

6.3.5 Indicative Project Schedule

Mining would be staged to maximise recovery of coal, whilst enabling the progression of rehabilitation as soon as practicable following the completion of mining and achievement of desired landform levels. Rehabilitation of the site to final landform would be completed in accordance with the Rehabilitation Strategy.

The timing of key project elements is as follows:

- Expand West Pit commencing from 2016 through to approximately 2037 to enable extraction of the resource;
- Commence construction of the cut and cover tunnel no later than Q4 2018;
- Increase in production to approximately 4.5Mtpa ROM coinciding with closure of Bloomfield Mine;
- Progressive rehabilitation of the site with the expansion of the West Pit;
- Establish entry location for the underground resource (southern end of the North pit); and
- Mine closure preparation from approximately 2035 until the end of the Project (refer **Section 25.0**).

This timing is indicative and may change due to economic or other factors.

6.3.6 Plant and Equipment

Plant and equipment currently used by the Mine is detailed in **Table 6-1**.

Table 6-1 Plant and Equipment

Plant / Equipment	Activities	Number of Plant
Caterpillar 789 Truck	Transport of ROM coal and overburden	6
Caterpillar 793 Truck		11
Caterpillar 994 Front-End Loader	Stockpile and overburden management	2
Caterpillar 992 Front-End Loader		2
Caterpillar 988 Front-End Loader		1
Caterpillar 950 Front-End Loader		1
Hitachi EX5500 Excavator	ROM coal and overburden removal from pit	1
Liebherr R9800 Excavator		1
Hitachi EX3600 Excavator		1
Caterpillar D 11 Bulldozer	Stockpile and overburden management	5
Caterpillar D 10 Bulldozer		5
Caterpillar Tiger R690B Bulldozer		1
Caterpillar 16G Grader	Haul road construction and maintenance	2
Caterpillar 24H Grader		1
Redrill SK75	Drilling for drill and blast operations	1
Redrill SK50		2
Caterpillar 785 Water Cart (114,000L)	Dust suppression and rehabilitation area management	2
Caterpillar 777 Water Cart (80,000L)		1
ACCO Water Cart (10,000L)		1

With the progression of mining, some of the existing plant and equipment would need to be retired as a consequence of increasing maintenance costs or as a result of plant and equipment deterioration. Additions to the fleet would also be required to account for the proposed increase in production. The Proponent estimates the following plant and equipment would be required to meet operational requirements over the life of the Project. In many instances, this additional equipment (or similar) would replace corresponding equipment listed in **Table 6-1**:

- Hitachi 5600 Excavator to be utilised from approximately year 2021 into the life of the Project;
- Liebherr 9800 Excavator to be utilised at approximately 2028;
- Cat 785 Water Truck to be utilised at approximately 2020-2021;
- Cat 789 Truck to be utilised at approximately 2018-2019, 2021-2022 and approximately 2025;
- Two Cat 793 Trucks to be utilised at approximately 2016-2022;
- Cat D11T Bulldozer to be utilised at approximately 2015, 2017 and 2019;
- Cat 24M Grader to be utilised at approximately 2015;
- Cat 992K Loader to be utilised at approximately 2020-2021;
- Cat 994F Loader to be utilised at approximately 2027; and
- SKF MD6290 Drill to be utilised at approximately 2015 and 2023.

No additional plant is expected to be required after 2029 for the remaining life of the Project. The Proponent would ensure new excavators, trucks and drills acquired for the Project are fitted with noise suppression to assist with adherence to noise criteria as production levels increase (refer **Section 12.0**).

In addition to the equipment listed above, the Mine operates a fleet of road trucks which deliver saleable coal from the CHPP to the rail loading facility on the Integra Coal Operations rail loop via internal mine roads. A fleet of light vehicles is also used by mine staff for environmental monitoring, surveying, in pit fleet maintenance and repair, and for safety and emergency management.

6.3.7 Coal Production Limits

The Project is seeking approval to increase production from approximately 2.8Mtpa ROM coal, to a maximum of 4.5Mtpa of ROM coal. It is estimated that with the preferred Mine Operations Plan enacted, the Project can see the recovery of approximately 32 million tonnes of coal for the life of the Project. Indicative upper coal production rates anticipated as part of the Mine Operations Plan for each year of mining are shown in **Table 6-2**.

Table 6-2 Indicative Production Rate over the Life of the Project

Years	ROM Coal (Mtpa)	Saleable Coal (Mtpa)
2017 - 2020	2.5	1.5
2021 - 2023	4.5	2.7
2024 - 2028	1.6	1.0
2029 - 2032	1.5	0.9
2033 - 2036	1.0	0.6
2037	0.8	0.5

As can be seen in **Table 6-2**, indicative peak production levels in the order of 4.5Mtpa for a period of three or more years post 2020 would coincide with closure of the Bloomfield Mine. Limited coal extraction is expected from 2036 onwards owing to Mine constraints including the extent of the lease area, available resources and increasing overburden ratios. It is expected that the underground resource would remain within CL 352 following the completion of open-cut mining activities as described in this EIS. Any remaining underground resource would be evaluated at the appropriate time in the future and, where necessary, additional approvals sought for the extraction of coal beyond the limits described in this EIS. As discussed in **Section 6.3.2**, the Mine Operations Plan has been designed to safeguard future access to the underground resource.

Once the coal has been extracted, it would continue to be processed via the existing CHPP, and transported via the Mine rail loop. The Project could see the quantity of product coal transported from the Mine to the Port of Newcastle increase from around 1.5Mtpa to around 2.5Mtpa.

6.4 Mine Infrastructure and Facilities

6.4.1 Administration, Office Building and Workshop Complex

The Mine administration building and visitor parking is located adjacent to the Mine entrance as shown in **Figure 2-1**. This building includes offices for management staff as well as crib rooms and amenities for the operational staff.

The Mine workshop sits adjacent to the administration building to the immediate west and provides for scheduled and unscheduled maintenance and repair of the Mine's plant and equipment fleet.

These buildings would continue to provide administrative and maintenance functions for the Project.

6.4.2 Coal Handling and Preparation

Currently raw coal from the pit is transported by truck to the CHPP where it is either dumped directly into a 600T hopper or stockpiled on a ROM stockpile area adjacent to the hopper and loaded into the hopper by front end loader as capacity permits. The coal is screened and reject material is stockpiled, removed by truck and transported to a tailing emplacement area. The remaining coal is processed through a rotary breaker to break it down into manageable sizes before being washed, screened, rinsed and dewatered. The coal is then conveyed to a storage (product) bin before being transported by truck to the washed coal stockpile at the rail loop for export.

The CHPP has approval to operate 7 days a week. While the process of coal handling and preparation would continue during the life of the Project, the increased production rate of 4.5Mtpa ROM coal would necessitate an increase in operational hours from the current 4.5 days per week to seven days a week for the period of peak production.

6.4.3 Rail loading Facility

From the CHPP, saleable coal is transported to the Rix's Creek Mine rail loading facility situated on the Integra Coal Operations rail loop, via truck on a mine haul road. Trains stationed at the Rix's Creek Mine rail loading facility comprise up to 96 wagons with the capacity to transport up to 95t coal per wagon. Once loaded onto trains, coal is transported on the Main North Rail Line to the Port Waratah Coal Services ship coal loading facilities at the Port of Newcastle for export to market. The existing Rix's Creek rail loading system is capable of handling the proposed maximum throughput of 4.5Mtpa of ROM coal and no upgrades are proposed as part of this EIS to accommodate the proposed increased rate of throughput.

The Bloomfield Group has an Agreement with Integra Coal Operations (reviewed in 2012) to use the Integra Coal Operations rail loop to transport coal. As part of the agreement, the proponent pays a charge for the use of the rail loop. The Integra Coal Operations rail loop would continue to operate indefinitely notwithstanding that in mid-2014 Integra put the Integra Coal Operations into care and maintenance. In order to provide greater security for coal transport should the access Agreement not be renewed, The Bloomfield Group applied for a modification to its development consent (DA 49/94) in 2013 to enable the construction and operation of the Mine's rail loop and coal loading facility. This facility would include:

- A 5.6km rail loop from the Main North Rail Line;
- Proposed rail loading facility;
- Clean coal stockpile (280m x 140m);
- Overland conveyor (410m) from the existing CHPP product bin;
- Stacker conveyor (260m) connecting the overland conveyor to the clean coal stockpile; and
- Reclaim tunnel with conveyor (460m) to rail load bin.

The modification application was approved by DP&E under delegation on the 25 November 2013.

6.5 Overburden and Rejects Management

Overburden overlying the coal seams is removed prior to accessing the coal. For the purpose of this EIS, management of overburden also includes the management of interburden which is the non-resource material located between coal seams.

Reject material is generated from the CHPP during the cleaning and preparation of coal for transport. Reject material includes coarse rejects and fine rejects.

6.5.1 Overburden Emplacement

Overburden is stockpiled in emplacement areas for use as backfill and for rehabilitation purposes. Overburden would also be used to fill the pit void following cessation of mining.

It is proposed to extend the western boundary of ML 1432 by the enabling of MLA (for purposes) 487, to cater for new rejects emplacement and overburden stockpile areas (refer **Figure 1-4**). Providing emplacement areas in this location would have the benefits of:

- Reducing the visual impacts of the existing area adjacent to the New England Highway;
- Moving overburden handling further away from Singleton and surrounding residential receivers, thereby reducing potential noise and air quality impacts;
- Reducing the distance overburden from Pit 3 needs to be transported, resulting in reduced tyre dust generation, vehicle emissions and operational costs; and
- Improving the efficiency of mining operations in Pit 3 that would result as mining progresses north and the Pit narrows.

With the completion of coal extraction from the northern end of Pit 1, overburden would be progressively backfilled into the void prior to capping to final levels and rehabilitation.

6.5.2 Coarse Rejects

Coarse rejects from the CHPP would continue to be conveyed to the reject bin, before being transported by truck to the open cut area to be disposed of within the spoil material in emplacement areas. Coarse rejects disposal within the spoil material would continue to be controlled by the production supervisor, with tip areas being located following careful consideration of environmental matters, the potential for spontaneous combustion and the stability of tip faces within the spoil area. All carbonaceous and reject material would also continue to be covered by a minimum of two metres of inert overburden material before the spoil area is shaped for final rehabilitation.

6.5.3 Fine Rejects

Fine rejects from the CHPP consist of a slurry of clay, silt and composite mineral and coal particles less than 1.5mm in size, with water to a pulp density of around 28 percent. This slurry would continue to be pumped from the underflow of the tailings thickener through a pipeline to either to Tailings Emplacement Dam No. 4 or to tailings drying infrastructure as described in **Section 6.5.4**.

6.5.4 Tailings Management

Tailings Emplacement

The tailings emplacement area within Pit 2 (Tailings Emplacement No. 3) covers 19 ha and reached capacity during 2014. This tailings emplacement area would continue to be dewatered, capped and eventually rehabilitated. Tailings Emplacement No. 4, located in a section of the North Pit void received approval in 2012. Placement of tailings in Tailings Emplacement No. 4 commenced in 2014 and tailings placement would continue for the duration of operations at the Mine.

Tailings Drying

In 2013, the first of three tailings drying centrifuges were trialled in a program to examine the feasibility of drying tailings for co-disposal in reject and overburden material in emplacement areas. Tailings-drying provides the benefit of not requiring tailings dams and associated water use. The centrifuge dries tailings to a moisture content of approximately 30%-40% with the consolidated material, known as 'cake'. The cake is disposed in emplacement areas instead of being pumped as a slurry to a tailings dam.

Following initial success of the first centrifuge, the Proponent commissioned the full plant in December 2014 with the aim of maximising the tailings being dried and suitable for co-disposal with overburden. Drying of approximately 80% of tailings is anticipated with the remaining 20% being disposed of via traditional means during down time of the drying centrifuges due to scheduled maintenance or other stoppages. The balance of tailings would be disposed of conventionally in the existing tailings emplacement areas. This approach would enable the extension of the life of the existing tailings emplacement areas for the foreseeable future.

6.6 Water Management

6.6.1 Site Water Management Plan

A water management system and Water Management Plan is currently implemented at the Mine. The Project would continue to operate under the existing water management system and the Water Management Plan would be reviewed to incorporate relevant management measures included in this EIS. Reference is made to **Section 15.0** and **16.0**.

The current Water Management Plan includes:

- A Site Water Balance prepared in accordance with the existing conditions of consent which details the sources, amount and security of water, provisions for the management of offsite water transfers and measures to minimise overall water use. Further details of the current site water balance are provided below;
- An Erosion and Sediment Control Plan including potential impacts from mining operations, control measures, monitoring requirements for impacts and to measure the effectiveness of control measures, and reporting requirements;
- Surface Water Monitoring requirements in accordance with the Mine Environmental Protection Licence (EPL 3391), detailing baseline hydrology, water quality data and monitoring locations. It also provides a monitoring program and monitoring criteria; and
- Groundwater Monitoring, providing baseline data for groundwater quality and groundwater levels, a monitoring program for the ongoing measurement of groundwater quality and levels against baseline levels and relevant criteria, and a groundwater response plan to be implemented in the event of unexpected adverse impacts to groundwater.

The Water Management Plan would be reviewed and updated in response to changes during the progression of mining operations, altered regulatory requirements and in response to ongoing review.

6.6.2 Site Water Balance

In 2014 the site water balance was updated to address the Project. The update found the Project would not change inputs and outputs of water at the Mine:

- Inputs into the water management system include groundwater, rainfall and runoff, imported water, water from ROM coal and recycled water; and
- Outputs from the water management system include water for dust suppression, evaporation, process water, tailings, coarse rejects and storage.

Further, it was demonstrated that the proposed water management system has sufficient capacity to service the Project during different climatic conditions including wetter than normal, and drier than normal conditions. Further detail on the site water balance for the Project is provided in **Section 15.0**.

The Mine is typically a no discharge site as all input water is consumed onsite and waste water from the CHPP is recycled back into the CHPP for further use. The Mine is a member of the Hunter Salinity Trading Scheme and although it has to date not needed to discharge from site, it continues the option to remain an active member in the future. If future conditions require the Mine to seek a discharge licence, the relative approvals will be sought for the process.

Operating strategies employed to minimise use, and optimize the re-use of water on site include.

- Use of dirty water for dust suppression on haul roads and within pits at the working face;
- Use of dirty water for plant and machinery wash downs as appropriate;
- Reuse of water to aid in the establishment of rehabilitation areas;

- Maximising dewatering of active pits and minimising the need to import water; and
- Use of water transfers between storages to make best use of the Mines available capacity and therefore minimise the need to import water.

6.6.3 Mine Dewatering

Mine water (including groundwater and runoff) encountered during continued mining operations would be pumped to mine water storages as part of the site water management system (refer to **Section 16.0**).

6.7 Provision of Service Infrastructure

Service infrastructure at the Mine has adequate capacity to accommodate the Project. No additional servicing or infrastructure connections are required by the Project.

A number of transmission line easements are located in the vicinity of the Project but would not be impacted by the Project. Electricity and telecommunications assets located in the New England Highway road reserve may be impacted by the proposed cut and cover tunnel subject to detailed design.

6.8 Workforce and Hours of Operation

The Mine currently employs approximately 130 personnel across its operation and has approval to operate 24 hours a day, seven days per week but typically operates an eight hour shift roster five days per week. The Project would continue to operate within the approved limits. With the proposed increases in extraction up to approximately 4.5Mtpa ROM coal, a permanent seven days per week roster would be established. During this time staff levels would increase to approximately 234 to meet the production requirements. Existing and anticipated staffing numbers are detailed below. Note the peak production period onwards (post 2020) staffing would reduce commensurate with production levels.

- 2014: 133 employees working a 5 day, eight hour roster
- 2023: 234 employees working a 7 day, 12 hour roster

Blasting activities at the Mine are regulated by EPL 3391. In accordance with the EPL, blasting is carried out between 09:00 and 17:00 Monday to Saturday. Blasting would continue to be undertaken where feasible during these standard hours. No blasting would be undertaken on Sundays or public holidays without prior approval from the EPA. No changes to blasting time are proposed as part of the Project.

6.9 Rehabilitation and Final Landform

Rehabilitation works would be closely integrated with mine production and would be undertaken progressively as mining proceeds. Disturbed land would be returned to a stable condition and a land capability at least equal to that which existed prior to mining.

The Proponent has demonstrated through its progressive rehabilitation efforts a successful rate of vegetation growth on existing rehabilitation areas. The Mine has also rehabilitated 370ha to pasture and 60 ha to agri-forest.

6.9.1 Final Land Use

The aim of rehabilitation at the Mine is to reinstate the Mine area into a mix of appropriate land uses suitable for the soil and landscape within which the Mine is situated, as well as having consideration of the Mine proximity to Singleton and potential higher uses which may be suitable for the location. For example, the return of some of the land to its pre-mining land capability of grazing land, where feasible, with stable landforms compatible with the surrounding landscape, whilst also allowing for a range of possible post-mining land-uses. The Proponent has prepared a Mining Operations Rehabilitation Management Plan and a Mine Closure Plan for the Mine. These plans would be updated to consider the Project. Rehabilitation and post mine closure is addressed in **Section 25.0**.

Initial post-mining land use options identified for the mining lease included:

- Agriculture – cattle grazing;
- Open space – retention of areas as grassed and woodland open space;

- Native Vegetation – including stands of local species and communities and corridors of vegetation connecting to stands of native vegetation on neighbour properties;
- Recreation – passive recreation in offset areas (subject to appropriate safety measures being implemented);
- Residential – subdivision of varying density for rural areas;
- Industrial – buildings and factories; and
- Commercial – sections along the New England Highway.

Various options were also considered for surrounding land owned by the Company. These holdings would be reviewed in unison with the strategic planning policy updates being undertaken by Singleton Council which would identify potential higher uses of land surrounding the Mine, given its proximity to Singleton and key transport infrastructure.

6.9.2 Final Landform

A final landform for the Mine has been developed based on the following:

- The need to establish and maintain native vegetation links within the Mine Lease and to adjoining lands;
- Requirement to re-establish land with agricultural capability similar to the land prior to mining disturbance;
- The reestablishment of grazing lands on the most suitable areas of the site;
- The need to maintain a natural land form and the visual character of the site consistent with rural areas in the vicinity of the Mine; and
- The requirement to establish surface water control devices that mimic pre mining hydrology.

The indicative final land form for the Project is shown in **Figure 6-5** (post underground entry rehabilitation). Specific details regarding the establishment of rehabilitation and grazing areas, and the management of post mining land is detailed in the rehabilitation discussion in **Section 25.0**.

The final landform presented in this EIS may change over time with the advent of new technologies or for example changes to the development framework for Singleton. Given the proximity of the Mine to Singleton, higher order land uses may be more appropriate for sections of the Lease area by the end of the Project's life.

The area of the final depression and water storage in Pit 3 (western side of the New England Highway), presents the opportunity for engagement with the Singleton community on specific landforms surrounding the water body. Final design of this area would be carried out towards the completion of the Project in conjunction with Singleton Council.

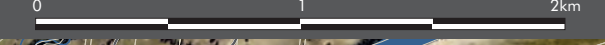
Any changes to the final landform which may evolve to accommodate a range of potential future land uses would be subject to discussion with the relevant agencies (including DRE) and may require modifications to approvals over time.



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KEY

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|--|----------------------|--|---------------------------------|
| | Project Area | | Underground workings area |
| | Lease extension area | | Infrastructure area |
| | CL352 Boundary | | Rehabilitation - Planted trees |
| | Road | | Rehabilitation - Pasture areas |
| | Railway | | Rehabilitation - Existing trees |
| | Watercourse | | Existing native vegetation |
| | | | Final depression |
| | | | Other water storages |



6.9.3 Rehabilitation Strategy

Rehabilitation procedures at Rix's Creek would be based upon established practices that have been progressively developed over the life of Mine to-date. Rehabilitation is currently undertaken in accordance with the Rix's Creek Mine, Mine Operations Plan (AECOM, 2013) and the Mining Operations Rehabilitation Management Plan (Bloomfield, 2011). Both these plans have been developed in consultation with the relevant stakeholders, notably DRE.

The objectives of the Mining Operations Rehabilitation Management Plan are to:

- Address the relevant conditions of the development consent;
- Address commitments made within the Environmental Assessment;
- Address legislative requirements and guidelines relevant to the Mining Operations Rehabilitation Management Plan and related management plans;
- Provide a clear and concise description of responsibilities in relation to Landscape Management (including Rehabilitation, Final Void Management and Mine Closure) during the operation and subsequent closure of the Proponent's mining operations; and
- Reduce the area of exposed mining land by keeping the rehabilitated final landform as close to the mining area as possible.

The rehabilitation strategy outlined in the Mining Operations Rehabilitation Management Plan and the Mine Operations Plan comprises three main components:

- Annual maintenance inspections;
- Scheduled rehabilitation monitoring; and
- Review of inspection/measurement data over time to assess rehabilitation performance.

Rehabilitation would be monitored for the level of vegetation cover and species diversity. Remedial actions may include:

- Correction of soil chemistry;
- Control of pests and weeds;
- Control of grazing; and
- Responses to extreme weather events (for example implementing emergency erosion and sediment control during time of high rainfall).

In the event that the annual inspection finds aspects of the rehabilitation are under performing or failing, further investigations are undertaken to determine the possible causes and identify an appropriate remediation strategy. Factors considered include:

- Nutrient levels;
- Soil limitations such as depth, pH, salinity;
- Insect attack, weeds or other pests;
- Drought or storm damage; and
- Excessive grazing.

The Mining Operations Rehabilitation Management Plan has identified representative monitoring sites to be established in newly rehabilitated areas at an average of one site per 10-20 ha of newly rehabilitated land. Each site would be monitored within 12 months of establishment and then every two years after. This would provide three sets of monitoring data in the first five years following rehabilitation. Each monitoring site would be permanently marked using steel pickets or similar. The inspection protocol includes assessment of the following parameters:

- Site establishment;
- General condition of rehabilitation;
- Weeds;

- Fauna;
- Vegetation;
- Nutrient recycling;
- Soils/surface condition; and
- Erosion and stability.

Rehabilitation at the Mine would be undertaken in a staged approach which includes two primary phases:

- Progressive rehabilitation of the Mine, emplacement and tailing disposal areas; and
- Mine closure and rehabilitation including final depressions rehabilitation management.

At the end of 2012 the total area of mined land that has been rehabilitated at the Mine was 374.4ha (Rix's Creek Mine MOP, 2012). The Proponent rehabilitates its lands with a combination of pasture areas and trees over grass. Pasture areas consist of a range of both native and introduced pasture species and are designed to sustain grazing. Areas of trees over grass use local native tree and shrub species and are designed to increase biodiversity values.

Further detail regarding the implementation of the rehabilitation strategy in relation to the Project is described in **Section 25.0**.

6.10 Mine Closure

As mining operations progress in Pit 3, the existing overburden emplacement areas to the south would continue to be used in addition to the Pits 1 and 2 voids which would be filled to the required final landform levels. Along with these existing areas, the overburden emplacement area to be located in the new ML application area would be established as the existing pit voids reach capacity or as required by the Mine schedule to enable efficient operations.

The overburden emplacement areas would be shaped for rehabilitation progressively, as they are constructed. To accomplish this, all bulldozers are equipped with GPS guidance systems containing final landform designs. The final landform is then developed as an integral part of the Mine's production system. Rehabilitation includes the implementation of a range of measures, including topsoil management, establishment of erosion and sediment controls, habitat reinstatement and revegetation works.

As mining progresses in Pit 3, topsoil resources would be stripped to the recommended depth and spread onto shaped rehabilitation surfaces or stockpiled for later use in rehabilitation areas. Topsoil material is used in rehabilitation areas as soon as practicable after stripping to preserve native seed banks and soil microflora. If topsoil needs to be stored for more than three months, stockpiles would be revegetated prior to respreading.

Following topsoil establishment seed mixes would be applied to the rehabilitation areas in accordance with their nominated post mining land use requiring either a pastoral seed mix or a native seed mix. Following application, rehabilitation areas would be monitored in accordance with the indicators listed in the Rehabilitation Management Plan. Monitoring results would be used to identify further management or monitoring requirements to address rehabilitation success.

A final landform has been designed for the mine that maximises the natural flow of the final landform consistent with local topography and drainage. The remaining final depression following the completion of mining in Pit 3 has been designed to have maximum slopes of 18 degrees and would include contour banks and diversion drains to control erosion and minimise water entering the depression.

The final landform would incorporate a relatively even mix of trees and pastures areas. Treed areas would provide connectivity between the vegetation to the west and north and areas of lesser slope in the east and south would be returned to pasture. These pasture areas would provide a buffer between the areas rehabilitated with trees and the more intensive land uses that are expected to move close to the Mine from Singleton, over the life of the Mine.

Given the proximity to Singleton, areas in the south east of the mine lease area, that would not be impacted by mining activities, could be used for higher and better use than revegetation to trees or pasture. As detailed in the Rehabilitation Management Plan, the final mix of land uses across the entire Mine Lease would reflect a number of requirements and land use objectives. For portions of the Mine within close proximity to the existing growth area of Singleton, potential exists to meet the land supply needs of the community of Singleton, particularly for

business or industrial land. Any such higher land uses would be subject to further detailed strategic planning being undertaken in consultation with Singleton Council.

It is noted that following completion of the open cut mining proposed by the Project, there would remain a coal resource within the mine lease area that could be accessed by underground mining techniques, primarily bord and pillar mining. The final landform design has been designed to allow an underground portal to be left following the completion of the Project. This would provide access to the underground resources. This landform has been designed to be self-draining if the underground resource is not mined. Any underground mining or mining beyond the life the Project would be subject to a separate environmental impact assessment and approval process at the time.

Following completion of the Project, a Mine Closure Plan would be prepared that provides the details regarding the final rehabilitation and ongoing management of the site and its remaining features and infrastructure.

6.11 Cut and Cover Tunnel

Note that throughout this EIS and supporting documentation the cut and cover tunnel is described as a 'tunnel' due to the historical nature of this structure, and the existing New England Highway crossing constructed at the Mine being referred to as a tunnel. This enables consistency with both the supporting studies to this EIS and other Mine reports and documentation. It is acknowledged that considering the nature of the structure it can also be described as a bridge.

6.11.1 Tunnel Description

The Mine is bisected by the New England Highway which separates the Mine infrastructure and North Pit in the east, from the main coal extraction activities that would be undertaken as part of the Project to the west. In order to provide access across the New England Highway, the Mine built and operates a road over bridge, over the New England Highway from 1994.

As mining intensified to the west of the New England Highway and Pit 3 was progressed, The Bloomfield Group recognised that a second crossing would be required to improve efficiency of operations and a cut and cover tunnel was constructed to improve access to Pit 3. The location of the existing bridge and tunnel is shown on **Figure 1-4**.

With the progression of mining in Pit 3 to the north as part of the Project, the existing cut and cover tunnel would have its access cut, firstly for mining the coal and overburden, and then for dumping of the overburden. As the cut and cover tunnel would be in-operable for a period of approximately three to five years, an additional cut and cover tunnel is required to enable continuation of operations. The new cut and cover tunnel would be located to the north of the existing cut and cover tunnel, to provide access across the New England Highway for the life of the Project (refer **Figure 1-4**).

When determining the need for the new cut and cover tunnel, the ability to use the existing cut and cover tunnel for the life of the Project was considered as this would minimise construction disruptions to road users. However use of the existing tunnel would reduce the ability to fully rehabilitate and close the southern portions of Pit 3 as mining progresses north. Additionally the new tunnel would improve operational efficiencies by reducing total haul road kilometres travelled by Mine trucks. This reduces dust and noise impacts, particularly in proximity to the urban areas of Singleton. Importantly there would be no vehicular connection between the tunnel and the New England Highway.

The proposed cut and cover tunnel would be constructed in a similar manner to the existing tunnel which is described as a top down construction sequence that can be staged to progressively construct across the highway corridor, whilst keeping the highway open to traffic via a temporary deviation or 'side-track'. The construction procedure and elements are described in the following sections. The structure would be constructed in accordance with AS5100 Bridge Design Code as well as relevant RMS specifications, Bridge Technical Directions and standard drawings. The design would also consider the need to make provisions for future duplication of the New England Highway. The bridge design including approaches would also consider minimising impacts of maintenance activities within the road reserve. The Mine would enter into an agreement with RMS for the ongoing maintenance of the structure. The design process will include RMS reviews and will be an ongoing iterative process up to construction.

Indicative Concept Plans of the proposed cut and cover tunnel are provided in **Appendix E**. Refinement of the design would be subject to further consultation with the RMS.

6.11.2 Construction Activities

Construction activities for the cut and cover tunnel would be scheduled as follows:

- Barricades (jersey barriers) would be placed along the New England Highway to provide separation between road users and the construction works. This would provide physical separation of the side track and the New England Highway;
- On approach on the New England Highway to the construction area, traffic management systems including fixed and variable message signage would be installed to slow the traffic from 100km/hr to 80km/hr, with provision to slow the traffic to 40km/hr for short periods of time for the barrier installation and traffic switches;
- A New England Highway deviation or 'side track' designed for an 80km/hr speed limit would be constructed along the western side of the highway to divert traffic around the tunnel construction site. This would involve typical road construction equipment. The intent would be to maintain traffic flows at 80km/hr on the side track for the duration of construction activities and include sufficient clearance to the New England Highway to enable safe construction. The side track would also be designed to accommodate full highway traffic loads to alleviate any potential restriction on highway traffic loading. The side track would be designed in accordance with relevant Austroad Guidelines and RMS supplements for the posted speed;
- Service relocations would include the relocation of a fibre optic cable;
- Stripping of topsoil, stockpiling and installation of erosion and sediment control works would be undertaken across the construction disturbance area;
- Preliminary excavation work would commence on the eastern side of the highway to allow access to the piling rig that would be used to install the bored cast *in situ* concrete piles;
- Installation of the bored piles and capping beam would commence on the eastern side of the highway. Traffic would be switched to operate on the side track following its completion and the piling would continue over the existing highway alignment. This work would involve piling equipment, concrete trucks and pumps and some earth moving equipment;
- When the piling across the highway is completed, precast concrete girders would be lifted into position to form the highway deck over the tunnel. A cast *in situ* concrete deck and traffic barriers would then be constructed over the girders using concrete trucks and pumps. Protection screens would then be fitted to the bridge to prevent items falling or being thrown from vehicles landing on the mine haul road below;
- When the deck is completed the new bridge deck would be connected back into the existing highway. Traffic would then be switched back onto the existing highway alignment;
- Sheet piling would then be removed and piling works would continue to the west of the bridge deck;
- The 'side track' and traffic barriers would be removed and the area where the 'side track' was located would be reinstated, via removal of the road pavement and replacement with top soil, turfing and grass seeding;
- After the piling is completed excavation under the bridge would commence. The excavation is likely to be undertaken by mine personnel. As the excavation progresses it would be necessary for the Mine to install rock anchors to stabilise the pile walls. This would require the use of a rock drill and grout mixings and pumping equipment. The gaps between the piles would then be sealed with shotcrete; and
- The mine haul road would then be completed.

Construction of the cut and cover tunnel is expected to take approximately 20 weeks. Construction activities would be managed through a Project specific Construction Environmental Management Plan which would be prepared for review and comment by RMS prior to implementation for any construction activities associated with the tunnel. Construction works would be undertaken at cost to the Mine.

6.11.3 Ancillary Facilities

A site compound with site sheds, parking and material set down areas would be established within the mine lease area, adjacent to the construction zone.

6.11.4 Public Utilities Adjustment

In order to undertake the Project, relocation of a PowerTel owned fibre optic cable is required. Consultation with the service provider would be undertaken during the detailed design.

6.11.5 Property Acquisition

The scope of works is contained within the existing road corridor and the mine lease area and as such property acquisition is not required. As all land adjoining the corridor is owned by the Mine, no access agreements would be required if additional land access is required during construction. Approval from the RMS would be obtained for the Project within the road corridor.

6.11.6 Works Authorisation Deed

A Works Authorisation Deed (WAD) would be entered into between Bloomfield and RMS. The WAD would involve specific details and requirements for the design and construction of the tunnel. All works for the tunnel would be undertaken at cost to Bloomfield.

Following completion of the construction works the Mine would enter into agreement with RMS for the ongoing maintenance of the structure. Following the cessation of mining Bloomfield would manage the demolition and removal of the bridge as necessary. Demolition and removal would be undertaken and funded by the Mine.

6.12 Site Management and Security

The Mine is administered from the central office administration building located adjacent to the CHPP. All Mine employees and visitors report to this building prior to obtaining the appropriate induction relevant to their activity onsite. Personnel movements are recorded and a record maintained to keep a constant and up to date account of persons on the Mine site should this be required in an emergency.

The Mine is accessed from Rixs Creek Lane. Where the Mine meets the New England Highway road reserve, access is restricted by a fence and signposted to prohibit trespass.

To the south east and east of the Mine, the rail corridor and lack of available road connections create a barrier to entry. Similarly to the north-west, the Integra Coal Operations and associated landholdings prevent public access.

Neighbouring properties adjoining the Mine generally include a number of agricultural holdings. To the south-west the majority of this land is owned by the Mine and leased for grazing. To the north-west landholdings are generally larger and rural dwellings are located at some distance from active mine workings. Mine boundaries to the west of the New England Highway are generally secured by post and wire fencing to prevent stock entering the Mine. Residents living in these properties are generally longstanding residents. No public access is available through these properties to the active Mine site.

6.13 Emergency Response and Incident Management

The Mine's existing operations are undertaken in accordance with the *MinOp Emergency Management System* and subordinate documents including MinOp Environmental Incident Emergency Response Management System (Rev 1.1, June 2104).

The Bloomfield Group's procedures in relation to the management of emergencies or incidents include mechanisms for the management of the various actions that may be necessary as a result of an emergency or incident. The Emergency Management System has been developed to be compliant with the requirements of the:

- Relevant statutory requirements, including:
 - *Coal Mine Health and Safety Act 2002*;
 - *Coal Mine Health and Safety Regulation 2006*;
 - *Work Health and Safety Regulation 2011*;
 - *Explosives Act 2003*; and
 - *Explosives Regulation 2013*.
- The Bloomfield Group's policies, procedures and subordinate documentation including but not limited to:
 - MinOp Environmental Emergencies Risk Assessment Report 300712;
 - MinOp Incident Notification Procedure;
 - Group Incident Reporting Form; and
 - Group Incident Investigation Procedures.

The Emergency Management System includes the following key elements:

- Responsibilities, reporting requirements (internal and external) and contact details for key stakeholders including with The Bloomfield Group, emergency services and the community;
- Details of actions to be undertaken in the event of a general (unspecific) type of incident, as well as in relation to those incidents that have potential to occur at an open cut coal mine, including:
 - Unlicensed release of Mine water;
 - Hydrocarbon spills;
 - Blasting accidents;
 - Noise pollution;
 - Spontaneous combustion of coal or overburden materials; and
 - Night lighting impacts and light spill.
- Details of training to be undertaken by key staff to support the implementation of the plan as needed; and
- Reporting, auditing and review mechanisms in order to meet regulatory requirements in addition to allowing continual feedback and improvement of the plan and related systems and protocols.

6.14 Environmental Management and Monitoring (Operations)

The Mine currently operates an environmental management and monitoring program to meet the various regulatory requirements of the existing Mine consent and EPL 3391. This existing environmental management and monitoring would continue to be operated during the Project and would be updated to include the relevant management measures included in this EIS.

The Bloomfield Group's Environmental Management System is discussed further in **Section 8.0**.

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