

RIX'S CREEK SOUTH CONTINUATION OF MINING PROJECT RESPONSE TO IPCN QUERIES FOLLOWING PROPONENT MEETING

For

The Bloomfield Group

1 INTRODUCTION

On 9 July 2019, The Bloomfield Group (Bloomfield) met with the Independent Planning Commission (IPCN) to discuss the Rix's Creek South (RCS) Continuation of Mining Project (the Project) regarding the Development Consent Application (SSD 6300). This document responds to queries raised during the meeting.

1.1 EMPLOYMENT NUMBERS

1.1.1 Issue

During the Rix's Creek DA49/94 MOD10 assessment process, it was stated that there are currently 255 Full Time Equivalents (FTE) employed at Rix's Creek.

Please provide indicative employment numbers over time including contractors for RCS relating to the Project. Include Rix's Creek North to show full employment.

1.1.2 Response

The 255 FTE mentioned in the presentation (Bloomfield, 2019a) described the workforce attributable to Rix's Creek South as at 2019. This number consisted of site-based personnel as well as an allocation of Bloomfield's corporate workforce and internal engineering personnel.

As detailed in the 'Revised Response to Submissions' (AECOM, 2017) (RRTS), the maximum employment rate at Rix's Creek South under SSD 6300 will be 217 (i.e. Bloomfield site based employees). The indicative number of employees, including an estimation of the required number of external contractors over time, is presented in **Table 1**.

Full time Bloomfield site-based employment numbers at Rix's Creek North are currently 118. This number will vary over time depending on operational requirements and future plans and approvals for RCN. SSD 6300 does not seek to alter the manning levels at RCN.

Table 1
Indicative Rix's Creek Mine FTE Employee Totals

Year	2020	2023	2026	2030	2035	2039
RCS	162	217	136	135	80	46
Corporate allocation *	115	115	95	85	44	44
Contractors	50	55	55	49	42	40

* Bloomfield Corporate and internal contractors (Four Mile, Kings)

1.2 SSD 6300 APPROVAL TERM

1.2.1 Issue

Please confirm the date from which the 21-year approval is sought.

1.2.2 Response

Approval for mining operations is sought for 21 years from the date that the development consent is granted.

1.3 OPTION 2 PREFERRED MINE PLAN

1.3.1 Issue

Please provide further information on the justification for the Option 2 mine plan over Option 1, including:

- a) A NPV value and discount rate for each option.*
- b) A discussion on cost and timings from historical data of how many days Option 2 would save in shutdowns and delays due to environmental reasons, and the value of retaining the two Overburden Emplacement Areas (OEA).*

1.3.2 Response

The trade-off study undertaken to consider the impacts and benefits of Options 1 and 2 assessed the following aspects:

- Air Quality impacts;
- Noise impacts;
- Biodiversity impacts and benefits;
- Final landform changes;
- Visual impact; and
- Changes in costs from differential haulage distances and elevations associated with the volumes reporting to each dump.

The assessment was comparative between the EIS case, Option 1 and Option 2.

Other environmental aspects were considered but not assessed as they were considered to be largely consistent with the impacts presented in the EIS (AECOM, 2018a).

The Air Quality, Noise and Visual assessments determined that there would be no material difference in the impact of either option when compared with the EIS (AECOM, 2018a). The relevant cost comparisons between cases were therefore only for Biodiversity, Final Landform and Haulage impacts.

a) The costs presented in Table 15 of the 'Response to IPCN Recommendations' (RTR) (AECOM, 2018a) report are discussed in Section 2.5 of the RTR and summarised below and in **Table 2**.

- Credits required were assigned against the four stages of offset credits as noted in section 2.7 of the RTR report. The assumed cost per credit was \$2,750 (Table 15 of the RTR report);
- The rehabilitation cost for all areas applicable to each case including the Western OEA, North Pit OEA and South Pit OEA was allocated on a progressive basis commencing at Year 3 (approximately 2022) and ending in year 10 - two years after completion of haulage; and
- Haulage cost was allocated to the annual volumes from the EIS schedule that related to the Western OEA, commencing in Year 1 (approximately 2020) and concluding in Year 8 approximately (2027).

Table 2
Incremental Costs of Option 1 and Option 2 compared to the EIS case

	Option 1	Option 2
	\$M	\$M
Biodiversity offsets	(2.7)	(1.9)
Rehabilitation	0.2	0.5
Haulage	10.4	2.6
Total additional cost	7.9	1.2

It should be noted that the incremental cost analysis performed assumes increases in operating costs only and excludes any assumption that additional capital expenditure would be required to increase the number of trucks in the mining fleet.

IPCN requested Bloomfield provide the Option 1 and Option 2 analysis on an NPV basis using the discount rate that applies to the assessment of mining projects. Bloomfield's internal finance experts advise that the selection of an appropriate discount rate for a particular mining project depends on a host of factors including, but not limited to:

- The mining project risk (including stage of the project, level of understanding of the resource and resource risk, capital investment required, construction risk, project and corporate finance risk);
- Sovereign risk;
- Current real risk-free interest rate;

- The company's WACC (weighted average cost of capital);
- Taxation; and
- Shareholder's expectations of return and debt versus equity financing.

Bloomfield Group's financial structure is confidential. However, for a brown-fields Australian project with established infrastructure where mining has been occurring for 21 years, the appropriate rate will, if it was to be placed within a current comparator group, be at the lowest end of the range of discount rates selected by mining companies for the full range of mining projects.

A NPV was calculated for the three components listed above using a 4.10% discount rate. This is the published Independent Pricing and Regulatory Tribunal (IPART) January 2019 rate applicable for Local Government infrastructure projects. This is considered suitable to the project and corporate risk circumstances and is publicly available. The results are shown in **Table 3**.

Table 3
NPV Comparison at discounted rate of 4.1%

NPV (\$)			Difference to EIS* (\$)	
EIS	Option 1	Option 2	Option 1	Option 2
25,448,201	31,840,315	26,314,669	6,392,114	866,468

*Source: Bloomfield

The results presented above are based on a credit price of \$2750 as used in Table 15 of the RTR report. The differential cost between Option 1 and Option 2 from Table 2 is \$5.5M. A sensitivity analysis on the weighted average price of the required credits indicated that the differential between the two options become \$5.6M for a reduction of \$500 in the average credit price and \$5.4M for an increase of \$500 in the average credit price.

While there is a significant difference in credit price between different Plant Community Types (PCT), at this stage there have been a limited number of trades in credits and hence it is unclear how these will vary over time. It is considered that the range of \$500 in the average credit price would cover the extremes in price that might reasonably be anticipated.

As an alternative to the IPART rate, a NPV analysis at the 7% discount rate used in the KPMG reports and in the DPIE independent assessment of project royalty streams dated 7 December 2015 is provided in **Table 4**.

Table 4
NPV Comparison at discounted rate of 7%

NPV (\$)			Difference to EIS* (\$)	
EIS	Option 1	Option 2	Option 1	Option 2
23,000,810	28,550,960	23,696,591	5,550,149	695,780

- b) The mining operations at RCM are managed to minimise the impacts of dust and noise on the surrounding environment. This process includes the pro-active, pre-emptive and progressive shutdown of machines and/or shutdown of all mining operations in order to prevent exceedances of predetermined environmental impact limits as prescribed in the relevant licences and approvals.

Environmental shutdowns of operations are generally caused by either rain, causing it to be too wet to safely operate equipment or by extremely dry conditions coupled with strong winds which lift dust from inaccessible areas where controls are difficult. In some instances, bushfire or dust storms originating in the far west of NSW can cause elevated fine particulate readings causing the mine to shut down its operations so as not to further exacerbate these extreme conditions.

As stated in the Bloomfield 'Air Quality Management Operational Procedures' which form part of the existing Integrated Environmental Management System, Bloomfield practices the following with regard to emplacement in exposed areas:

"Suspending dumping activities at exposed locations under high wind conditions e.g. on the top of overburden emplacement areas when wind speed is > 10 m/sec;"

An analysis of periods when the wind speed was greater than 10 m/s was completed for 2016, 2017 and 2018. The results averaged over these three years was 371.5 hours or 15.5 days) per annum.

High wind speed will impact on emplacement at the high and exposed OEAs of the North Pit and South Pit as shown on **Figure 1**. Option 1 of the trade-off study would focus emplacement on these two OEAs. Option 2 utilises emplacement on these two OEAs and the new Western OEA (reduced in size from that proposed in the EIS).

The overburden emplacement schedules are based on criteria such that when a section of pit floor is exposed, overburden is preferentially allocated to the available in pit backfill location.

The impact of strong winds on the mining operation would be highly dependent on whether an in-pit backfill location was available at the time strong winds were encountered. It is considered that the impact of high winds on Option 1 could see operations affected for up to 10 days per year (over five of the eight years that emplacement is active on the exposed North Pit OEA and South Pit OEA). Option 2,

until the later years, provides the flexibility of screened emplacement with the Western OEA and no loss of production is anticipated.

The existing Rix's Creek 'Noise Management Plan' (Bloomfield, 2019b) describes the Trigger Action Response Plan (TARP) process in place to ensure no exceedances of noise impact criteria. Compliance with the noise TARP relies upon alternate emplacement locations being available at the time noise conditions are unfavourable. While the frequency of periods when noise levels could impact operations is potentially greater than for strong wind conditions, the duration is generally less.

An impact of one to two production days per year is considered the order of magnitude for Option 1 and about half this level for Option 2.

As stated in the RTR:

"Option 2 provides the greatest operational flexibility with additional dump destinations which allows for air quality and noise impacts to be better managed on a day and night time basis and also to manage variations that occur in daily weather patterns;"

The other significant operational and cost advantage offered by Option 2 over Option 1 relates to the availability of trucks to meet the longer hauls to the North Pit emplacement area. Haulage to the North Pit emplacement area will require increased truck fleet numbers to be available. Truck breakdowns impact the efficiency of the haulage circuit. A sub-optimal number of trucks reporting to each excavator significantly adversely affects productivity and cost. Some under-trucking can be economically tolerated but a point exists for each excavator and haulage unit where the cost to operate the loading unit and ancillary equipment is not economic. While this applies to both options, on the inevitable occasions when the truck fleet becomes depleted due to breakdowns, the opportunity exists with Option 2 to re-direct the truck fleet to the shorter Western OEA rather than shut down the circuit.

Based on a recent four month period of long hauls, it is estimated that the annual impact on production due to breakdowns on a long haul circuit would be about 5 days per year.

It also follows that because the increased cost of Option 1 is primarily additional trucking costs from greater truck operating hours, that there is an additional fuel burn for Option 1 that will result in an increase Scope 2 emissions when compared to the EIS or Option 2 cases.

1.4 CLOSURE

1.4.1 Issue

Do the requirements of Condition B70(m) cover the mine entering unexpected closure or care and maintenance?

Please provide indicative progressive rehabilitation figures for Option 2.

1.4.2 Response

Authorisations (i.e. Mining Leases) issued under the *Mining Act 1992* contain conditions that require an approved Mining Operations Plan (MOP) be in place prior to and during mining operations. The Division of Resources and Geoscience (DRG) reviews and approve MOPs.

MOPs can be approved for a period up to seven years and are required to be renewed to allow mining operations to continue.

MOPs must be prepared in accordance with the '*ESG3: Mining Operations Plan (MOP) Guidelines, September 2013*' (DRG, 2013). This document details the information which must be included, such as:

- Annual plans for each year of mining showing progression of mining and rehabilitation;
- Plan showing final rehabilitation and post mining land use;
- Details of proposed actions at each stage of rehabilitation, including decommissioning actions;
- Rehabilitation objectives that describe the range of rehabilitation outcomes required achieve post mining land use; and
- Ongoing monitoring and remediation activities until the rehabilitation meets the objectives.

A new MOP is required if the mine is placed into "care and maintenance" or in the unlikely event that RCS entered premature or unplanned closure (DRG, 2013).

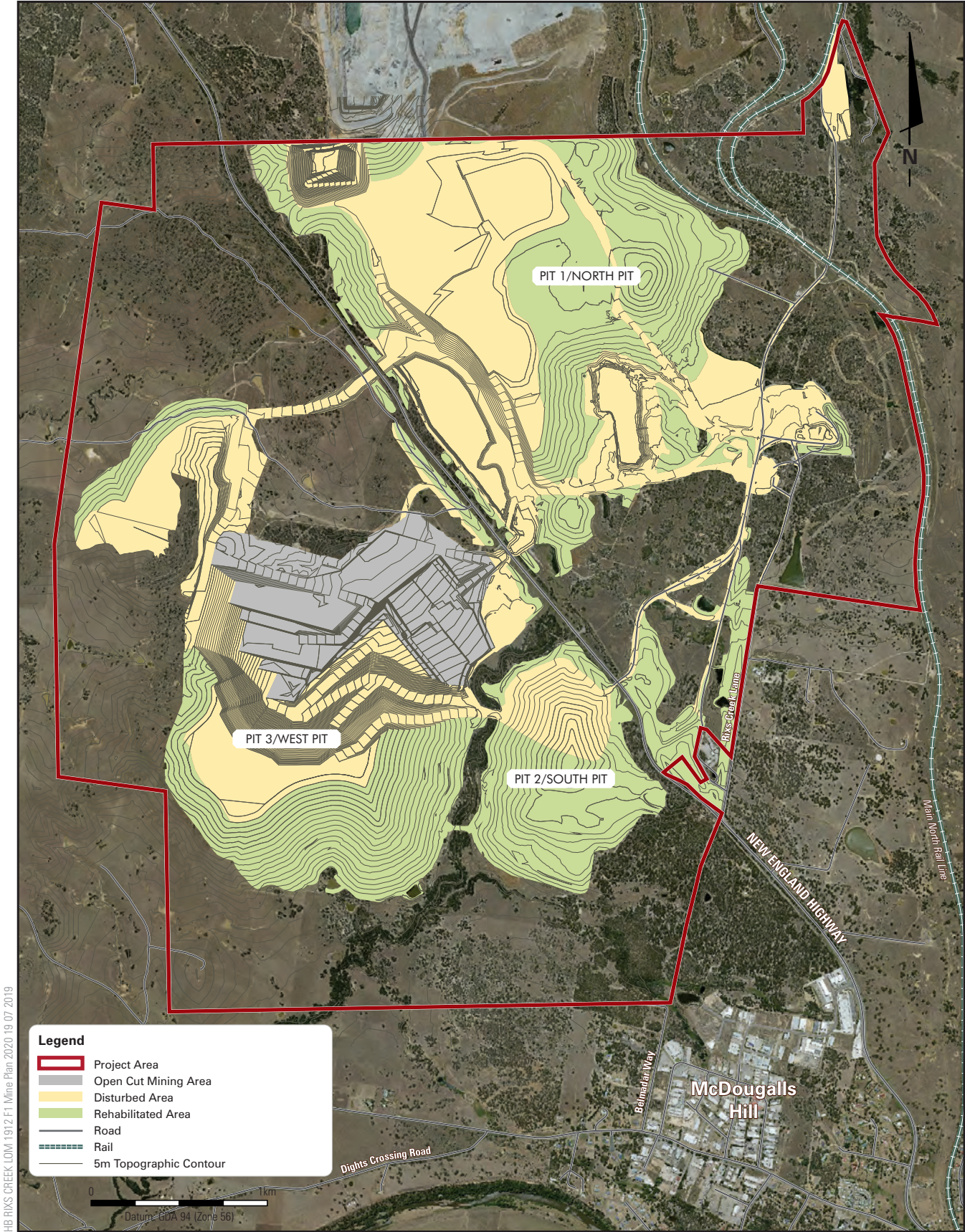
Title holders are required to submit a Rehabilitation Cost Estimate (RCE) in conjunction with a new MOP (DRG, 2013).

DRG provides a tool to assist authorisation holders to develop their RCE (DRG, 2017). The RCE tool calculates the costs associated with each stage of rehabilitation based on the maximum disturbance or greatest rehabilitation liability in the period covered by the estimation. The RCE further assumes that if the mine has been abandoned by its operator, there must be sufficient funds available to cover the cost of project management and completion of any outstanding rehabilitation by a third party. DRG reviews the estimate and once approved, the authorisation holder pays a security deposit, bank guarantee or insurance bond to DRG. This bonded amount is revised over time on the occurrence of specified trigger events as the mine and rehabilitation progresses to ensure that the bonded amount is adequate to cover the outstanding rehabilitation liability (DRG, 2017).

Authorisation holders are also required to produce an Annual Review under Condition E9 which provides an overview of the reporting year's performance and describes the development proposed for the next year, including rehabilitation.

Together, the required RMP/MOP and associated RCE, and the Social Impact Management Plan (which includes a requirement to plan for closure) provide a comprehensive plan for closure, including contingency for early or unexpected closure, and more than sufficient funds to cover any outstanding rehabilitation liability in the event of early closure.

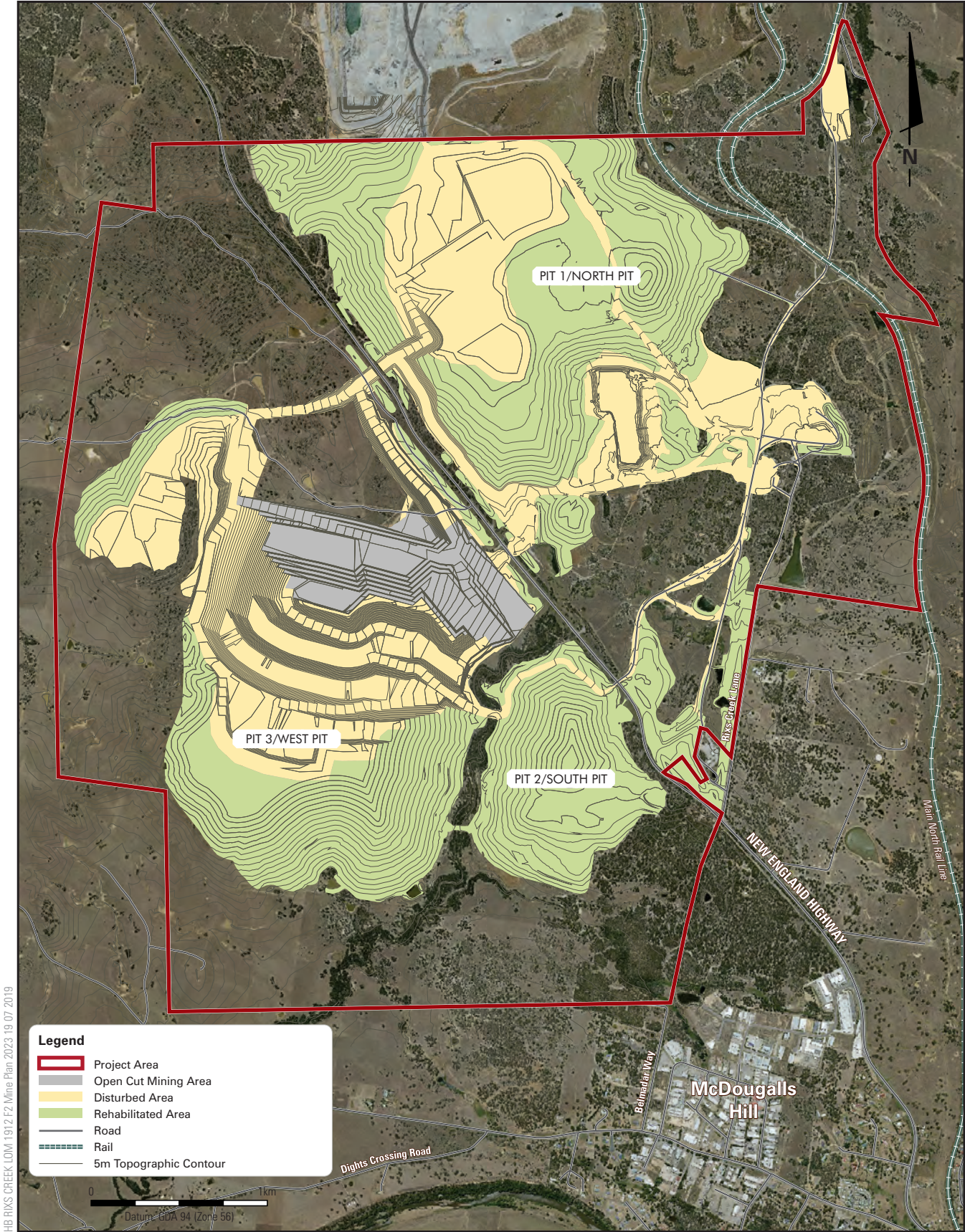
Figure 1 to Figure 4 present the conceptual progression of mining and indicative rehabilitation through the term of SSD 6300 for the Option 2 mine plan. Final landuse for the Option 2 mine plan is included in Appendix 7 of the draft conditions of SSD 6300.



RIXS CREEK COAL MINE

Conceptual Mine Plan - 2020

FIGURE 1



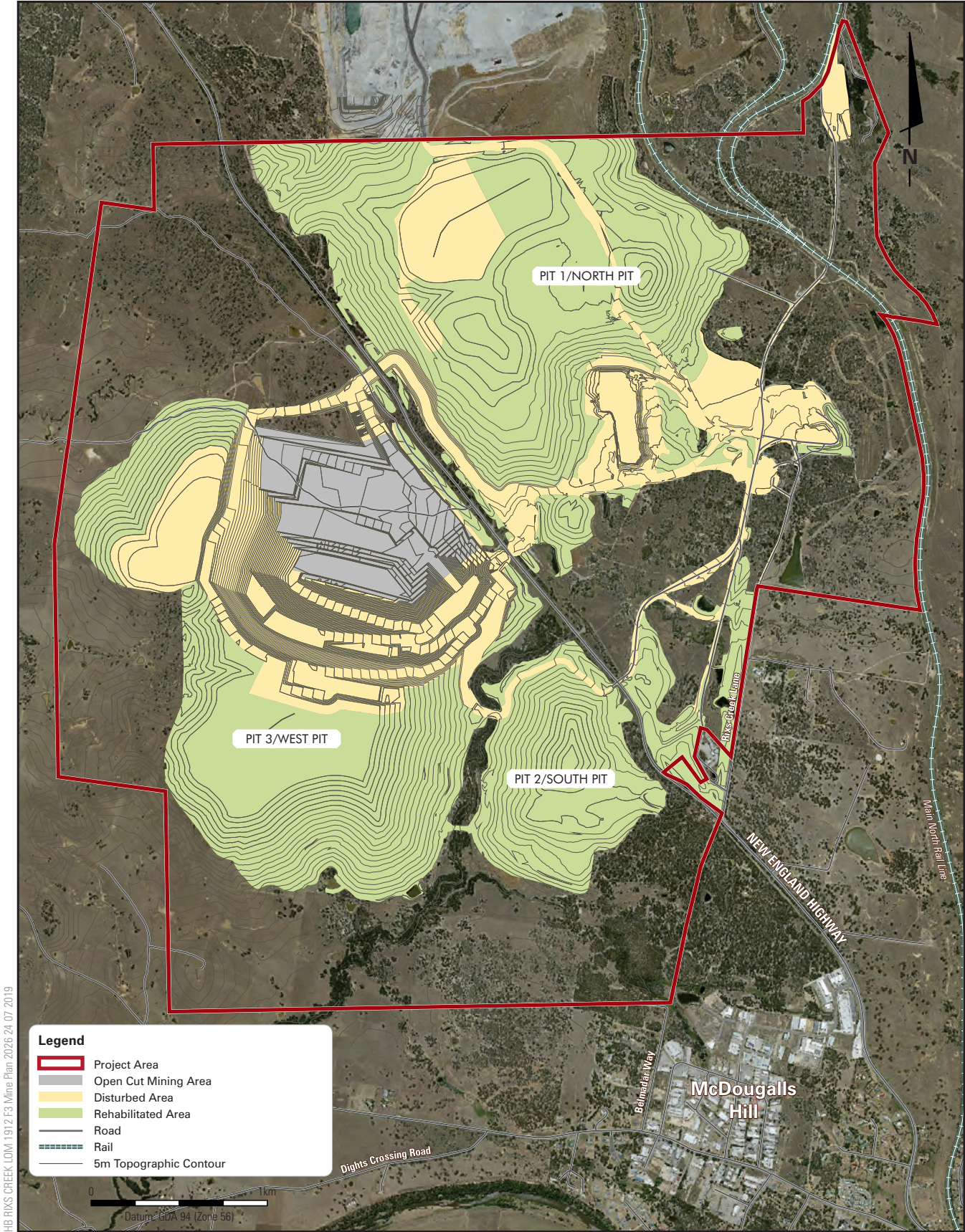
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RIXS CREEK COAL MINE

Conceptual Mine Plan - 2023

FIGURE 2





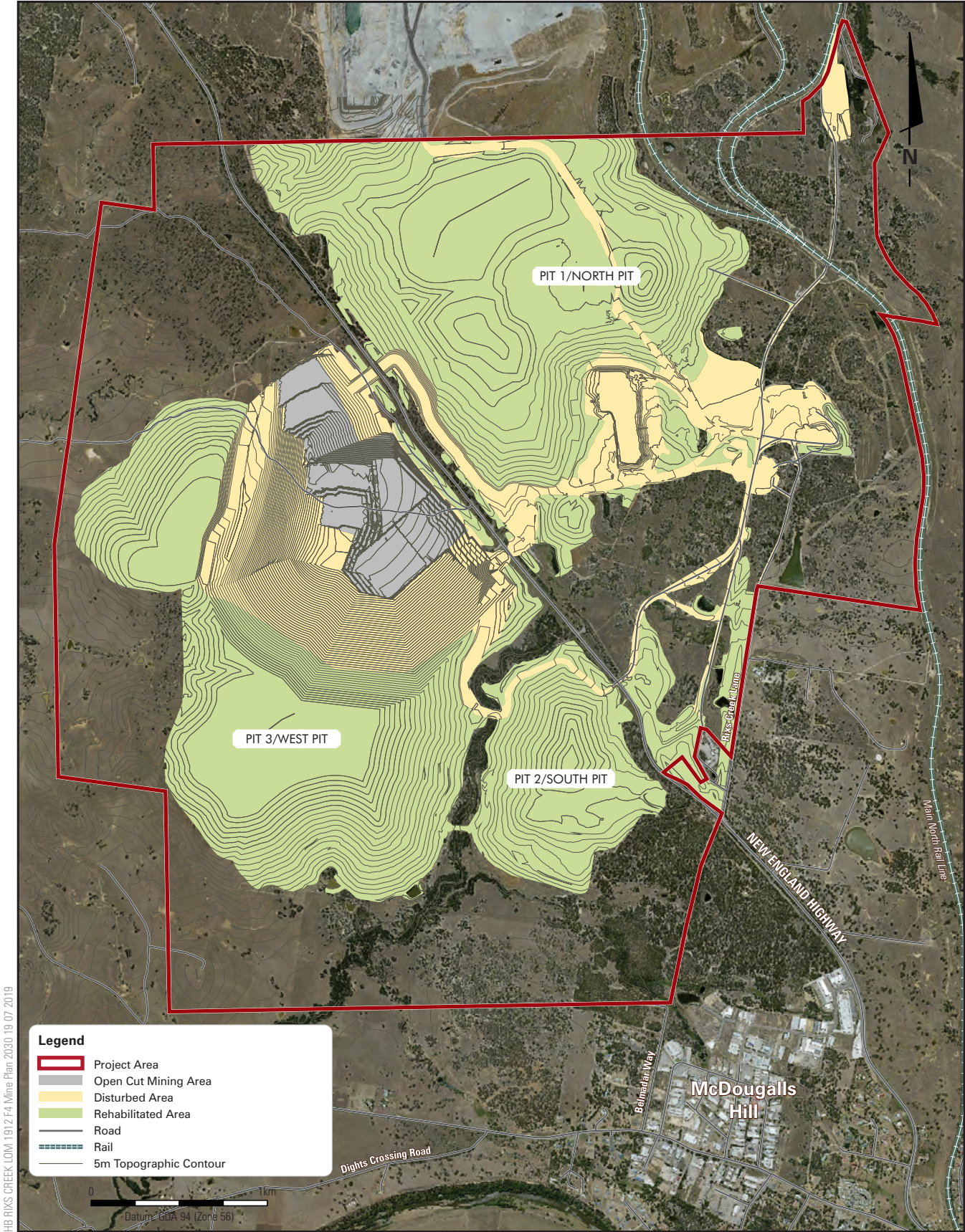
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RIXS CREEK COAL MINE

Conceptual Mine Plan - 2026

FIGURE 3





RIXS CREEK COAL MINE

Conceptual Mine Plan - 2030

FIGURE 4

1.5 FINAL VOID AND LAND USE

1.5.1 Issue

What final land use options have been considered?

What is your opinion about triggers in conditions regarding final void use?

1.5.2 Response

Land Use

Section 6.0 of the 'Rix's Creek Mine – Rehabilitation Strategy' (AECOM, 2018b) lists indicative final land use options that have been considered as at 2018:

- *“Agriculture – cattle grazing;*
- *Open space – retention of areas as grassed and woodland open space;*
- *Native vegetation – including stands of native plant species and communities and corridors of vegetation connecting to stands of native vegetation on neighbour properties;*
- *Recreation – passive recreation in areas - subject to appropriate safety measures being implemented;*
- *Residential - subdivision of varying density for rural areas;*
- *Industrial – buildings and factories;*
- *Aquaculture based ventures or water for industry from the final void; 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 will identify potential higher uses of land surrounding the Mine given its proximity to Singleton and key transport and services infrastructure.”

Draft conditions B70 and B74 allow for revisions to the RMP and SIMP to consider the outcome of future proposed consultation and discussion on this issue with the community and Council, to determine a final land use that is commensurate with technology and developments which may occur over the next 20 years and yet be unknown.

Final Void

The Development Consent contains conditions that trigger a review of final void use:

"Table 6: Rehabilitation Objectives

...Final Void

- *Designed as long-term groundwater sink to prevent the release of saline water into the surrounding environment, unless further mine planning and final landform design processes identify a more suitable outcome for the final void (see condition B70);*
- *Minimise to the greatest extent practicable:*
 - *the size and depth of final voids;*
 - *the drainage catchment of final voids;*
 - *any high wall instability risk; and*
 - *the risk of flood interaction*
- *Maximise potential for beneficial reuse, where practicable*

"B70 (m) include a post-mining land use strategy to investigate and facilitate post-mining beneficial land uses for the site (including the final void)..."

"B70 (p) include a program to periodically review and update this strategy at least every three years."

Closure requirements are also discussed in **Section 1.4.2**.

The three-year review trigger included in B70(p) provides a regular trigger for consideration of final void use in consultation with relevant stakeholders. In addition to any other opportunity to use the final void that might be considered at that time, future mining approvals and activities in Rix's Creek North may provide options to consider partial or complete filling of the void in Rix's Creek South.

1.6 REFERRAL

1.6.1 Issue

Did the Project require re-referring following the listing of the Central Hunter Valley Eucalypt Forest and Woodland Critically Endangered Ecological Community?

1.6.2 Response

On 29 September 2014, Bloomfield referred the Project to the Department of Environment and Energy (DoEE) under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Referral stated:

"The Project is not expected to result in a significant impact to threatened species and ecological communities as no flora, fauna or ecological communities considered to be MNES were identified in the site."

"The Project is not expected to result in a significant impact on water resources from changes to hydrological characteristics including changes to groundwater drawdown, quantity or quality impacts."

On 21 November 2014, the DoEE determined that the Project was "not a controlled action" (NCA).

On 7 May 2015, the Central Hunter Valley Eucalypt Forest and Woodland Critically Endangered Ecological Community was listed under the EPBC Act (which correlates to Narrow-leaved Ironbark-Native Olive shrubby open forest, Bull Oak grassy woodland and Grey Box grassy open forest from referral (Table 12 in the 'Ecology Report for the Continuation of Rix's Creek Mine, Singleton LGA' (Eastcoast Flora Survey, 2015)).

Section 158A of the EPBC Act relevantly states:

"158A Approval process decisions not affected by listing events that happen after section 75 decision made

(1) *In this section:*

Approval process decision means any of the following decisions:

(a) *a decision under section 75 whether an action is a controlled action; ...*

Listing event means any of the following events:

(j) *an ecological community becoming a listed threatened ecological community;*

(2) *This section applies if:*

(a) *the Minister has, before or after the commencement of this section, decided under section 75 (the primary decision) whether an action (the relevant action) is a controlled action (whether the decision is that the action is a controlled action, or that the action is not a controlled action); and*

(b) *at a time that is after the commencement of this section and after the primary decision was made, a listing event occurs.*

(3) *The validity of the primary decision, or any other approval process decision made in relation to the relevant action before the listing event occurred, is not affected by the listing event, nor can it be revoked, varied, suspended, challenged, reviewed, set aside or called in question because of, or for reasons relating to, the listing event.*

(4) *After the listing event occurs, the listing event is to be disregarded:*

(a) *in making any further approval process decision in relation to the relevant action; and*

(b) *in doing anything under this Chapter, in relation to the relevant action, because of the making of an approval process decision in relation to the relevant action (whether that approval process decision is or was made before or after the listing event occurred).*

(5) *This section has effect despite any other provision of this Act and despite any other law.'*

In its 'Environmental Assessment Report' (DPE, 2018), DPIE stated:

"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)."

In accordance with DPIE's request, Bloomfield corresponded with DoEE on 28 May 2018, summarising the facts of the Referral and the relevant changes in the Project and requesting confirmation that no further consultation was required. No response has been received to date.

However, in accordance with section 158A of the EPBC Act, the later listing event does not apply to the Project because the NCA decision had already been made. No further correspondence or approvals are required from DoEE.

1.7 ECONOMICS

1.7.1 Issue

Were any additional Coal Price Forecasts aside from Macquarie Bank, IMF and the World Bank considered?

List the environmental impacts included in the Cost Benefit Analysis and what was not included and justify why.

The environmental externalities were quoted as \$5.9 M, please explain how calculations were made and what were the key drivers and inputs.

1.7.2 Response

Additional Coal Price Forecasts

The 'Rix's Creek Extension Project – Economic Assessment' (KPMG, 2018a) (Revised Economic Assessment) was developed in response to a request from DPIE for an updated cost benefit analysis (CBA) to reflect changes to the project. This assessment was based on Macquarie Bank's forecasted nominal coal prices, which are presented in Appendix 1 of the Revised Economic Assessment. KPMG advises that forecasts from the World Bank and the IMF were considered but not selected for the central assumptions as they presented only thermal coal prices, where Macquarie Bank provides forecasts for thermal and coking coal and as such is more relevant to the Project.

A sensitivity analysis was conducted and the results presented in Table 3-9 (KPMG, 2018a). This included a 25% variation in Gross mining revenue and consideration of the World Bank and IMF forecasts, and the results highlighted "*that the economic evaluation results for the project remain positive even when costs are increased or benefits reduced by the parameters shown...*".

Following this, in its 'Review Report' (IPCN, 2018), the IPCN requested:

R20 that the applicant provide further information in relation to how it has determined its "base case" financial parameters, including the assumptions relating to commodity price and exchange rate forecasts, and references to other available commodity price and exchange rate forecasts.

R21 that the applicant provide a more detailed discussion of the likelihood and range of feasible alternatives to the "base case" referred to above, including, but not limited to its selection of the downside coal price scenario of 25% and the World Bank commodity price scenario.

R22 that the applicant provide further information (including relevant risk minimisation strategies) in relation to how it has considered severe downside scenarios (including, but not limited to, the World Bank commodity price scenario), in accordance with the Guideline for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals 2012 and accompanying Technical Notes.

These recommendations were responded to in the 'Rix's Creek Extension Project – Economic Assessment – Addendum to report prepared for Big Ben Holdings Pty. Limited' (KPMG, 2018b) (Economic Assessment Addendum).

The Economic Assessment Addendum (Pg 5) provided justification for the use of its coal forecast prices and states:

“The economic analysis uses forecast coal prices from Macquarie Bank due to their consistent derivation, the scope of available data (annual until 2030) and most notably the more granular split of coal type relevant to Rix’s Creek operations (specifically thermal and semi-soft coking coal). The Macquarie Bank forecasts are also specific to Australian coal prices (typically higher than global averages associate with a higher quality for both metallurgical and thermal coal) and show a higher correlation with coal prices historically and currently received for Rix’s Creek coal than the alternative sources considered below.

Estimates from the World Bank and IMF are available and were used to conduct sensitivity analysis. These sources were not selected to be central assumptions because they presented only thermal coal prices rather than a disaggregation by thermal and semi-soft and had fewer years of forecast data available (with World Bank having certain year gaps and IMF forecasts ending at 2022).”

KPMG collates broker price forecasts for hard coking coal, Pulverised Coal Injection (PCI) Coal and relevantly semi-soft and Newcastle benchmark thermal coals. These have been sourced from various research databases and broker reports (the Contributors), presented on a 31 December year end basis. Where available, the Contributors’ long-term price forecasts are also included, specifically:

- For semi-soft coking coal, the report contains pricing in USD/T nominal terms from 10 Contributors;
- For Newcastle benchmark thermal coal, the report contains pricing in USD/T nominal terms from 16 Contributors; and
- For AUD/USD exchange rates, the report contains pricing in nominal terms from 21 Contributors.

The Macquarie Bank forecast prices were conservative when compared to broker consensus. It was therefore not necessary to test those forecasts against individually selected broker forecasts.

Rix’s Creek South produces approximately 60% semi-soft and 40% thermal coals. The World Bank and IMF forecasts can be considered to represent an extremely improbable downside case as semi-soft pricing commands a healthy premium above thermal pricing.

The ‘Resources and Energy Quarterly’ for June 2019 has been recently released by the Federal Department of Industry, Innovation and Science, Office of the Chief Economist. This report provides a two-year outlook for Australia’s major resources and energy commodity exports. The report predicts that thermal coal prices will be approximately US\$83 a tonne in 2019, falling to around US\$70 a tonne in 2021.

The five-year outlook from the March 2019 'Resources and Energy Quarterly' forecasts a modest recovery to US\$82 a tonne by 2024. The *Quarterly* does not provide a forecast price for semi-soft coking coal.

The initial fall in price is reflected in Appendix 1 of KPMG (2018b), with the price falling to US\$83.3 in 2020 and to US\$71.4 in 2021. Appendix 1 conservatively does not anticipate the recovery in price with the forecast being US\$63.2 in 2024 and a slow recovery to around US\$73.8 in 2030.

In other words, the thermal coal price forecasts used in the CBA are comfortably below the more recent forecast from the Office of the Chief Economist.

CBA and Environmental Externalities

Section 3.2.3 of the Revised Economic Assessment (KPMG, 2018a) lists the environmental externalities considered as part of the Project:

- *“air quality;*
- *ecology;*
- *noise and vibration;*
- *soils and geology;*
- *surface water;*
- *groundwater;*
- *heritage;*
- *traffic and transport;*
- *visual amenity and landscape;*
- *hazard and risk;*
- *greenhouse gases;*
- *land use;*
- *waste; and*
- *rehabilitation*

Consistent with the 2015 report and subsequent discussions with DPE, the CBA considered the quantitative cost associated with air quality and GHG emissions. The remainder of the environmental externalities were considered qualitatively and outlined in the 2015 report and in the broader EIS.”

The Revised Economic Assessment discusses how the quantitative costs were calculated. Under the Greenhouse Gas (GHG) emissions, it notes that:

“Importantly, Scope 3 emissions are typically not considered in the economic analysis of mining projects as it is not methodologically clear how the costs of other emissions categories should be treated within a CBA framework.” (KPMG, 2018a Pg 11).

The ‘Rix’s Creek Extension Economic Assessment’ (CIE, 2017) (peer review commissioned by DPIE) also notes that *“The draft guidelines for the economic assessment of mining projects specify that ... Being secondary effects, Scope 3 emissions are excluded from the appraisal...”*

The Scope 1 and Scope 2 GHG emissions cost was estimated to be \$4.7 million (KPMG, 2018a).

KPMG (2018a) calculated the costs associated with air quality emission using an approach *“...consistent with the Air Quality Valuation Workbook that supports the NSW Government Guidelines for the economic assessment of mining and coal seam gas proposals...”*. Using a cost per tonne of PM_{2.5} emissions of \$41,000, consistent with default values provided by the Air Quality Valuation Workbook, the total economic cost of air quality impacts was estimated to be \$1.2 million. (KMPG, 2018a Pg 14).

The total quantitative cost of the environmental externalities of the project was therefore calculated to be \$5.9 million for the GHG and air quality impacts. As noted above, other environmental externalities were treated qualitatively rather than quantitatively.

1.8 GREENHOUSE GAS

1.8.1 Issue

Please provide Scope 3 volumes and impacts.

1.8.2 Response

The Greenhouse Gas Letter to DPIE dated 2 April 2019 entitled ‘Additional information relating to greenhouse gas emissions’ (Bloomfield, 2019c) summarises the Scope 1, 2 and 3 GHG emissions for the Project:

“The likely Scope 1, 2 and 3 GHG emissions for the Project have previously been provided within Section 15 of the Air Quality and Greenhouse Gas Impact Assessment (Appendix L of the EIS) prepared by Todoroski Air Sciences.

Scope 1 and 2 emissions for the Project include the on-site combustion of diesel, petrol, petroleum based greases and oils, explosives, fugitive methane emissions, gaseous fuels and the on-site consumption of electricity. Scope 1 and 2 GHG emissions were calculated at 0.991 Mt CO_{2-e} over the 21 year Project life.

Scope 3 emissions for the Project were calculated based on the indirect emissions resulting from the purchase of diesel, petrol, petroleum based greases and oils, electricity for use on-site, the transport of product coal to its final destination and the final use of the product coal. Scope 3 GHG emissions were calculated at 71.5 Mt CO_{2-e} over the 21 year Project life.”

The Greenhouse Gas Letter discusses the likely impacts of the Project and notes that:

- The annual average Scope 1 and 2 emissions from the Project are negligible (at 0.008%) in respect to Australia’s Nationally Determined Contributions (NDC) under the Paris Agreement;
- The Scope 1 and 2 emissions are also minor (at 0.031%) in comparison with the total NSW emissions in 2011-2012;
- The Project is not inconsistent with either the Australian or NSW Government’s climate change policies;
- Bloomfield’s customers are in countries which are either signatories to the Paris Agreement with respective NDC targets, or have introduced voluntary GHG emission reduction goals; and
- The Scope 3 emissions from the Project constitute 0.2%, 0.1% and 0.5% of these countries’ goals (Japan, Republic of Korea and Taiwan respectively, noting that Taiwan is only supplied semi soft coal).

It should be noted that the above is a conservative assessment of GHG emissions, based on the original EIS scope which included a mining rate of 4.5 Mtpa ROM coal and has since been reduced to 3.6 Mtpa ROM coal.

The revised estimate of Scope 1, 2 and 3 emissions for the 3.6 Mtpa ROM coal production profile (Revised Mine Plan) was originally presented within Appendix N of the RRTS (Chart 2-1 and Chart 2-2) and is summarised in **Table 5**.

Table 5
Summary of CO_{2-e} emissions for revised project

Period	Scope 1	Scope 2	Scope 3	Scope 1+2
1	45,123	9,174	3,970,531	54,297
2	43,378	8,819	3,807,767	52,197
3	45,957	9,343	4,023,208	55,300
4	45,103	9,170	3,941,045	54,273
5	45,611	9,273	3,944,841	54,885
6	62,942	12,797	5,433,465	75,739
7	62,763	12,760	5,417,971	75,523
8	65,378	13,292	5,643,715	78,670

Period	Scope 1	Scope 2	Scope 3	Scope 1+2
9	54,760	11,133	4,727,143	65,893
10	52,128	10,598	4,499,908	62,726
11	38,015	7,729	3,274,322	45,743
12	37,762	7,677	3,273,885	45,439
13	33,988	6,910	2,931,550	40,898
14	36,654	7,452	3,161,148	44,106
15	37,244	7,572	3,277,866	44,816
16	31,481	6,400	2,788,075	37,881
17	23,784	4,836	2,047,086	28,619
18	16,732	3,402	1,508,163	20,133
19	15,207	3,092	1,326,313	18,299
20	16,143	3,282	1,308,360	19,425
21	13,920	2,830	1,131,496	16,750
Total	824,071	167,542	71,437,855	991,613

The KPMG economic analysis included within Appendix N of the RRTS report valued greenhouse gas emissions for the Project using four assumptions. Scope 3 emissions using the approach dictated within the 'NSW Government Guidelines for the economic assessment of mining and coal seam gas proposals' (DPE, 2015) (Assumption 1 - Forecast European Union Emission Allowance Units price, as noted in Table 2-2 of KPMG March 2017 report) were valued at \$449.5 Million.

Bloomfield's Greenhouse Gas Letter dated 2 April 2019 to DPIE provided a prorated economic cost of these global Scope 3 emissions to NSW of \$280,000 (real, 2015) based on the global cost of carbon calculated using Assumption 4 - European Union Allowance Futures Price, as identified in Table 2-3 of the KPMG March 2017 report.

Using the global cost of carbon using Assumption 1 in the KPMG March 2017 Report (i.e. \$449.5 Million), Gillespie Economics has estimated that the prorated economic cost of Scope 3 emissions to NSW is \$460,000 (see **Appendix A**).

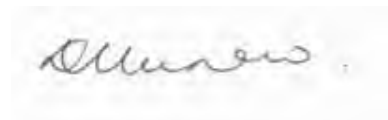
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for

HANSEN BAILEY



Kirstin Blaikie
 Senior Environmental Scientist



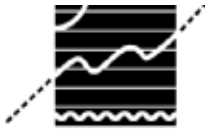
Dianne Munro
 Principal

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APPENDIX A

Economic Assessment of Scope 3 Emissions



5 August 2019

Nathan Cooper
Hansen Bailey Pty Ltd
PO Box 473
Singleton NSW 2330

Dear Nathan

Re: Rix's Creek - Economic Assessment of Scope 3 Emissions

Appendix N of the Revised Response to Submissions provided an updated KPMG Economic Analysis of Rix's Creek Environmental Impacts. This included valuation of Scope 1, 2 and 3 greenhouse gas emissions from the Rix's Creek Continuation Project (the Project) based on four different assumptions on the social damage cost of carbon. The estimated economic costs of Project Scope 3 greenhouse gas emissions are reproduced in the second column in Table 1 below.

These are global damage costs as they rely on multiplying emissions levels by an estimate of the global social damage cost of a tonne of carbon.

Table 1 - Economic Costs of Carbon over the Project Horizon (Present Value, \$M real 2015)

	Global Costs of Carbon for Scope 3 Emissions ^a	NSW Costs of Carbon for Scope 3 Emissions
Assumption 1 (NSW Government Preferred Approach)	\$449.20	\$0.46
Assumption 2	\$1,645.50	\$1.69
Assumption 3	\$855.90	\$0.88
Assumption 4	\$270.20	\$0.28

^a Economic Analysis of Rix's Creek Environmental Impacts (KPMG, 2017)

Scope 3 emissions are associated with the end use of the coal and in economics are part of a different project e.g. burning of coal for electricity, that has its own set of economic costs and benefits, including the benefits of electricity generation.

Notwithstanding, if any of these global social damage costs of Scope 3 emissions are to be included in a costs benefit analysis (CBA) of the Project, only the damage costs of these emissions to NSW households are relevant. Both the NSW Government (2015) *Guidelines for economic assesment of mining and coal seam gas proposals*, and NSW Treasury (2017) *NSW Government Guide to Cost-Benefit Analysis*, state that CBA should focus on the costs and benefits to the NSW community.

Some means of apportioning global social damage costs to NSW is therefore required. In the third column of Table 1 above, this is done based on NSW share of global population i.e. a global population of 7.7 billion and a NSW population of 7.9 million, with NSW representing 0.1% of the global population.

I would be happy to discuss any aspect of the above.

Regards

A handwritten signature in black ink, appearing to read 'R Gillespie', with a long horizontal flourish extending to the right.

Dr Rob Gillespie
Principal