committed to reprofiling the highwall slopes to improve public safety, stability and land use potential. In order to achieve these outcomes, approximately 1.4 Mt of ROM coal would be sterilised. Overall, the Department is satisfied that Bloomfield has used its best endeavors to minimise the extent of the remaining final void and ensure public safety and long-term stability, through careful consideration of mine and overburden emplacement sequencing options.

The Department is also satisfied that the proposed mine plan and final landform would facilitate sustainable post-mining land use outcomes. As the design is conceptual in nature, there would be further opportunity to refine the landform as part of the detailed mine planning process and staged rehabilitation process under the MOP. The Department considers that this refinement should continue to focus on incorporating micro-relief techniques and integrating post-mining landform with Rix's Creek North.

6.6.1 Land Capability and Land Use

The EIS included a Soil and Land Impact Assessment (SLIA) prepared by SLR Consulting, which assessed the potential impacts on soil and agriculture land capability within the new disturbance areas. The SLIA also investigated potential post-mining land capability, based on re-using stripped topsoil and subsoil in rehabilitation.

The proposed disturbance areas primarily comprise land of Class 4 (moderate land capability) and Class 5 (moderate to low land capability, suitable for grazing), according to OEH's 2012 *Land and Soil Capability Assessment Scheme*. These soils are typical of the wider Project area. Bloomfield also obtained a SVC for its new mining lease application area which confirmed that the site did not comprise BSAL and that inherent agricultural land use limitations exist (see **Section 4.7**).

The SLIA identified that there would be ample recoverable soil material within the new disturbance areas to meet the minimum depth and quality requirements of the targeted post-mining land capability classes, but that the sodic subsoils would likely require treatment with ameliorates. Bloomfield would continue to use biosolids to provide nutrients and improve soil structure.

Bloomfield has committed to returning all land affected by the Project to a better land capability than its pre-mining condition and to a condition suitable for a range of post-mining land uses. Bloomfield's post-mining land capability commitments are shown in **Table 11**. They include a 38% and 62% reduction in lower-capability Class 5 and 6 lands, respectively, and a 117% increase in higher capability Class 4 land.

Table 11: *Comparison between pre-and post-mining land capability class*

		Pre-mining areas		***Post-mining areas***		
Slope	*Class*	*Area (ha)*	*% of total land*	*Area (ha)*	*% of total land*	*% Change*
< 10	2	9.6	0.5	9.6	0.5	nil
10	4	496.4	25	1078.2	54	+117%
10-18	5	1096.2	55	681.7	34	-38%
> 18	6	402.4	20	154.4	8	-62%
Unclassified pit lake		-	-	80.7	4	
	Total	***2004.6***	*100*	***2004.6***	*100*	

At a minimum, the post-mining landform would be suitable for agricultural activities such as grazing. However, given its proximity to Singleton, higher-order post-mining land uses such as residential and industrial development may be more beneficial for sections of the Project area, post 2038. Bloomfield has committed to investigating higher-order land use opportunities closer to mine closure. Council agreed that a flexible approach should be taken to enable adaptive end of mine planning that is responsive to evolving community and industry views.

The Department is satisfied with this flexible approach and considers that post-mining beneficial land uses could be further investigated as the mine progresses. The Department also recognises that the minimum land use requirements are in keeping with the objectives of DRG's 1999 *Synoptic Plan – Integrated Landscapes for Coal Mine Rehabilitation for the Hunter Valley of NSW*, which support biodiversity enhancement and sustainable agricultural practices.

6.6.2 Rehabilitation

The EIS included a Rehabilitation Strategy that sets out the overarching rehabilitation outcomes and objectives to guide the rehabilitation program for the entire mine site. Bloomfield's proposed rehabilitation objectives are summarised in **Table 12**.

To meet these objectives, Bloomfield would continue to revegetate the lands to an even mix of pasture and trees over grass. Pasture areas would be focused on the flatter slopes and would connect with adjacent buffer agricultural land. Treed areas would provide habitat connectivity across the Project area, assist in restoring the ecological landscape lost in clearing for mining, provide screening of operations and facilities, and improve the visual amenity of the area. In addition to establishing productive pasture and treed corridors, Bloomfield would establish erosion and sediment controls and noxious weed and pest controls.

Bloomfield has also committed to undertaking this rehabilitation progressively (against delaying rehabilitation until the end of the mine life) to minimise the area of exposed disturbance and reduce environmental impacts. Bloomfield also states that progressive rehabilitation would provide significant economic advantages and operational efficiencies through equipment integration, reduced earthmoving costs and improved topsoil management.

Bloomfield has also committed to continually improving its standard of rehabilitation. This commitment is supported by Bloomfield's involvement in rehabilitation research projects on biosolids, weed control, plant species and grazing and pasture productivity.

Table 12: *Bloomfield's proposed rehabilitation objectives*

Feature	Objective
General	• Rehabilitated land will represent a minimal source of offsite environmental impacts, such as dust emissions, water pollution, impact to visual amenity, weeds spread and odour. • Rehabilitated land will require ongoing management inputs no greater than similar adjacent land. • Rehabilitation will be compatible with the proposed post-mining land-use and the surrounding land-uses.
Landform	• Rehabilitated land will be safe and stable. • Land capability will be returned to a class similar to that existing prior to the commencement of mining. • Mined land will be re-contoured to a landform compatible with the surrounding natural landscape. • A stable drainage network will be reinstated and the landform (excluding the void) will be free draining.
Overburden	• Out-of-pit overburden emplacement (including the height of these emplacements) will be minimised. • Voids left by the progression of the open cut mining will be progressively backfilled with overburden material. • Designed to provide amenity attenuation.
Final Void	• The final void will maintain effective catchment contribution and yield into the Hunter River. • The final void will present a low risk to public safety. • The final void will not be readily visible offsite. • The final void will be outside the 100 year recurrence interval flood prone area of the Hunter River.
Growing Media	• A sustainable vegetation cover will be established on rehabilitated land (soils).

Feature	Objective
Vegetation	• Rehabilitated land will be topsoiled, fertilised and sown with grass and/or native vegetation species. • A sustainable vegetation cover will be established on rehabilitated land. • Grazing areas will be established with a range of species suitable for pasture production in the area. • Areas of trees over grass will be established with native species by either direct seeding or tubestock planting techniques. • Vegetation species will be aligned with surrounding buffer lands.
Infrastructure	• All infrastructure, including roads, will be removed and rehabilitated. • Footings will be removed to the existing ground level only, covered with a minimum of 0.5 metres of fill and rehabilitated. • Electricity supply infrastructure (overhead lines, poles, substations, etc.) will be removed. • The proposed and existing cut and cover tunnels under the New England Highway will be partially filled, allowing post-mining access under the Highway for cattle.

The Department would recommend conditions requiring Bloomfield to update and implement its Rehabilitation Strategy, in consultation with DRG and Council, in order to provide a broad framework for life-of-mine rehabilitation. This strategy should outline, in detail, the stages and timing of proposed rehabilitation across the mine site. This strategy should also incorporate future opportunities to improve rehabilitation outcomes, such as:

- integrating the final landform design and rehabilitation with Rix's Creek North; and
- investigating beneficial (ie higher order) post-mining land use options.

Bloomfield should also prepare a MOP/Rehabilitation Management Plan detailing specific rehabilitation performance and completion criteria, measures to meet these criteria and a program to monitor, review and report on the effectiveness of these measures. The MOP would essentially detail a formal program of what rehabilitation works would be undertaken and when.

Considering that rehabilitation to date has focused on pasture areas and that it takes longer to establish trees, the Department recommends that short to medium term rehabilitation measures focus on expediting tree planting.

6.6.3 Conclusion

The Department is satisfied that the proposed rehabilitation would deliver appropriate environmental outcomes. Bloomfield would deliver a post-mining rehabilitated landform that integrates with the surrounding natural environment, addresses relevant safety and stability considerations and provides land suitable for beneficial re-use post-mining. At a minimum, this would include returning the land to its pre-mining agricultural land capability (or better) and retaining flexibility to alter this use to suit the future needs of Singleton.

The Department agrees with this approach. It is considered impractical and inappropriate to set the final land use twenty years before mining is expected to cease, particularly considering the changes that are likely to occur to Singleton and its surrounds during this time. Instead, it is more reasonable to lock in rehabilitation requirements that, at a minimum, would return the land to its pre-mining state and provide sustainable post-mining land use outcomes. This approach is further supported by Bloomfield's commitment to investigate other post-mining beneficial land uses (including for the final void) over the course of the Project.

The Department is confident that the Project area could be rehabilitated to meet current best practice measures for the NSW mining industry and that the Project could be managed to achieve sustainable final landform and rehabilitation outcomes. The Department also recognises that there is currently a high level of interest in mine rehabilitation more generally and that the NSW Government is currently working through a number of reforms to strengthen operational rehabilitation requirements for all major mining projects in NSW.

6.7 Economics

The EIS included an Economic Assessment (EA 2015), prepared by KPMG that evaluated the Project's potential direct and indirect economic costs and benefits for local and regional communities and the State. This included a cost benefit analysis (CBA) that estimated the net present value (NPV) of the

Project based on the forecast costs and benefits and a computable general equilibrium (CGE) analysis to quantify potential flow-on effects to the wider economy.

The EA 2015 was prepared generally in accordance with the NSW Government's *Economic Evaluation in Environmental Impact Assessments* (2003) and the *Guideline for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals 2012* (Economic Guidelines 2012). In December 2015, the Department released the *Guidelines for the economic assessment of mining and coal seam gas proposals* (Economic Guidelines 2015). However, the development application for the Project predated this release and therefore the updated guidelines have not been applied.

The Department commissioned the Centre for International Economics (CIE) to provide an expert review of the EA 2015. CIE was specifically asked to critically analyse the assumptions, methodology and outcomes in the CBA. CIE provided two review reports based on the EA 2015 and a subsequent response from Bloomfield in March 2017 (see Appendix N of Revised RTS). These reports considered that the CBA was broadly consistent with the Economic Guidelines 2012, but identified several areas requiring further consideration. These issues included:

- calculation of wage premiums against the industry average wage as opposed to the mining sector wage;
- consideration of alternative carbon prices to test the estimate of GHGE costs; and
- quantification of the Project's air quality impacts.

These issues are further outlined in CIE's review reports (see **Appendix E**). Bloomfield responded to CIE's initial review report and other submissions that raised economic issues (such as from The Australia Institute) in its Revised RTS.

CIE also separately quantified the minimum net benefits to NSW under a conservative scenario based on lower end royalties and upper-end GHGE estimates. Under this scenario, CIE estimated that the Project would still be expected to generate a benefit to the NSW community of $86 million NPV.

Following changes to the Project's scope (see **Section 2.1**), the Department raised concerns with Bloomfield over whether the EA 2015, and subsequent responses in its Revised RTS, continue to accurately reflect the Project's potential benefits to the NSW community. In March 2018, Bloomfield provided an updated EA (EA 2018) which accounted for changes made to the Project's capital expenditure, employment generation, production profile, air quality and GHGE estimates. The EA 2018 also included updated assumptions regarding coal prices, foreign exchange rate and operating cost.

Due to the project changes and other changes over time, the two EAs are not readily comparable, and the outputs are significantly different. For example, the overall NPV of the Project increased from $251 million in the EA 2015 to $614 million in the EA 2018, assuming a discount rate of 7%. Bloomfield advised that the main contributing factors to the increased NPV were:

- higher revenue estimates in 2018, due to the application of 2018 coal price forecasts which differentiated between thermal and semi-soft coking coal; and
- reductions in capital expenditure from $110.5 million to $57.5 million NPV following the acquisition of Rix's Creek North.

The Department did not consider it necessary to re-commission CIE to review the EA 2018 as Bloomfield had previously responded to CIE's comments. However, the Department has applied CIE's general principles and methodologies from its review of the EA 2015 to the following assessment of the EA 2018.

6.7.1 Benefits

The EA 2018 estimated that the Project would result in an overall benefit for the NSW community of $272.1 million NPV. This benefit included $104.3 million in royalties to the NSW Government, $116.9 million in wage premiums and $50.9 million in company tax attributable to NSW.

Royalties

The EA 2018 estimated that the Project would generate $104.3 million NPV in royalties. This estimate was based on selling 24 Mt of product coal over a 23-year mine life at coal prices based on Macquarie Bank's coal price forecasts for thermal and coking coal. The Department acknowledges that the Revised RTS identifies a slightly different production schedule, being approximately 25 Mt of coal over 21 years. This inconsistency is unlikely to significantly change the royalty estimate but it could be further clarified by Bloomfield, prior to determination.

Bloomfield's estimate of coal royalties did not include allowable deductions, which are included in royalty calculation methods under the *Mining Act 1992*. In its submission, DRG noted that the Project would benefit from a deduction of $4.50 from the per tonne selling price on which the percentage-based royalty is calculated. This deduction reflects applicable levies and the product being subject to a full washing cycle. With these allowable deductions, the Department estimates that royalties over the life of project would decrease slightly (5%) from $104.3 million to $99.5 million, in present value terms.

DRG's submission and CIE's review also included royalty estimates of a similar magnitude, albeit these were based on the EA 2015.

Employment

The Project would result in the ongoing employment of 130 existing staff. Staff numbers would increase up to 217, at peak production between 2021-25. This presents an opportunity for long-term continuity of employment and the creation of an additional 87 jobs. The social benefits of this employment are discussed further in **Section 6.9**.

The Department recognises that coal mining in the Hunter Valley is an established industry that has provided significant levels of employment and associated social benefits to local communities and the region. The mining industry employs 36% of workers that reside in the Singleton LGA[3] highlighting the importance, both economically and socially, of mining for the area.

Wage Premium

The CIE and The Australia Institute disagreed with Bloomfield's approach to calculating wage premiums in the EA 2015. This was due to the comparison against the average wage for all industries (including the mining sector), as opposed to the mining sector wage alone. CIE considered that, if the Project did not progress, workers would find work in other mines, as opposed to other industries or being unemployed. Based on the EA 2015, CIE estimated that the wage premium for the Project would range between $150,000 to $300,000 PV. That is, it estimated that the value of wage premiums for mine workers employed at Rix's Creek was almost nothing when compared to those workers being fully employed at another mine.

The Department notes that Bloomfield has maintained the same approach to calculating wage premiums in the EA 2018 as it did in the EA 2015, which continues to result in a substantially higher estimate than CIE's. The EA 2018 estimated that the Project would generate $116.9 million NPV in wage premiums. Bloomfield justified the use of the average industry wage due to the high level of unemployment in the Hunter Valley and the average individual taxable income in the region being significantly lower than the State average. Bloomfield considered that, if the Project did not proceed, existing employees may face difficultly obtaining alternate employment at their current wage, due to the lower coal price environment, which has led to production cutbacks and staff retrenchments at a number of mines.

The Department considers CIE's approach to be overly conservative, as it assumes that there are 217 vacancies in the other Hunter Valley mines that could be readily filled by workers that would otherwise have been employed by Bloomfield, if the Project proceeded. Nonetheless, it is also likely that Bloomfield's approach is optimistic in assuming that the great majority of workers required for the Project would otherwise be unemployed or working in other industries (ie non-mining), if the Project did not proceed. It's fair to say a significant proportion of Bloomfield's workers would seek to obtain other jobs in the Hunter Valley mining industry. Consequently, the Department recognises that the wage premium benefit associated with the Project is likely to lie somewhere between the two estimates.

The Economic Guidelines 2015 state that "a zero wage premium is a useful starting assumption, [but that] the appropriateness of this assumption must be assessed on a case by case basis." The Department recognises that even if a zero wage premium were applied, the Project would still result in a positive benefit to the NSW community.

Other Benefits

The Project would also generate other economic benefits for NSW as a result of tax requirements and capital invested into the Project.

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[3] Singleton Community Strategic Plan (2017-2027), Singleton Council

Bloomfield identified that the Project would generate $50.9 million NPV in company tax. This benefit was estimated based on the per annum Commonwealth tax requirement, proportional to the Australian population represented by NSW (32%). The Department acknowledges that this proportion is based on recent population statistics (Australian Bureau of Statistics, 2017).

Bloomfield also identified that industries that supply the mining sector with trade, manufacturing and professional services, would likely experience additional demand and positive flow-on impacts as a result of the Project.

Currently, Bloomfield provides community funding through the Bloomfield Foundation. Between 2006 and 2014, the Bloomfield Foundation contributed $2.6 million ($325,000 per annum) in funding and sponsorship to a range of recipients in the local region. Some of these recipients include:

- the Cancer Council;
- Youth Off The Streets (Kurri Kurri and Cessnock);
- Hunter New England Health – Neonatal Intensive Care Unit; and
- local schools, sporting teams, festivals and shows.

Bloomfield has committed to continuing the Bloomfield Foundation over the life of the Project. Additionally, Bloomfield has proposed to contribute to local infrastructure through a Planning Agreement (PA) with Council. The Department has further considered the proposed PA in **Section 6.9**.

6.7.2 Costs

GHGEs

Bloomfield considers that the Project's key costs to the NSW community are in relation to GHGEs. The EA 2018 estimated that the cost of GHGEs from the Project would be $6.3 million NPV, based on Scope 1 and 2 emissions only. This estimate is based on a carbon price reflecting the European Union's Emission Allowance Units (EU's EAU).

In its review of the EA 2015, CIE utilised three different carbon prices to determine the sensitivity of the Project's GHGE costs. These carbon prices were the:

- EU's EAU;
- Australian Treasury's Clean Energy Future Policy Scenario; and
- US EPA's Social Cost of Carbon.

Based on these three scenarios, CIE estimated that the Project's carbon emission costs for Scope 1 and 2 emissions would be between $6.7 million and $25 million NPV. Notwithstanding that this range is based on an assessment of the EA 2015 with slightly different inputs, the Department notes that Bloomfield's estimate of GHGEs is similar to CIE's lower-end estimate.

The Department notes that there is no agreed carbon price in NSW and that each of the above pricing methodologies hold validity. These prices have been developed using a range of complex assumptions and/or modelling. These prices utilise different measures in estimating carbon prices and are not directly comparable.

The Department accepts Bloomfield's use of the EU's EAU carbon price as there is inherent uncertainty in estimating carbon prices and this methodology provides a reasonable indication of a market based carbon price linked to longer term emission targets. Notwithstanding, the Department is satisfied that even if CIE's highest estimated carbon price were to apply, it would not significantly affect the overall benefit of the Project.

Particulate Matter

In its review of the EA 2015, CIE considered that the Project's air quality impacts on properties needed to be quantified and monetised. CIE used the estimates of particulate matter emissions within the AQIA to quantify the related cost of the Project. CIE estimated that the Project's particulate matter emission costs would be $1.6 million NPV.

Bloomfield subsequently included these costs in the EA 2018 and estimated that the Project's particulate matter emission costs would be approximately $1.2 million NPV.

The Department notes that even if CIE's more conservative estimate is applied, the costs of particulate matter impacts is minor in relation to the estimated benefits of the Project.

Other

As the Project would utilise existing agricultural land for mining purposes, the EA 2018 quantified the cost of foregone agricultural production (cattle grazing). Based on historical assessment of the agricultural value of the land, the foregone agricultural production was estimated as approximately $0.6 million NPV. This cost is considered minor in relation to the estimated benefits of the Project. Agricultural impacts are discussed further in **Section 6.9**.

Bloomfield would also incur costs as a result of any imposed mitigation and acquisition rights. Although these costs have not been quantified in the EA 2018, the Department notes that their inclusion would likely be a minor influence on the overall Project CBA.

6.7.3 Conclusion

Overall, the Department is satisfied that the Project would generate a minimum net benefit to the NSW community of approximately $120 million NPV and contribute to employment and expenditure in the local and regional economies.

The Department recognises that there is inherent uncertainty in estimating costs and benefits over the life of a mine. However, when considering conservative assumptions, the Department is confident that Project's benefits to NSW would significantly outweigh the costs. There is some uncertainty regarding the exact quantum of this benefit, and Bloomfield could provide further information to reduce this uncertainty.

6.8 Social Impacts

The EIS included a Social Impact and Opportunity Assessment (SIOA), prepared by Umwelt (Australia) Pty Ltd, that considered the social costs and benefits of the Project. The SIOA included a social profile analysis, an assessment of the potential impacts on the local and regional communities and consideration of mitigation and management measures in response to these potential impacts. The SIOA also reviewed the mine's complaints register and the minutes of the mine's Community Consultative Committee (CCC) meetings.

The social profile analysis included a stakeholder identification and engagement program, and a scoping of issues and/or values from these stakeholders. This analysis indicated that the Project posed no significant risk to the local community and no wider risks to natural, economic, human, physical and social community capitals than those presented by the existing Rix's Creek Mine. The SIOA identified that the key social values of the local community include protecting the natural and built environments, safety, connectedness, heritage and sustainability.

On 8 September 2017, during assessment of the Project, the Department released its new *Social Impact Assessment Guidelines for State significant mining, petroleum production and extractive industry development.* The transitional arrangements for projects already under assessment allow the Department to request additional information, consistent with the guideline, if reasonably required to consider the application. At this stage, the Department has not requested further material to inform its preliminary assessment.

6.8.1 Environment Related Social Impacts

The SIOA identified that the Project's potential social impacts predominantly relate to amenity, health, and wellbeing related to air quality, noise, blasting and visual impacts.

Air quality, noise and blasting impacts were the most common concerns raised in public submissions about the Project, and have been the most frequent issues raised in complaints to Rix's Creek Mine. The Department has carefully considered the Project's environment impacts in its above assessment. Generally, these impacts are within the relevant criteria, or else mitigation and management strategies are proposed to reduce the impact to acceptable levels set under NSW Government policy. The Department acknowledges that people may experience these impacts differently and that there would likely be some residual amenity impacts to the community. However, the Department is satisfied that the specialist assessments and additional information provided by Bloomfield satisfactorily address the environmental impacts of the Project.

6.8.2 Employment and Social Services

Bloomfield considered that the continued employment of existing staff together with the anticipated increase in staff during full production represents a positive social benefit to the local region, particularly

to Singleton. Bloomfield has committed to preferentially hiring members of the local community when recruiting additional workers for the Project.

In the event that additional workers are sourced from outside the region, the SIOA considered that the potential increase in population would not affect social infrastructure and services, such as access to housing, community facilities and services.

To enhance the positive social benefits of the Project, Bloomfield has proposed to continue its funding support of the Bloomfield Foundation. Additionally, Bloomfield has committed to entering into a PA with Council, which would include contributions to maintain or improve local facilities or services. The SIOA identified the Alroy Oval and the Singleton Heights Sports Centre as potential local facilities requiring funds for upgrade. The Department considers that the terms of this agreement should be negotiated between Bloomfield and Council, and (if possible) agreed upon prior to determination of the Project.

Whilst these social benefits do not directly offset the negative impacts identified in the SIOA, they would provide an indirect benefit by improving the local community's sporting facilities and way of life.

6.8.3 Mitigation

Bloomfield considers that the social impacts of the Project could be mitigated through implementing management and monitoring programs, as well as effective communication procedures including:

- operation of a 24-hour community hotline;
- regular CCC meetings;
- ongoing consultation with immediate neighbours and interested stakeholders; and
- ongoing dissemination of information to the community through print media, information sessions, and online forums.

Bloomfield has committed to continually inform the community of noise, dust and blasting mitigation and monitoring activities. The Department considers that Bloomfield's ongoing communication with the community and responsiveness to community concerns is key to successfully managing the Project's social impacts.

6.8.4 Conclusion

The Department recognises that the Project would have potential social impacts which are directly linked to a range of environmental impacts considered in this report. The Department notes that Rix's Creek Mine has been operating in the community for over 25 years and that the Project is an extension to existing operations, as opposed to a new development. The Department considers that the Project would not substantially change the severity and extent of existing impacts on social amenity. It also acknowledges that the Project would result in social benefits, particularly local and regional employment and the community funding initiatives proposed.

Although some residual social impacts may be experienced as a result of the Project, the Department considers that conditions of consent could be recommended to manage and minimise these impacts. In addition to noise, dust and blast management and monitoring conditions, the Department considers that conditions requiring independent review of impacts on privately-owned land, management plans and continued operation of a CCC, would enhance Bloomfield's social accountability and transparency.

6.9 Other Impacts

The Department is satisfied that the other impacts associated with the proposed Project are minor in nature. Consideration of these other impacts is provided in **Table 13** below.

***Table 13**: Summary of other issues*

Issue	Potential Impacts	Consideration & Conclusion
Visual	▪ The EIS included a Landscape Character and Visual Impact Assessment (LCVIA), prepared by RPS, to assess the visual impacts of the Project. ▪ Nine view zones surrounding the mine were assessed, using photomontages. ▪ The LCVIA found that the extension of mining operations (by nature of the open cut mining activity) would exacerbate existing views of the mine, particularly for zones with direct views of the overburden emplacement and disturbance areas. ▪ The LCVIA also recognised the Project's potential for lighting impacts, when operating during the night period. ▪ The LCVIA found that seven of the zones would experience negligible to moderate impacts from the Project, due to distance, the fleeting nature of views, intervening topography and/or elements of the built environment. ▪ The remaining two zones, comprising mobile sensitive receivers travelling along the New England Highway and static privately-owned residences immediately south of Pit 3, would likely experience high visual impacts from the Project due to their close proximity to the mining operations. ▪ To mitigate views of the Project for travellers on the New England Highway, Bloomfield proposes to construct additional earth bunds and vegetation screens along the adjacent section of highway, using endemic species. ▪ The residences to the south of the mine near Maison Dieu Road and Dights Crossing Road currently experience views of a rehabilitated overburden emplacement at the southern end of Pit 3. Further visual impacts are likely to be experienced until Year 7, when emplacement in this area reaches its maximum proposed height. Progressive rehabilitation would be undertaken to minimise this impact. ▪ Bloomfield has also committed to installing additional localised vegetation screens, if feasible, where high visual impacts are identified by the community during operation of the Project. ▪ To mitigate and manage visual impacts, Bloomfield proposes to implement a Visual and Landscape Management Plan. This plan would detail: o a progressive rehabilitation and tree planting schedule over the life of the Project; o procedures to consult with affected landowners and identify localised mitigation options; o measures to retain existing tree cover and safeguard existing vegetation; and o design and location of permanent and mobile lighting to avoid direct line of sight from areas surrounding the site, and minimise light spill.	▪ The Department recognises that there are existing views of mining operations at Rix's Creek Mine but considers that any significant change in visual impacts as a result of the Project must be mitigated to acceptable levels. ▪ The Department considers that Bloomfield's proposed vegetation screening along the New England Highway is acceptable and should be completed within the first year of the Project. This would maximise the effectiveness of this mitigation measure over the life of the Project. ▪ The Department accepts that progressive rehabilitation would assist in minimising the visual impacts of the remaining mine landscape, and that the implementation of vegetation screening would result in an improved visual outcome from some vantage points. ▪ The Department also accepts that impacts to receivers to the south of Pit 3 would be largely unavoidable, but would reduce over time with progressive rehabilitation. ▪ However, there may be further opportunity to install localised vegetation screens in this area in consultation with affected residences. ▪ The Department considers that visual mitigation could be effectively managed under the proposed Visual and Landscape Management Plan. ▪ On this basis, the Department considers the visual impacts of the Project are acceptable.
Traffic and Transport	▪ The EIS included a Traffic Impact Assessment that considered: o impacts of the proposed tunnel construction; o additional employee vehicles on the local and State road network; and	▪ The Department considers that the Project would result in a negligible increase in mine-related road traffic and rail transport.

Issue	Potential Impacts	Consideration & Conclusion
	○ coal train movements and the capacity of the rail network to the Port of Newcastle. ▪ Bloomfield proposes to construct a new cut and cover tunnel which would require a temporary deviation of sections of the New England Highway for around 20 weeks. The RMS did not object to the proposed tunnel but outlined its requirements, including minimum engineering design standards and the need to obtain a Works Authorisation Deed. ▪ Analysis of the intersection of the New England Highway and Rix's Creek Lane revealed that the Project would result in approximately 125 additional staff car movements at this intersection during the morning and afternoon peak hours, at peak production volumes. ▪ These additional movements would result in marginally longer delays (1-5 seconds) to vehicles turning right on to the New England Highway. This additional delay would not result in a change to the current Level of Service (LoS) E classification. ▪ The EIS advised that this poor level of service would be experienced by a very low volume of cars using the intersection (less than 1%). ▪ The remaining turns within the intersection are predicted to operate at either LoS A or B. ▪ The Department notes that the poor LoS would almost exclusively affect mine employees leaving the site at shift change over times. ▪ In respect of rail traffic, the Project would require additional train movements on the rail network to transport product coal to the Port of Newcastle. The EIS predicts that the Project would result in approximately 115 additional laden trains per year, or two additional train movements every three days. From 2025, rail traffic from the Project would gradually reduce. ▪ Bloomfield advised that there is sufficient capacity in the rail network to accommodate the proposed increase, which is subject to agreement with the Australian Rail Track Corporation (ARTC). ▪ Bloomfield has confirmed in its Revised RTS that it would continue to haul product coal via private roads to the existing Integra rail loop and loading infrastructure at Rix's Creek North instead of building a new rail loop near the CHPP.	▪ The Department considers that road traffic impacts could be managed under a Traffic Management Plan. ▪ Rail transport would continue to be managed through the commercial arrangements with ARTC. ▪ Bloomfield would also need to consult with RMS to confirm the final design of the new cut and cover tunnel and implement a Construction Traffic Management Plan to manage New England Highway traffic during construction of the tunnel and the associated road deviations. ▪ Subject to these measures, the Department is satisfied that the traffic and transport impacts of the Project are acceptable.
Agriculture	▪ The EIS included an Agriculture Impact Assessment (AIA) prepared by Neil Nelson Agvice Pty Ltd, that assessed the Project's impacts on agriculture. ▪ The Revised RTS also included an assessment of areas of the new disturbance area not included in the EIS. ▪ The Project would remove 170 ha of cattle grazing land for the new mining lease area, from a larger cattle grazing enterprise. ▪ This would result in a reduction of the overall stock carrying capacity for that property by approximately 81 breeding units. This represents less than 0.2% of	▪ The Department considers that removal of cattle from the new mining lease area would have a negligible impact on regional agricultural production. ▪ The Department notes that the Project's impacts on agricultural land could be further managed through conditions of consent requiring progressive site rehabilitation as well as management plans for soil stripping and rehabilitation.

Issue	Potential Impacts	Consideration & Conclusion
	cattle sold at the Singleton Regional Saleyards (based on 2013 sales figures), and equates to annual returns of approximately $75,313 (based on 2017 cattle prices). ▪ The AIA considers this loss of a small area from a low intensity cattle farm would have minimal effect on local employment and agricultural support services. ▪ As discussed in **Section 6.6**, Bloomfield has committed to reinstate grazing land post-mining, including returning a larger proportion of Class 4 land suitable for grazing. ▪ Current research indicates that equivalent or higher production is possible on rehabilitated sown pasture, when compared to natural pastures. ▪ Since 2013, Bloomfield has been trialling the use of rehabilitated land for grazing. It proposes to continue with this trial and the use of biosolids to improve rehabilitation outcomes. ▪ DPI noted Bloomfield's engagement in these research programs and supported its proposed approach.	▪ Overall, the Department is satisfied with Bloomfield's proposal to deliver a post-mining landform that would enable the ongoing productive use of land for a range of uses, including agriculture and grazing.
Aboriginal Cultural Heritage	▪ The EIS provided an Aboriginal Archaeological and Cultural Heritage Impact Assessment, which identified that 21 Aboriginal sites would be disturbed by the Project. ▪ Following the issue of the consent orders and amendments to the proposed disturbance area (see **Section 1.3**), this number was revised to 17. ▪ Subsequently, Bloomfield clarified that the number of sites to be disturbed was actually 16, as AHIMS 37-6-1793 was salvaged in 2007 in accordance with Aboriginal Heritage Impact Permit #2822. ▪ The Project would also disturb an area with potential for subsurface Aboriginal archaeology, adjacent to Dead Mans Gully. ▪ Of the 16 sites proposed for disturbance, two were assessed as having moderate scientific significance and the remaining 14 as being of low scientific significance. ▪ The low significance of these sites was attributed to past erosion, earthmoving works and stock trampling. ▪ Bloomfield has committed to salvaging all 16 sites and undertaking archaeological excavation adjacent to Dead Mans Gully, in consultation with Registered Aboriginal Parties. ▪ When considering the number of sites within 20 km of the Project, and the low significance of the sites proposed to be disturbed, Bloomfield considers that the cumulative impact to cultural heritage in the Hunter Valley would be minimal. ▪ To mitigate and manage impacts to Aboriginal cultural heritage, Bloomfield proposes to prepare an Aboriginal Cultural Heritage Management Plan (ACHMP) in consultation with Registered Aboriginal Parties, OEH and the Department. This plan would include: o a program to salvage all 16 sites proposed to be disturbed;	▪ The Department considers that the Project's potential impacts on Aboriginal cultural heritage are minor. ▪ The Department notes that the majority of sites to be disturbed are of low scientific significance and that the proposed ACHMP would allow for effective management of disturbed sites and mitigation of any future impacts on Aboriginal cultural heritage. ▪ With the appropriate management conditions in place, the Department considers that the Project's impacts on Aboriginal cultural heritage are acceptable.

Issue	Potential Impacts	Consideration & Conclusion
	○ archaeological excavation in areas with potential subsurface deposits; ○ protection and monitoring of sites outside the disturbance areas; ○ precautionary measures in the event of any unexpected finds (amongst other procedures); and ○ cultural awareness training and reporting procedures. ▪ OEH strongly supported the proposed ACHMP for the Project. ▪ The Department notes that three sites initially proposed for disturbance in the EIS (AS14, AS15 and AS16) are now located in areas considered approved for disturbance. The Department considers that these sites should also be subject to the management strategies outlined in the proposed ACHMP.	
European Heritage	▪ A Heritage Impact Assessment identified four historical heritage items in the vicinity of the Project. These include: ○ the Coke Ovens; ○ the Granbalong Trig Station; ○ a Mound with Historical Material; and ○ a Linear Embankment. ▪ The Mound with Historic Material and the Linear Embankment would be directly impacted by proposed mining activities in the North Pit Area. These items are not listed on any heritage registers but are of local heritage significance. ▪ Bloomfield proposed to undertake archival recording and surface collection at these sites. However, Heritage NSW recommended that additional historical research be undertaken regarding the potential association of these items with the Coke Ovens, to determine whether salvage and recording is necessary. ▪ Bloomfield agreed to undertake this additional research following determination, but prior to disturbing these items. ▪ Following the issue of the consent orders (see **Section 1.3**), these items are now located in areas considered approved for disturbance. Nevertheless, the Department considers that, as these items are not yet disturbed, the additional research should still be undertaken prior to any disturbance. ▪ The Coke Ovens and the Granbalong Trig Station are not located in the Project's proposed disturbance area, but may be indirectly impacted by the Project. ▪ The Coke Ovens are located within the eastern boundary of the site and hold State and local significance as evidence of historic mining practice. Due to its proximity to proposed mining activities, this item has the potential to be indirectly impacted by blasting (ie ground vibration). ▪ As discussed in **Section 6.3**, Bloomfield considers that indirect impacts from blasting could be managed through application of tailored blast designs, and appropriate monitoring and reporting. ▪ The Granbalong Trig Station is located within the new mining lease area and holds historical significance relating to early surveying and mapping of the area.	▪ The Department is satisfied that the Project's impacts on historic heritage sites would be minor and that the proposed mitigation and management measures could preserve historic heritage values. ▪ The Department is satisfied that the historic heritage impacts of the Project could be appropriately managed under a Heritage Management Plan and conditions of consent including: ○ condition reporting and monitoring for the Coke Ovens (refer to **Section 6.3**); ○ additional historical research on the Linear Embankment and Mound with Historic Material, prior to disturbance of these items; and ○ sympathetic placement of overburden proximal to the Granbalong Trig Station.

Issue	Potential Impacts	Consideration & Conclusion
	The visual outlook from this item has the potential to be impacted by the proposed emplacement of overburden. ▪ As part of the final landform design, Bloomfield has endeavoured to minimise visual impacts to this item.	
Waste	▪ Bloomfield currently implements a waste management program that aims to avoid, reduce, re-use and recycle waste. ▪ Bloomfield expects that waste streams for the duration of the Project would be similar to or less than existing volumes, except during 2021 – 2025 when production increases to 3.6 Mtpa. ▪ During this time, the greatest waste stream generated would be coal reject material (coarse rejects and tailings), which are proposed to be disposed of by mixing with overburden in backfilled pits or designated emplacement areas. ▪ Other waste streams, including waste generated through the construction of the cut and cover tunnel, would be managed through arrangements with existing waste contractors and relevant construction management plans.	▪ The Department is satisfied with the ongoing implementation of Bloomfield's existing waste management program, which adopts the hierarchy of avoid, reduce, re-use, recycle and dispose. ▪ The Department is satisfied that waste generated during the life of the Project could be appropriately managed, with low risks to the environment.
Hazards	▪ Bloomfield has a Hazardous Management System and Explosives Management Plan in place. This system and plan would be updated and revised as part of the Project and include additional mitigation measures, if required, to protect the public and the environment.	▪ The Department does not expect the Project to increase the risk of hazards to the public or environment and that risks would continue to be managed through Bloomfield's existing procedures.

7. CONCLUSION

The Department has assessed the development application and the various documents submitted to support the application throughout the assessment process, in accordance with the relevant statutory requirements of the EP&A Act. The Department has also obtained expert advice on the economic costs and benefits of the Project and carefully considered the advice provided by public authorities and the comments provided by the community.

The Department's assessment has concluded that the Project represents a logical extension to the existing operations of the Rix's Creek Mine that would allow for the efficient recovery of significant coal resources with fewer environmental impacts than would arise with a greenfield project of the same or similar scale. This is amplified through Bloomfield's utilisation of existing infrastructure and integration of operations with Rix's Creek North.

The Project would not significantly increase the severity or extent of existing impacts of the Rix's Creek Mine, which has been in operation for over 25 years. The Project provides an opportunity to improve the operation and management of a legacy mine and require it to adhere to current best practice mining techniques, environmental management and rehabilitation standards.

The Department believes that the benefits of the Project outweigh its costs and that the proposed mine plan strikes an appropriate balance between protecting the environment and local community and realising the significant economic benefits of the Project to the region and the State. Consequently, the Department's preliminary findings are that the Project is in the public interest and is approvable, subject to the development of robust and contemporary conditions of consent.

Following the IPCN's review of the Project, the Department will finalise its assessment, including carefully considering the IPCN's findings. It will then refer the development application for the Project to the IPCN for its determination.

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