



Warkworth Continuation 2014

1

Response to Submissions

Prepared for Warkworth Mining Limited | November 2014

VOLUME 1 — Main Report



MAIN REPORT

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Prepared for Warkworth Mining Limited | 10 November 2014

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Warkworth Continuation 2014

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Date 10 November 2014

Date 10 November 2014

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Chapter 1

Context



Chapter 1 — Context

- 1.1 Context of the proposal
- 1.2 Improvements and differences to Warkworth Extension 2010
- 1.3 Purpose of the report

1 Context

1.1 Context of the proposal

Development consent for Warkworth Continuation 2014 (the proposal) is required to enable the long-term viability of operations at Warkworth Mine.

Mining in West Pit at Warkworth Mine is forecast to reach consent limits in 2015 which would significantly reduce the length of mining (strike length). The choice of mining method, which is dictated in part by the available strike length, is critical to ensuring the ongoing viability of the operation through changing economic environments, given the high strip ratio and, consequently, relatively high costs of extraction. Any approval that provides a lesser strike length than would be afforded under the proposal is expected to cause the mine to become unviable.

For Warkworth Mine (and the adjacent Mount Thorley Operations - MTO), draglines are the most efficient mining method used to offset a proportion of the overall higher cost of mining. Draglines move waste material for approximately one third the cost of load and haul mining systems.

The reduced strike length that would result from the current spatial consent limit being reached would mean that a dragline could no longer be used to economically remove overburden material. The inability to use a dragline to remove overburden material in West Pit would require alternative methods that are more costly and slower. This means the cost of production would increase while revenue decreases from a reduced rate of coal produced, affecting the viability of the mine. Strike length and the viability of Warkworth Mine are discussed further in Section 2.3.2.

The purpose of the proposal is therefore to extend the spatial limit approved under the current development consent to enable mining in West Pit along the required strike length and, subsequently, enable the two main pits, North and West Pit, to advance down dip to the west.

The resource can be extracted efficiently and effectively by the applicant, Warkworth Mining Limited (WML), because of the hundreds of millions of dollars invested in the mine since it commenced operations in 1981 and, that as an existing mine, it has established access to product transport and distribution infrastructure such as road, rail and port. Extraction of the resource would enable the mine to continue to be a major employer in the Singleton local government area (LGA).

The continued operation of Mount Thorley Warkworth (MTW), which is comprised of Warkworth Mine and MTO, has significant social and economic benefits in the form of continuing employment for a workforce of approximately 1,300 persons on average, net economic benefits in net present value (NPV) terms of some \$1.5billion including royalties of some \$617million.

The economic significance of the resource attributable to Warkworth Mine only includes:

- the continuation of approximately 1,187 jobs on average in the long-term;
- the payment of \$567million in royalties in NPV terms to the state; and
- indirectly, the making of approximately \$75million in additional income in NPV terms and additional annual employment of 57 full-time people in the Singleton LGA.

It is recognised that the proposal has some residual social and environmental impacts, some of which would be experienced locally, but as discussed below, it is consistent with current government policies and would be managed in accordance with industry best practice.

1.2 Improvements and differences to Warkworth Extension 2010

The proposal follows a previous environmental assessment for an extension of mining in a similar area in 2010. The proposal was titled the Warkworth Extension Project and is herein referred to as Warkworth Extension 2010. The Project Approval for Warkworth Extension 2010 was the subject of a merit appeal in the NSW Land and Environment Court (L&E Court), the appeal being upheld on 15 April 2013 and effectively resulting in the refusal of the Warkworth Extension 2010 despite it previously being approved by the NSW Government. Notwithstanding, Warkworth Mine retains Commonwealth approval for the activities and the spatial extent the subject of the proposal.

The L&E Court judgment resulted in the inability of Warkworth Mine to operate along the required strike length in West Pit to maintain viable production rates. Accordingly, a 350m extension referred to as Modification 6 was sought and approved in early 2014. This enabled mining to continue in the very short-term whilst enabling longer term mine planning at Warkworth Mine to continue regarding its future.

While the proposal has similarities to the Warkworth Extension 2010, there are a number of important differences and improvements. These were developed with consideration to, amongst other matters, feedback received during stakeholder engagement for the proposal and the L&E Court judgment. Further, significant operational improvements, particularly regarding noise and dust management, have been made since the 2010 application.

Of importance, a number of changes to legislation and policies have occurred since the 2010 application that clarify the considerations required by decision makers. One of the important changes has been the amendments to the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (the Mining SEPP) which operates to make the 'significance of the resource' the principal consideration of the matters the Minister is to consider under Part 3 of the Mining SEPP. The proposal, which considers and is consistent with the contemporary legislative and policy framework, is outlined in Chapter 2.

Important improvements and differences between the proposal and the Warkworth Extension 2010 are summarised below.

- Operational improvements in response to ongoing stakeholder engagement particularly regarding the proactive and reactive management of noise and dust resulting in changes to operations.
- Additional commitments, for example: the inclusion of an additional area within the Wollombi Brook Aboriginal Cultural Heritage Conservation Area (WBACHCA); and establishment of local historic heritage conservation initiatives.
- Design elements, such as: a more undulating landform; optional underpass of Putty Road; emplacement of overburden at MTO enabling the void at MTO to be backfilled providing for an improved final landform; and extraction of coal as part of Warkworth Mine's operations which is approved for mining operations under MTO's development consent (DA 34/95), avoiding the need to relocate Putty Road.

- Key matters raised in the L&E Court judgment have also been addressed, namely:
 - Noise:
 - Background noise levels in Bulga have been confirmed through further detailed studies enabling a thorough and advanced way of allocating background noise levels to each individual receiver, which was discussed with the NSW Environment Protection Authority (EPA) and is in full accordance with the Industrial Noise Policy (INP).
 - All residences in Bulga are predicted to be below the Mining SEPP's cumulative noise limit from all industrial noise sources. Compliance with the Mining SEPP's cumulative noise limit is accepted as providing significant protection against noise impacts. This means that the total impact from all mines in the locality would meet all relevant regulatory amenity criteria.
 - Ecology:
 - The proposed biodiversity offset strategy (BOS) fully satisfies contemporary policies and provides a significant ecological benefit in the long-term. The BOS has been certified by OEH in accordance with clause 14(3) of the Mining SEPP as adequate for the impacts of the proposal.
 - An assessment of impacts on biodiversity has been undertaken in accordance with new government policies which were not in place for Warkworth Extension 2010.
 - In accordance with the Secretary's requirements, an assessment of the likely biodiversity impacts of the proposal has been undertaken having regard to the principles and strategies in the *Draft NSW Biodiversity Offsets Policy for Major Projects*, the *Framework for Biodiversity Assessment* (FBA) and the *Upper Hunter Strategic Assessment Interim Policy*. These new policies have been developed to encourage a transparent methodology for calculating biodiversity loss and gain and support the strategic management of biodiversity. It should be noted that the *Draft NSW Biodiversity Offsets Policy for Major Projects* was finalised on 8 September 2014. The proposal remains consistent with the version of policy released on 8 September 2014.
 - The calculation of impact credits using the biodiversity certification assessment methodology (BCAM), as amended by the Upper Hunter Strategic Assessment (UHSA). Calculation of land-based offset credits using the BioBanking Assessment Methodology (BBAM), as amended by the UHSA.
 - Warkworth Sands Woodland (WSW) community impact credits would be retired using a combination of land-based offset areas and supplementary measures endorsed by the NSW Office of Environment and Heritage (OEH) and Department of Planning and Environment (DP&E).
 - Non-WSW communities impact credits would be retired in accordance with the provisions of the UHSA or by providing land-based offset areas or purchasing credits on the open market.

- Economics:

- New models have been provided to assist the consent authority in understanding the economics of the proposal. The models used rely on market-based and revealed preference techniques for valuing the external effects associated with the proposal as opposed to choice modelling as it is considered to be a more reliable indicator of people's preferences. It is noted that these are tools only, and do not replace the decision-making task of the consent authority, but are as robust as current economic modelling permits.
- The resource within the proposed 2014 disturbance area, which is approximately 230 million tonnes (Mt) of Run of Mine (ROM) coal. This 230Mt of ROM coal would increase the total ROM coal to be extracted as part of the proposal to approximately 358Mt over the life of operations, which is economically significant as per the matters outlined in clause 12AA(2) of the Mining SEPP.
- It is clear that the proposal provides significant economic benefits. The benefits of MTW include annual average employment of almost 1,300 full time people, approximately \$6billion in additional expenditure (including capital investment), and \$617million in royalties in NPV terms. The benefits attributable solely to Warkworth Mine include annual average employment of approximately 1,187 full time people, approximately \$5.7billion in additional expenditure (including capital investment), and \$567million in royalties in NPV terms.
- NSW Trade & Investment advised in its submission that it supports the proposal proceeding given its economic significance.

- Social:

- A detailed social impact analysis was undertaken. The results of which are that, while a number of immediate neighbours have expressed concerns in respect of the proposal, the objective evidence demonstrates that the actual impacts meet the levels prescribed in various government policies. Therefore, while not wanting to minimise the concerns of immediate neighbours, the impacts of the proposal need to be considered in this light.

In addition to the above, there is a changed legislative and policy environment, including the introduction of Clause 12AA of the Mining SEPP as described above. Non-discretionary development standards for mining were also introduced through the operation of Clause 12AB of the Mining SEPP.

1.3 Purpose of the report

The Response to Submissions (RTS) report responds to submissions received on the *Warkworth Continuation 2014 Environmental Impact Statement* (EIS) which was publically exhibited from 25 June to 6 August 2014.

It is noted that the *Mount Thorley Operations 2014 Environmental Impact Statement* (MTO EIS) was publically exhibited concurrent with the Warkworth Continuation 2014 EIS with submissions lodged through DP&E's website (www.planning.nsw.gov.au) via the web page for the respective proposals.

Table 1.1 provides a comparison of submissions that would be categorised as applying to Warkworth Continuation 2014 EIS under three alternative approaches.

The first column represents the number of submissions that are found on the Warkworth Continuation 2014 EIS application web page. The second column comprises those on the Warkworth Continuation 2014 application web page together with those on the Mount Thorley Operations 2014 web page that reference the Warkworth Continuation 2014 proposal application number (SSD 6464). The third column comprises all submissions made on the Warkworth Continuation 2014 application web page and submissions made on the web page for the MTO EIS referenced the below:

- Warkworth Mine, its project elements or application number;
- MTW, complex, proposals, applications, mines or projects; and/or
- 1,300 employees in general terms.

The latter and most conservative approach was adopted for this RTS with the aim of ensuring that all submissions relating to Warkworth Continuation 2014 EIS were captured and considered. Columns 2 and 3 in Table 1.1 have also removed the duplicated submissions listed on the web page.

Table 1.1 Approach to categorising submissions

| | As per Warkworth Continuation 2014 web page ¹ | Warkworth Continuation 2014 application number | Conservative approach |
|----------------------------------|--|--|-----------------------|
| Individual – support | 1,601 | 1,603 | 1,638 |
| Individual – object | 269 | 261 | 277 |
| Special interest group – support | 30 | 29 | 32 |
| Special interest group – object | 21 | 21 | 20 |
| Total | 1,921 | 1,914 | 1,967 |

Notes: 1. Submissions listed on the web page include a number of duplicate submissions that are not recorded in columns 2 and 3.

Matters raised in submissions that specifically reference the neighbouring MTO and/or its proposal are considered in this report but are responded to in the MTO RTS.

This RTS report responds to matters raised specific to Warkworth Mine and the proposal as well as those that reference the broader MTW where it relates to Warkworth Mine. Matters raised in submissions that specifically reference the neighbouring MTO and/or its proposal are not considered in this report but are responded to in the MTO RTS.

The RTS report also does not respond to matters beyond the scope of the proposal, for example, matters outside the control of the applicant (ie government prescribed criteria such as health-based air quality criteria).

The RTS report is structured to provide context of the proposal (Chapters 1 and 2), an analysis of submissions (Chapter 3), and provides a summary of the matters raised in submissions, a response and background context for government submissions, submissions in support and submissions of objection (Chapters 4, 5 and 6, respectively). The Bulga Milbrodale Progress Association Inc (BMPA) was provided an extension of time to provide a submission by DP&E; a detailed response is provided in Chapter 7. Chapter 8 provides a conclusion to the report.

This report will be submitted to the DP&E which will make it publically available on its website and distribute it to government agencies and the Planning Assessment Commission (PAC) for consideration in the proposal's assessment and determination.

It is noted that a number of matters have been raised more than once in submissions. For example, historic heritage is raised by the Heritage Council of NSW, community and special interest group objectors and the BMPA. Although promoting repetition, a response is given each time for ease of reference for the various stakeholders groups.

It is also noted that minor changes have been made to the Statement of Commitments presented in Chapter 22 of the EIS, as documented in the proceeding chapters of this RTS report. The revised Statement of Commitments is presented in Appendix M.

Chapter 2

The proposal



Chapter 2 — The proposal

- 2.1 Overview
- 2.2 Avoidance
- 2.3 Proposal need
- 2.4 Biodiversity impact assessment and offset strategy

2 The proposal

2.1 Overview

2.1.1 Objectives

The proposal seeks a continuation of all aspects of Warkworth Mine as it presently operates and extends or alters them as described in Section 2.1.2 below.

The objectives of the proposal are to:

- ensure the long-term economic viability of the mine;
- maintain the current workforce at MTW of 1,300 jobs on average;
- minimise impacts on near neighbours to the greatest extent possible using all reasonable and feasible industry best practice measures while maintaining an economically viable mine plan;
- maximise return on the substantial capital invested in the mine since it commenced in 1981 using existing infrastructure such as road, rail and port;
- ensure consistency with all government policies; and
- continue to provide economic benefits to local, regional, state and national economies.

2.1.2 Components

To enable the objectives to be met, the key components of the proposal comprise:

- an extension of the approved mining disturbance footprint by approximately 698ha to the west of current operations (ie the proposed 2014 disturbance area);
- the ability to transfer overburden to MTO to complete MTO's final landform;
- the closure of Wallaby Scrub Road;
- an option to develop an underpass beneath Putty Road for the third bridge crossing yet to be constructed (while retaining the current approval for an overpass);
- minor changes to the design of the Northern out-of-pit (NOOP) dam; and
- the continued use of secondary access gates to the mine site and offset areas for activities such as drilling, offset management, and equipment shutdown pad access amongst other things.

The proposal would also enable the provision of a fully contemporised development consent for the Warkworth Mine.

Under the development consent granted in 2003, Warkworth Mine has approval to operate until 19 May 2021. The proposal, as shown in Figure 2.1, seeks a 21 year development consent period from the date of any approval. If approval is granted in late 2014, operations at Warkworth Mine are forecast to continue to 2035, a 14 year extension over the current approval. It is noted that the proposed 2014 disturbance area includes the proposed western extension of mining (referred to herein as 'proposed extension area') and the services corridor.

Approximately 63ha of land approved to be mined by MTO in accordance with its development consent (DA 34/95) is within the Warkworth Mine's proposal footprint. Given it is already approved to be cleared, and would otherwise be mined by MTO, this area is not included within the disturbance boundary for offsetting purposes.

As described in Section 2.2, extracting this coal under Warkworth Mine's operations avoids the need to relocate Putty Road. The area is included within the development consent boundary as amended under the proposal and was considered in the proposal's noise, air quality and visual assessments.

It is noted that the EIS in Section 7.2.3 (p84) stated that the proposal would be carried out on land zoned RU1 Primary Production. However, further examination of land use mapping for the Singleton Local Environment Plan 2013 (LEP) shows that this 63ha area also comprises a small area of land zoned SP2 Infrastructure, the northern side of the Putty Road/ Wallaby Scrub Road intersection, and RU4 Rural Small Holdings, an area in the south western of the disturbance area. Notwithstanding, the additional land use zoning, Clause 5(3) of the Mining SEPP contains provisions that allow it to prevail where there is an inconsistency with the provisions of the LEP.

2.2 Avoidance

2.2.1 Overview

Open cut mining projects cannot readily avoid impacts as mineral resources are in fixed locations. However, wherever possible and consistent with the L&E Court judgment (par. 69), avoidance was applied as the guiding principle for the proposal's development.

As was the case with the Warkworth Extension 2010, development of the proposal considered different options and alternative plans to avoid or minimise impacts on sensitive features, including those on ecology, whilst needing to satisfy the economic and financial viability requirements of the operation in the longer term.

In this context, the development of the proposal design has incorporated features of the Warkworth Extension 2010 but, importantly, includes some key differences and improvements as outlined in Section 1.2.

The design of the proposal has considered avoidance of environmental impacts where feasible. Technical specialists for aspects such as ecology, noise, air quality and surface water worked closely with WML's mine planners to test a range of design approaches and measures to avoid off-site impacts in the first instance, before mitigation and monitoring were considered. For example:

- The proposed closure of Wallaby Scrub Road, rather than its relocation. This option has resulted in the reduction of the level of clearing associated with the proposal by approximately 30ha, resulting in avoidance of approximately 3ha of WSW and some 27ha of other listed endangered ecological communities (EEC). The area of WSW avoided is shown in Figure 2.2.
- While economic coal has been found to the north of the current approved mining limit, this area has been avoided. In isolation, the volume of coal does not provide sufficient replacement to the coal provided by the proposal and, therefore, the mine would not be economically viable under this scenario if it were to replace the proposal. It is noted, however, that it could provide a source of additional coal to that proposed for extraction under the proposal. This area does not form part of the proposal to enable its continued use as offset areas as part of the Southern Biodiversity Area (SBA) and, therefore, it avoids impacts on ecology (including an area of WSW) and items of Aboriginal cultural significance. The area of WSW avoided is shown in Figure 2.2.

- The level of impact to RAAF Base Bulga has been assessed as minor, as the proposal is anticipated to affect only a very small portion (approximately 1.75 per cent) of the RAAF Base Bulga complex. The anticipated area of disturbance comprises approximately 4.8ha at the very eastern end of the east-west runway (shown in Figure 2.3). This is an area of cleared ground situated beyond the end of the constructed runway. The affected area is largely avoided and is to be incorporated within a 200m wide infrastructure corridor extending eastwards from the western boundary of the proposed 2014 disturbance area. This infrastructure corridor will not be mined and will be used for provision of services such as an access road, water pipelines, power and drainage and, therefore, the anticipated impacts will be minor.
- The majority of the proposed mining would be within the footprint of CCL 753, while the south part of West Pit would be within CL 219 (MTO mining lease). As noted in Section 2.2 of the EIS, a portion of this southern area (generally an area bounded by CCL 753 in the north, Putty Road in the south and Wallaby Scrub Road to the west) has planning approval for mining operations as part of the development consent for MTO (ie DA 34/95). Accessing this coal from Warkworth Mine under the proposal would avoid the need to relocate Putty Road which would need to occur if the coal was mined pursuant to DA 34/95.
- Acoustic and air quality amelioration measures were incorporated into the mine design where practicable. The effectiveness of these measures was continually tested in an iterative process with mine planners until modelling predictions achieved compliance with government policies whilst maintaining viable production rates.
- A water management system (WMS) has been developed that minimises the risk of adverse impacts occurring; for example, managing catchments to ensure the diversion of clean surface water runoff away from disturbed areas to minimise the volume of water captured in the Site and, thereby, reducing the potential requirement for discharges.

From an operational perspective, avoidance is inherently linked to MTW's noise and dust reactive management regimes. For example, through a range of existing acoustic management and monitoring procedures, which are implemented on a continuous (standard) basis, the requirement to modify operations to avoid potential impacts is identified and implemented. This is a vital avoidance measure which is part of the proposal.

In 2014 (as of 31 August), noise and dust management has resulted in equipment stoppage totalling more than 20,000 hours of equipment stoppage equating to many millions of dollars in lost working time. This significant level of operational disruption demonstrates MTW's commitment to avoiding and minimising impacts and maintaining compliant operations.

An assessment of monitoring data (publically available via the Rio Tinto Coal Australia website www.riotinto.com/coalaustralia) demonstrates that a high level of compliance with noise criteria has been achieved throughout the life of the Warkworth Mine. Non-compliant noise measurements account for only 0.36 per cent of the monitoring dataset (10 non-compliances measured from 2,791 individual assessments undertaken).

Both proactive and reactive operational control strategies and measures are implemented to effectively manage air quality impacts from the mine. Proactive measures would be further enhanced following the implementation of a predictive dust risk forecasting tool to assist operational personnel to make optimal management decisions on a day to day basis, further assisting in avoiding potential dust impacts.

Operational noise and air quality management measures implemented at Warkworth Mine are discussed further in Section 6.4 and 6.5 of this report, respectively.

2.2.2 Avoidance of WSW

An option which retained approximately 72ha of WSW within the proposal's footprint was considered. This mine plan was discounted as it would result in the sterilisation of coal reserves in excess of 30Mt of ROM coal over the proposal life (and, as part of Warkworth Extension 2010, was estimated to result in a \$352million reduction in producer surplus from mining (Gillespie 2011)) and a substantial reduction in annual production levels for the operation.

Since the publication of the EIS and in response to submissions regarding the avoidance of WSW, further analysis and refinement was undertaken regarding the sterilisation of coal under this mine plan option. The analysis calculated the reserve at 43Mt. Inaccessibility to the resource would begin to materially impact the rate of production from 2017, resulting in an average of loss of 2.39Mt ROM coal per year. This would result from the inability to extract the 43Mt resource and the reduction in strike length described in Section 2.3.2. A production rate of less than 18Mtpa of ROM coal across MTW renders the operation not economically viable in the long-term.

Avoidance of WSW would also require a reduced strike length at North Pit. At a reduced strike length, production cannot be maintained at 18Mtpa of ROM coal. A mine plan that cannot sustain 18Mtpa of ROM coal does not provide long-term economic viability for the mine.

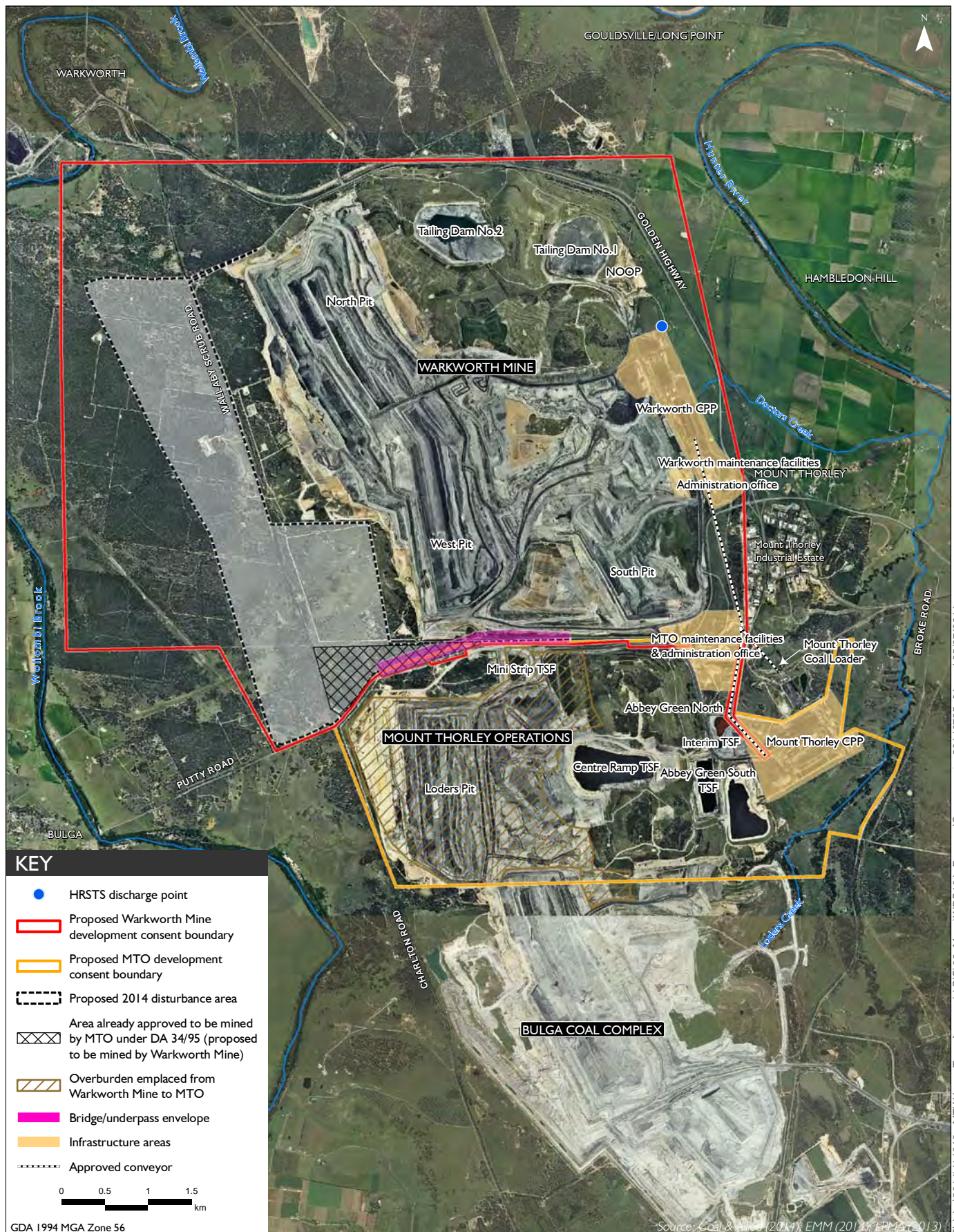
MTW currently operates with a total available strike length of 6.65km. The planned closures of South Pit in 2016 and Lodgers Pit in 2020 (subject to the approval of the Mount Thorley Operations 2014 proposal) further reduces dragline strike length, to 3.8km; a 43 per cent reduction from the current situation. At this point, MTW would have only two operating pits (ie North and West pits).

Furthermore WSW cannot be avoided because the current proposal also allows for haul road access to all seams being mined in the pre-strip whilst maintaining geotechnical stability to the overall wall profile. The proposed endwall benches are wide enough to allow ramp access for haul trucks to the intermediate mining sequences between the benches. If the area is to be avoided, this would result in increases to the haul distance along endwalls by up to 600m on each bench, increasing operational costs of pre-strip operations.

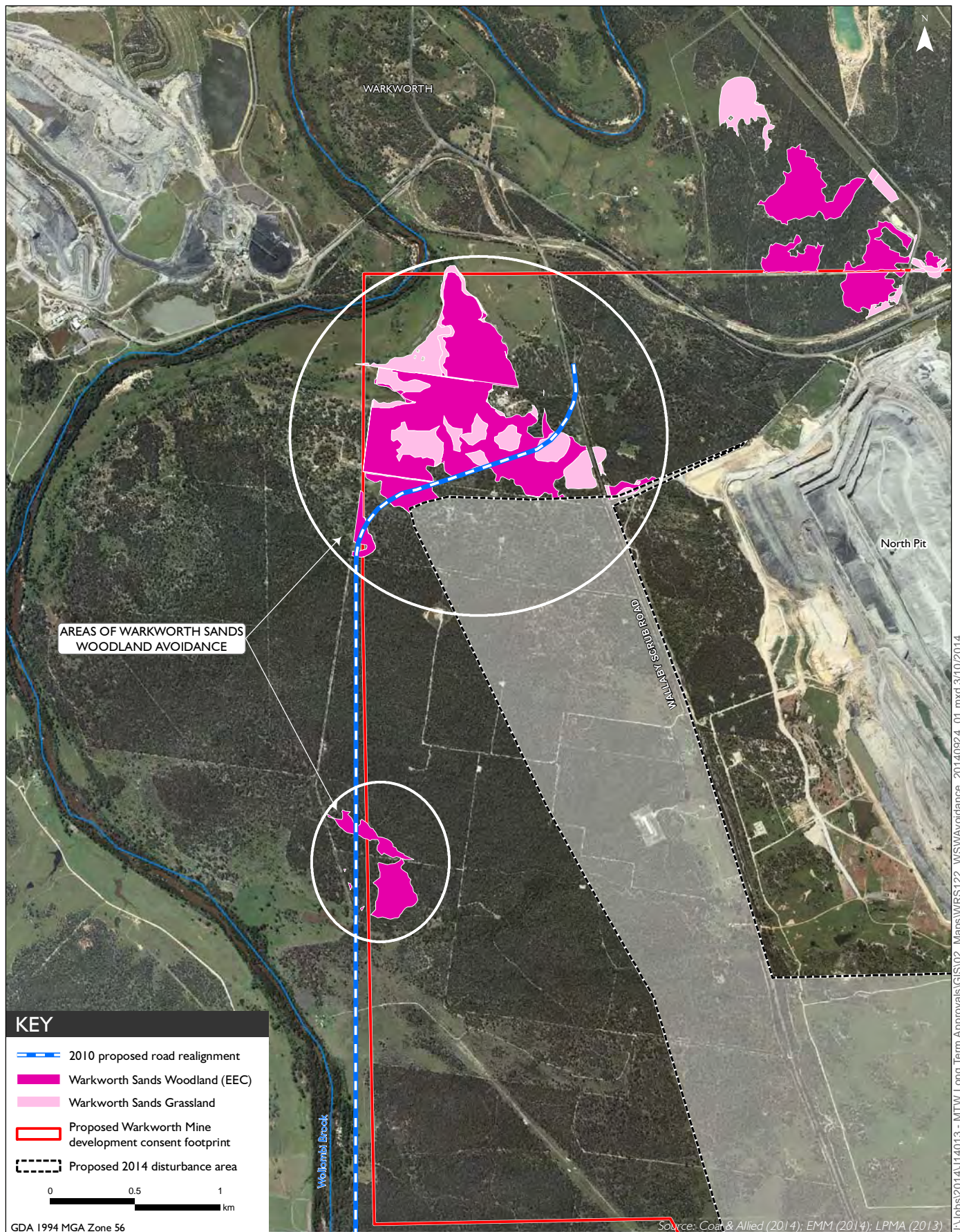
Additionally, in order to maximise coal recovery, alternative options to remove or narrow the endwall benches were considered; however, this would result in a lack of truck access and increased haulage costs. The additional haulage costs are due to overburden material being hauled south which is a longer distance than the proposed North Pit waste emplacements, and would also result in increased noise and dust emissions.

To provide MTW with its best opportunity to remain a viable operation, MTW requires dragline length to be maximised as they move material at a lower cost compared with load and haul mining systems as well as maintaining a production profile of approximately 18Mtpa of ROM coal across the two mines.

As previously noted, the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposals present the best opportunity for MTW to remain viable.



The proposal
Warkworth Continuation 2014
Response to Submissions
Figure 2.1





2.3 Proposal need

2.3.1 Overview

Warkworth Mine has been operating for over 30 years in the Hunter Valley. It is a large-scale business built on hundreds of millions of dollars of investment, which requires the efficient extraction of 18million tonnes per annum (Mtpa) of ROM coal on average to remain viable throughout cyclical economic conditions.

The proposal is needed to:

- maintain strike length to enable the long-term viability of the mine;
- maintain jobs and ensure the mine's economic and social benefits continue; and
- enable continued supply of a resource necessary for energy generation and steel production.

2.3.2 Mining constraints

Warkworth Mine and MTO commenced mining in 1981 as separate operations. Warkworth Mine commissioned a Bucyrus 1370 dragline in 1981 and MTO commissioned a Marion 8200 dragline in 1983. The primary reason for the selection of draglines as the preferred mining method was their low operating costs. Draglines are high capital investments but have relatively short payback periods due to their low operating costs. In 1999, Warkworth Mine commissioned a second dragline, a P&H 9020. All of these draglines are still in operation.

As Warkworth Mine progresses down-dip, the strip ratio (ratio of waste material to coal) increases steadily over time. To keep the Warkworth Mine (and MTW as a whole) profitable, the draglines form a vital part of the operation as they move overburden significantly cheaper than conventional truck and shovel methods, enabling extraction costs to be minimised. In addition to the above, the coal seams mined at MTW are regular and dip to the west at a consistent, relatively shallow grade, lending them to the dragline operation as the primary overburden stripping method.

The available strike length of the two mines makes them suitable for dragline operations. Strike length refers to the total horizontal distance (or strike) available for the draglines to work along. Longer strike length allows time for other operations above to release strips for draglines to dig (for example, drill and blast of overburden, truck and shovel overburden stripping and decoaling operations), thereby keeping the draglines highly utilised with minimal or no park idle or 'park up' time.

The drawback of dragline operations is their inflexibility with respect to mining method. To maximise utilisation of the dragline fleet the deposit needs to be mined in strips, with truck and shovel fleets pushing back upper benches as far as required to release strips for draglines to dig. A shorter strike length means the dragline will have periods of poor utilisation while it waits for these other processes to occur. This increases unit costs for each tonne of coal produced.

Through years of technical analysis by mine planning engineers it has become evident that to remain profitable throughout cyclical economic conditions, Warkworth Mine and MTO need to maintain as much dragline strike length as possible. This enables operating costs to be kept low, as well as maintaining a production profile of at least 18Mtpa of ROM coal across the two mines. This level of extraction is the threshold critical to generate sufficient revenue to offset the high fixed costs of MTW (including labour, fuel, explosives, parts and consumables).

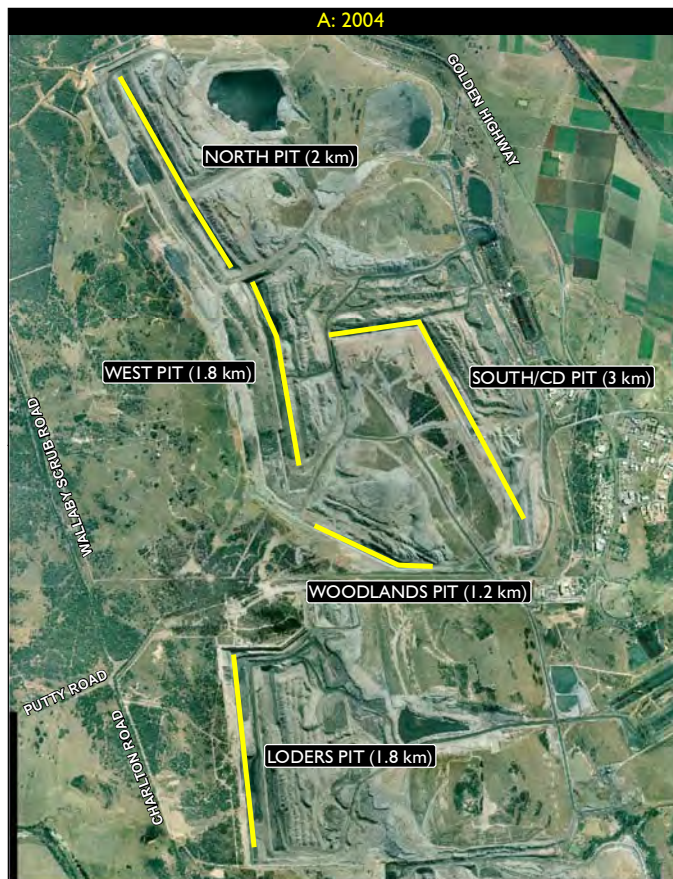
MTW currently operates three draglines that move approximately 25 per cent of the mines' total prime waste (overburden not including rehandle waste), with a total available strike length of 6.65km. In 2004, the three draglines moved approximately 75 per cent of MTW's prime waste, with an available strike length of 9.8km (Figure 2.4a).

As shown in Figure 2.4b, by the end of 2013 dragline strike length had been reduced to 6.65km, due to the closure of CD Pit and Woodlands Pit. Analysis at MTW has shown that maintaining as much strike length as possible is the best mechanism to sustain a viable, economic operation into the future.

The closure of South Pit in approximately 2016 and Lodgers Pit in approximately 2020 reduces dragline strike length further, to 3.8km. At this point, MTW's only two operating pits are North Pit and West Pit. Figure 2.4c shows MTW's dragline strike length in Year 14, nominally 2023 under the proposal.

Figure 2.4d shows the total dragline strike length available should the Warkworth Mine stay within the spatial limits approved under the existing development consent (which includes Modification 6). South Pit will close in approximately 2016 and Lodgers Pit in approximately 2020. By 2021, the strike length has decreased to 2.25km. At the point where West Pit strike length reduces, the lower dragline horizon is no longer viable. This would result in one of the draglines parking up as there is not enough overburden available for mining to keep it operational.

The steady decline of dragline strike length over the last ten years is illustrated in Figure 2.5. The figure also shows the increase in saleable coal required to offset the declining dragline strike length and associated lower operating costs as well as the high fixed costs of MTW.



Historic and proposed MTW dragline strike lengths

Warkworth Continuation 2014

Response to Submissions

Figure 2.4

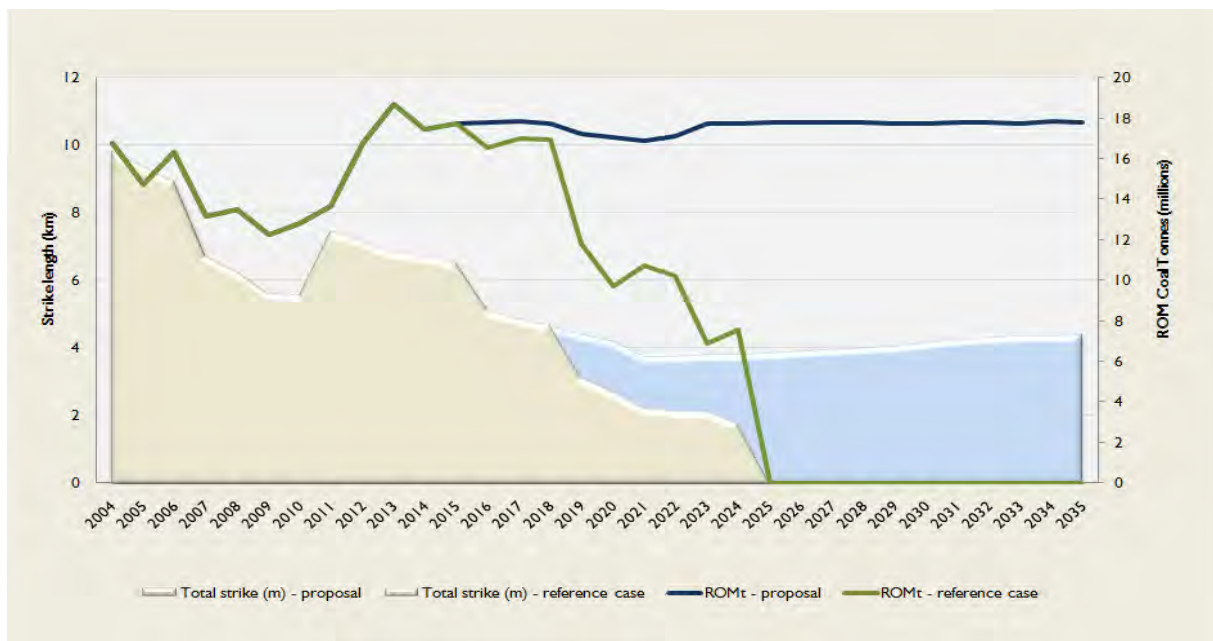


Figure 2.5 Strike length and extraction volumes

While the dragline component of prime waste movement at MTW has declined over the past decade, they form a vital part of the operation as waste removal by this method is significantly cheaper than truck and shovel methods and, therefore, minimises operating costs at MTW, enabling the mine to be economically viable. The draglines access the two lowest seams mined at MTW, Bowfield and Warkworth/Mount Arthur in North Pit and West Pit. Mining of the upper benches by truck and shovel takes approximately two years to allow sufficient working room for draglines.

To reduce operating costs and maintain extraction at 18Mtpa of ROM coal with existing fleet in 2020 and beyond, strike length under the proposal would be maximised by ‘fanning out’ the North Pit and West Pit endwalls. This would allow higher utilisation of the draglines and hence lower operating costs. If, for example, the existing North and West Pit endwall alignments were maintained and not fanned out, additional truck and shovel resources would be required to enable extraction of 18Mtpa of ROM coal. Under this scenario MTW is not economically viable as draglines would be utilised less due to insufficient strike length, resulting in much higher operating costs.

With the completion of mining in Loders Pit in 2020, one of the draglines would be parked up with not enough strike length to feasibly remain operational, which would occur regardless of the outcome of the proposal and the Mount Thorley Operations 2014, however the operation would still remain economically viable. This leaves the two remaining draglines cycling between North and West Pits. In North Pit the draglines would dig one overburden pass (ie the waste material between two coal seams), and in West Pit two overburden passes. The coal uncovered by these overburden passes represents approximately one third of the total coal uncovered across the Warkworth Mine operation per year under the proposal at an extraction rate of 18Mtpa of ROM coal and is the lowest cost coal uncovered at Warkworth Mine.

Should the proposal in its current form not be approved, strike length drops dramatically in West Pit to the point that the draglines can no longer dig the lower overburden pass in West Pit due to insufficient working room for the dragline, dragline spoil emplacement limitations and the inability to access the coal due to no room for an access ramp for coaling trucks.

At this time another dragline would be parked up because there would not be enough strike length to keep it utilised at a reasonable level. This is best illustrated by Figure 2.6. It is noted that, for comparison purposes, total dragline park-up dragline days shown in Figure 2.6 assumes a modification to development consent to enable completion of mining approved under the 2003 footprint.

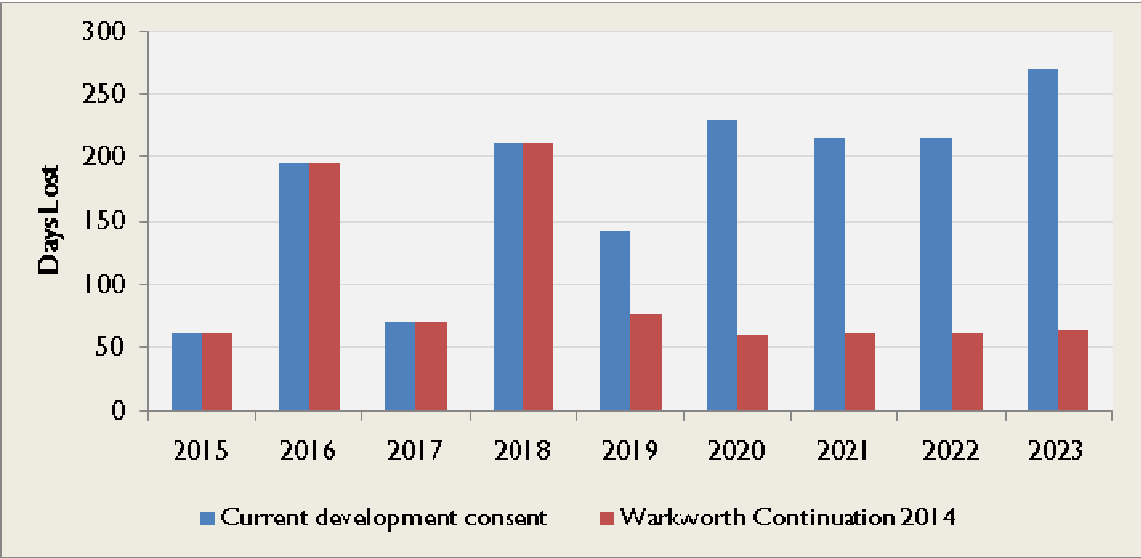


Figure 2.6 Total dragline park-up days due to unavailability of dig areas

Under the proposal there are spikes of around 200 parked up days for the draglines in 2016 and 2018. This is due to the inability to mine through the Saddleback Ridge as part of the current consent conditions over the past two years. This is the direct consequence of the disapproval of the Warkworth Extension 2010. The ramifications of not being able to lay the prestrip benches back in this area are not projected to materialise for approximately two years. This is the amount of time it takes the prestrip fleet to expose one dragline strip in West Pit.

Should the proposal be approved, the layback of the prestrip benches gets to steady state and the two draglines would be able to progress with minimal delays post 2018 (as shown in Figure 2.6).

Should the proposal not be approved and, accordingly, the applicant is unable to mine through the Saddleback Ridge area in West Pit South, on average dragline parked up days are projected to be over 200 per year from 2018 to 2023 (hypothetically adopted for comparison purposes). As such, the amount of coal uncovered by draglines would decrease dramatically (as shown by Figure 2.7) and, in turn, additional prestrip capacity would be required to make up the deficit at a much higher cost. Critically, this is expected to reduce mining below the required production rates.

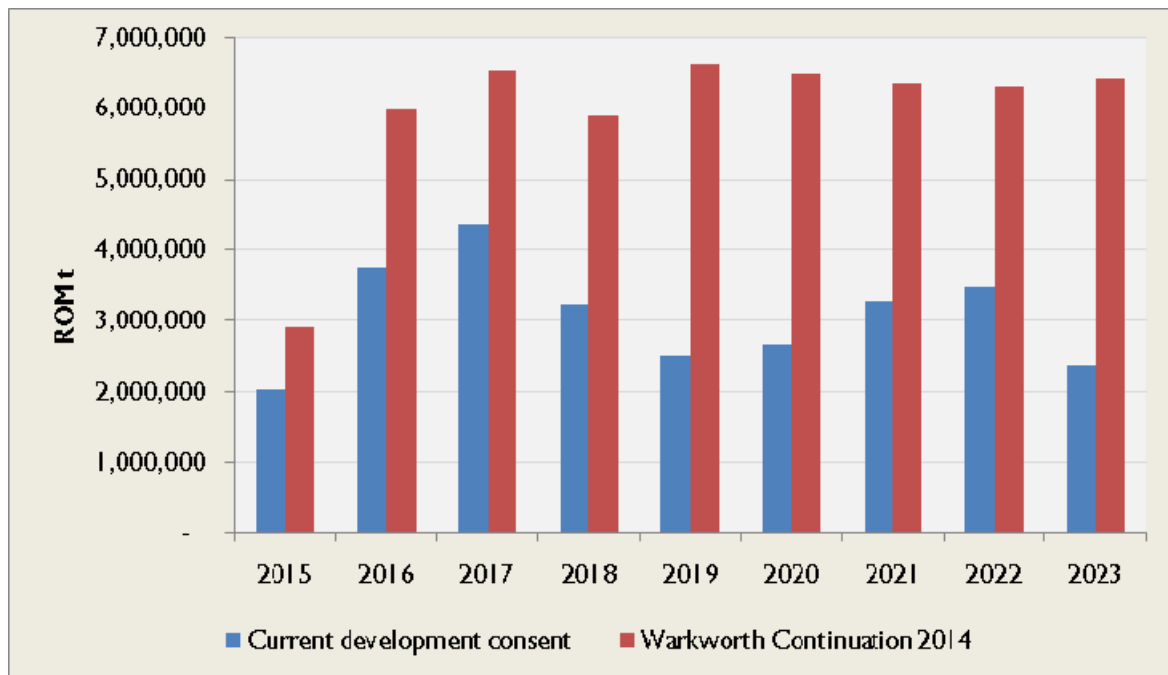


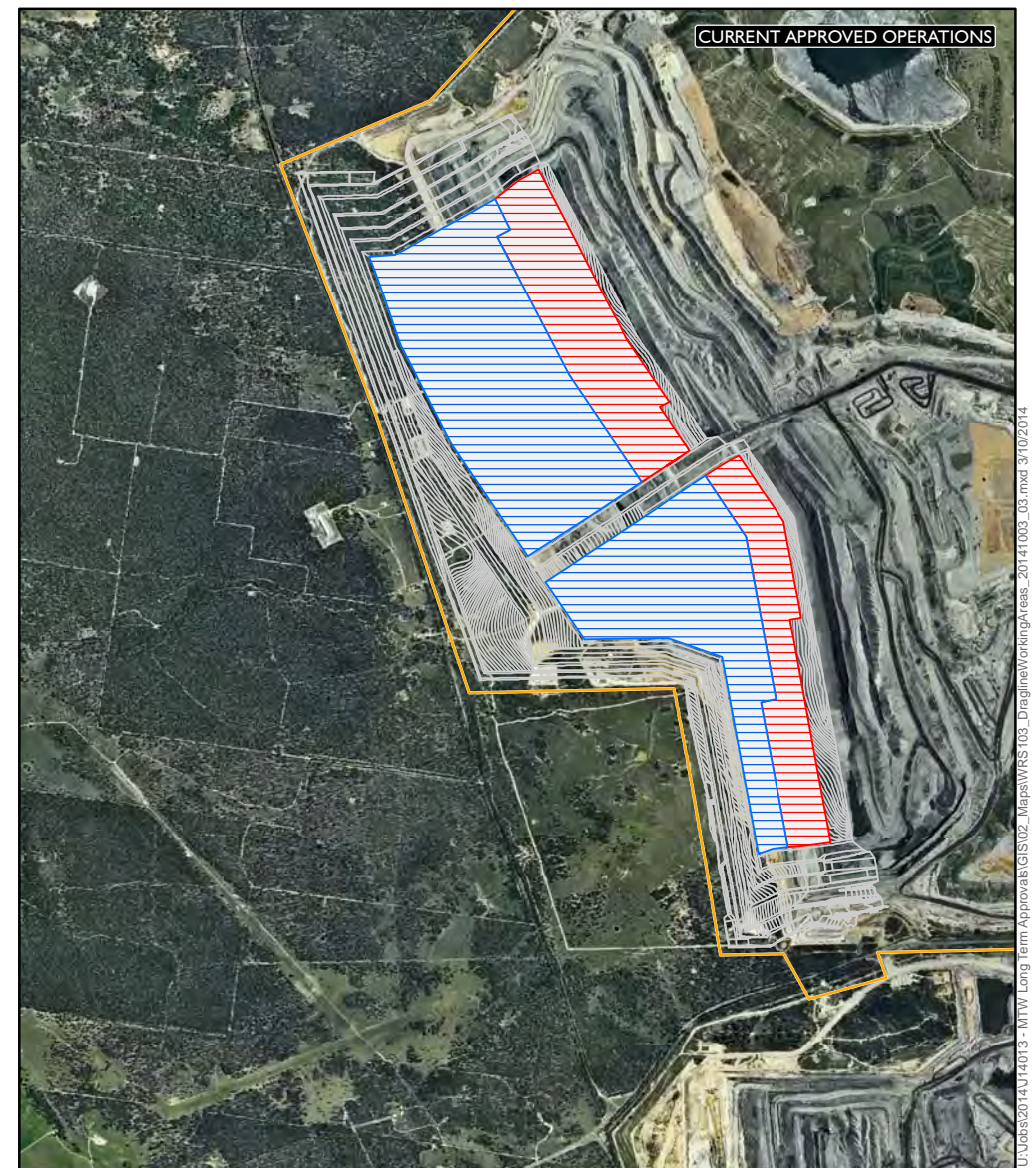
Figure 2.7 ROM coal tonnes uncovered by draglines

Figure 2.8 shows the impact on dragline working areas available should the proposal not be approved. It is noted that the intended focus of the diagram is on strike length, not ROM tonnes extracted. The ROM tonnes shown assume a modification to development consent to enable completion of mining approved under the 2003 footprint. If this was not granted, ROM tonnes extracted beyond 2021 would be zero.

Draglines working areas as proposed are shown in the left hand image and those currently approved in the right hand image. By 2019, MTW would be operating with a single dragline and producing significantly less coal at much greater cost. As described above, it is unlikely that the operation would continue to the western limit of the existing development consent boundary due to significant cost in getting the prestrip wall out to the final highwall limit in North Pit without the use of draglines to do this economically.

The economic study (EIS Appendix E) compares the reference case (or proposal disapproved case) to the proposal approved case. Under the reference case, coal production would decline from 2016 onwards and would end by 2021.

It is important to note that the economic study is a conservative assessment against a reference case. As described above, the reference case is not likely to eventuate as mining under this scenario is not expected to be economically viable due to extraction constraints from a reduced strike length in West Pit. Accordingly, it is likely, under current economic conditions, that the mine would shut prior to 2021.



Dragline working areas under the proposal and as currently approved

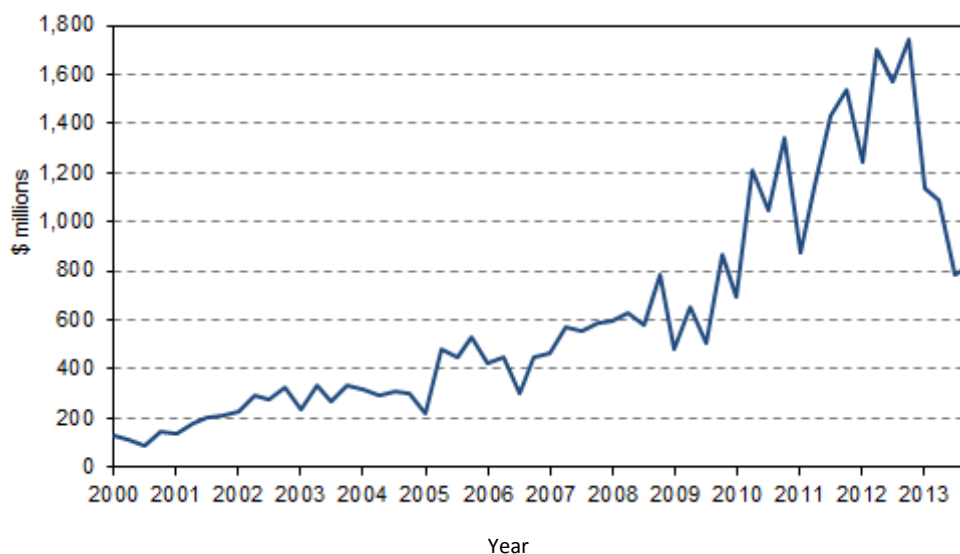
Warkworth Continuation 2014

Response to Submissions

Figure 2.8

2.3.3 Mining slowdown

The economic study (EIS Appendix E) suggests through a number of indicators that while mining activity has been historically very high, significant declines in Australian thermal coal prices over the past two years and the high Australian dollar, amongst other factors, have had a negative impact on capital expenditure in NSW. This is shown in Figure 2.9. Investment in new tangible assets has fallen by more than half between December 2012 and December 2013. These trends are consistent with the expectation by the Hunter Valley Research Foundation (HVRF 2013a,b) that few additional mining investment proposals will progress in the medium term, except extensions of existing mines that are required for those mines to remain viable and that require little capital.



Source: ABS (2014).

Figure 2.9 New capital expenditure in the NSW mining industry (current prices)

The effects of the mining slowdown are also being observed in the labour market. In a reversal of trend of the recent past, there is now an excess of qualified mining engineers in NSW (Australian Journal of Mining 2014), as well as a shortage of positions for mining apprentices and trainees in the Hunter Valley (Australian Mining 2013). This is reflected in recent unemployment statistics published by the Australian Bureau of Statistics. These show that unemployment has increased dramatically in the Hunter Valley from 5.8 per cent in May last year to 9.2 per cent. This is a reduction in approximately 4,000 jobs. This figure is considered conservative as only those unemployed and 'seeking employment' is calculated.

The HVRF's measure of employment intentions suggests that further weakness in the Hunter Valley labour market can be anticipated. Employment intentions have declined since December 2011 with HVRF's most recent measures lower than those during the Global Financial Crisis of 2008. Similar trends are also evident in the HVRF's (2013b) Household Survey, which suggests that consumer confidence and purchasing intentions in the Hunter Valley remain negative. Overall, HVRF (2013b) conclude that the economic outlook for the Hunter Valley reflects the end of the previous expansion phase combined with a drive to achieve efficiencies, the effects of which are now being felt by local suppliers, contractors and operational employees.

Recent job losses have also occurred in the wider industry, with approximately 1,500 direct mining jobs lost in the Hunter Valley over the past 18 months (NSW Mining 2014) including the recent announcement of a further 500 job losses at Integra Coal Operations. This number excludes the expected loss of approximately 500 jobs announced by Anglo American on 21 October 2014 following the Planning Assessment Commission's decision that the Drayton South Project is not in the public interest and should not proceed. These job losses and their respective flow-on effects are representative of the indicators described above.

2.4 Biodiversity impact assessment and offset strategy

2.4.1 Introduction

The proposal would require the progressive clearing of 611ha of native vegetation, including approximately 72ha of WSW EEC, 372ha of Central Hunter Grey Box – Ironbark Woodland EEC and 15ha of Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC (including regenerating vegetation). The remaining 152ha is Central Hunter Grey Box – Ironbark derived grassland.

In order to minimise and offset the proposed impacts a comprehensive BOS has developed. This BOS provides short and long-term enhanced biodiversity outcomes for the vegetation communities (EECs) and fauna proposed to be impacted. Further detail on the assessment of impacts and the BOS is provided below.

The assessment of proposed impacts and the proposed BOS has been developed in accordance with the Secretary's requirements. An extract of the relevant Secretary's requirements for biodiversity follow:

- an assessment of the likely biodiversity impacts of the new development, having regard to the principles and strategies in the *draft NSW Biodiversity Offsets Policy for Major Projects* and the *Upper Hunter Strategic Assessment – Interim Policy*, using the Biodiversity Certification Assessment Methodology as amended by the Upper Hunter Strategic Assessment for credit calculation, and the BioBanking Assessment Methodology as amended by the UHSA for calculating the credits of any offset areas;
- specific assessment of the likely impacts of the new development on the WSW EEC; and
- the provision of alternate offset areas for the disturbance area approved under the 2003 development consent, using the Biodiversity Certification Assessment Methodology as amended by the UHSA for credit calculation and the BioBanking Assessment Methodology as amended by the UHSA for calculating the credits of any offset areas.

The UHSA was initiated by the NSW and Commonwealth Government in 2012 to provide a strategic biodiversity assessment process for acquiring and managing future mining offset areas for the Upper Hunter Valley coalfields. The purpose of the UHSA is to implement a coordinated assessment of the current biodiversity values of current and future impacts of coal mining in the Upper Hunter Valley coalfields, in order to inform the Upper Hunter Biodiversity Plan.

In accordance with the Secretary's requirements, BCAM is used to assess the proposed impacts. BCAM is also the methodology used by the UHSA. BCAM assesses general biodiversity values for their conservation significance including native vegetation types, condition and spatial configuration such as connectivity and extent of native vegetation. Using the methodology it is possible to determine how many credits would be required to offset an impact to biodiversity.

As directed in the Secretary's requirements, BBAM is used to assess the proposed land-based offset areas. BioBanking is a market-based scheme that provides a biodiversity assessment process for development and an offsetting scheme. BioBanking establishes an 'improve or maintain' test for biodiversity values. Improving or maintaining biodiversity values means avoiding important areas for conservation of biodiversity values, and offsetting impacts on other areas. The offset areas are measured in terms of credits, using the BBAM. The credits represent an improvement in the condition of biodiversity values such as an improvement in the habitat or an increase in the habitat or population of a threatened species. The scheme creates a market for the credits.

Following public exhibition of the EIS and in accordance with clause 14(3) of the Mining SEPP, OEH has extensively considered and assessed measures to mitigate or offset the biodiversity impact of the proposal (ie the BOS) as adequate, and provided certification. The BOS certification from OEH is provided in Appendix L.

2.4.2 Draft NSW Biodiversity Offsets Policy for Major Projects

The *draft NSW Biodiversity Offsets Policy for Major Projects* (pp 13 to 18) requires that applicants undertake a 'Biodiversity Assessment'. The results of this Biodiversity Assessment for the proposal were provided in the EIS and are summarised below. The headings used below reflect those in the policy.

It is noted that the *draft NSW Biodiversity Offsets Policy for Major Projects* was finalised on 8 September 2014, and the assessment of the Warkworth Continuation 2014 remains consistent with the version of the policy released on 8 September 2014.

Reference to the *draft NSW Biodiversity Offsets Policy for Major Projects* policy has been continued throughout the RTS to maintain consistency with the EIS.

The following sections outline the requirements of the Biodiversity Assessment and how they have been addressed in the proposal.

i Avoiding and minimising impacts

Item 1 of the Biodiversity Assessment requires applicants to firstly seek to avoid and minimise any impacts of their proposal. In respect of the proposal, avoidance and minimisation of impacts on listed species and communities was carefully considered during the planning process, further details of avoidance are discussed in Section 12.3 of the EIS.

Avoidance of WSW was considered, as outlined in Section 23.2.1 iii and 23.2.4 of the EIS, and discussed in Section 6.3 of this report. The mine plan does include avoidance of areas outside the proposed footprint which contain economic coal resources overlain by WSW to the north and west; please refer to Figure 2.2. These stands are proposed to be protected in the SBA. Technical studies investigating the relocation of Wallaby Scrub Road west of the proposal identified numerous additional impacts. If Wallaby Scrub Road was relocated this would result in approximately 30ha of additional clearing, including clearing of WSW and other listed vegetation communities, see Figure 2.2. The SBA and the Northern Biodiversity Area (NBA) are shown in Figure 2.10 below.

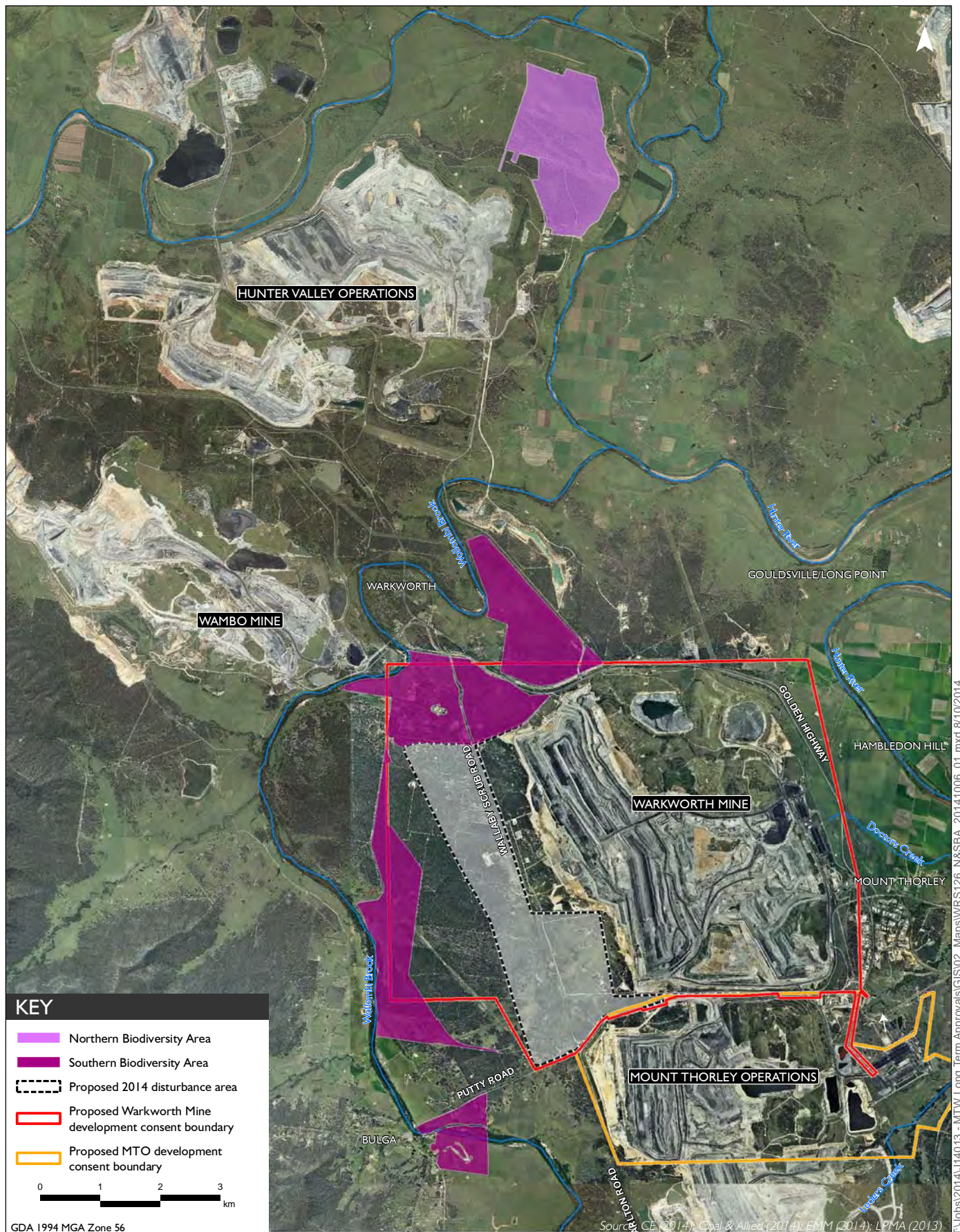
An option to retain the WSW within the footprint of the proposal was considered and discounted for the following reasons:

- sterilisation of coal reserves calculated at 43Mt of ROM coal over the proposal life and a substantial reduction in annual production levels for the operation;

- avoidance of WSW would require avoidance of the general area, rather than the specific footprint of mapped WSW. That is, avoidance would require a reduced strike length at North Pit by up to approximately 60 per cent in some places due the constraints placed on endwall design as shown conceptually in Figure 2.11 below;
- substantial capital has been invested by MTW to establish extraction at 18Mtpa of ROM coal to minimise unit costs of production to position itself to be economically viable in the long-term. A mine plan that does not support 18Mtpa of ROM coal does not provide long-term economic viability in the context of cyclical economic conditions;
- a combined strike length of approximately 6.65km is currently operated at MTW. This will reduce to approximately 3.8km as mining is completed at Warkworth Mine's South Pit and MTO's Loders Pit. MTW is proposed to continue operating in the long-term from the strike length afforded by West Pit and North Pit. An alternative mine plan that excludes WSW at North Pit would see the strike length further reduced to 0.75km in North Pit at the shortest point. At this length, inadequate physical working room is available to allow production to be maintained at 18Mtpa of ROM coal; and
- with the reduction in production rate and increased operational costs, this option would not enable the required production rates to be achieved west of Wallaby Scrub Road.

Minimisation of impacts of the proposal includes:

- procedures to minimise clearing and avoid unnecessary disturbance;
- pre-clearance surveys;
- clearing protocols to minimise impacts on fauna;
- relocation habitat features;
- seed collection and propagation;
- weed and feral animal control measures;
- erosion and sedimentation control measures; and
- specifications for replanting native trees where appropriate.

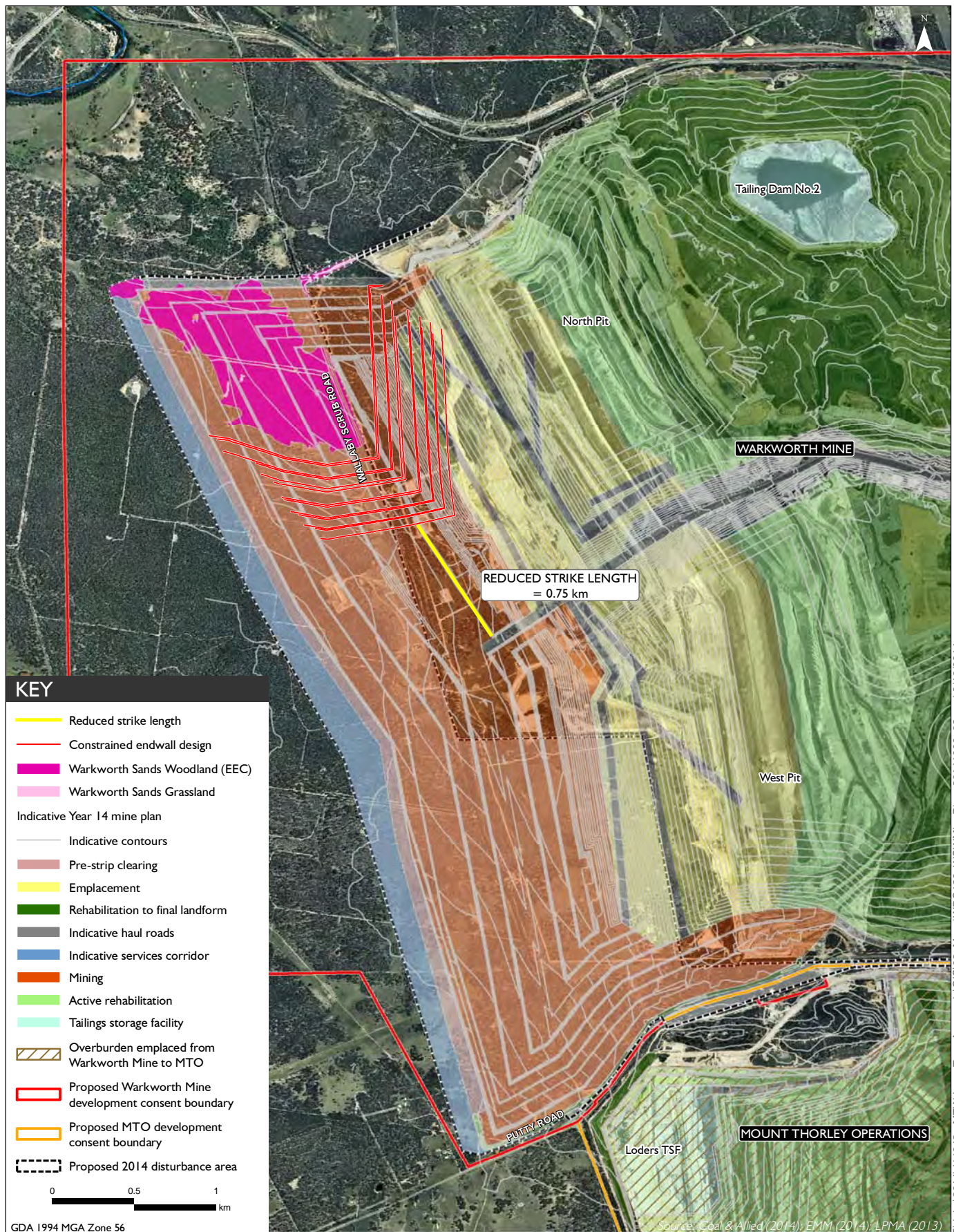


Location of Northern and Southern Biodiversity Areas

Warkworth Continuation 2014

Response to Submissions

Figure 2.10



Constrained endwall design and reduced strike length

Warkworth Continuation 2014

Response to Submissions

Figure 2.11

ii Assess remaining impacts

Item 2 of the Biodiversity Assessment require applicants to assess the remaining impacts on biodiversity that will be caused by the proposal and cannot be avoided or minimised. These impacts have been assessed using BCAM, as amended by the UHSA. At the time of assessment, there was no functioning calculator for the policy or the FBA. Accordingly, the Biodiversity Assessment was completed in accordance with the Secretary's requirements using OEH's BCAM as amended under the UHSA.

A summary of the indicative impact credits is outlined below in Section 2.4.4.

iii Impacts requiring further consideration

Item 3 of the Biodiversity Assessment provides that while most offset requirements can be determined during assessment, some impacts will require further consideration by a consent authority. These impacts are more complicated or severe and often cannot be adequately offset, including on a like for like basis. They therefore need to be explicitly considered in the consent authority's decision on whether to approve the proposal.

It has been identified during the assessment of proposed impacts that the WSW EEC will require further consideration, due to the limited current extant of the community, and the risk that the proposal may reduce the community's viability. In accordance with the policy when considering the proposed impacts to WSW, the consent authority may make the following recommendation:

the project can proceed with additional offset, supplementary measures or other actions to be undertaken regarding offsetting that impact [sic].

The Biodiversity Assessment has been undertaken in the ecology study (EIS Appendix H) and supports the recommendation that the proposal will have a low risk of WSW not being viable in the short-term, and the viability of the community should be increased in the long-term.

After consultation with OEH, it was suggested that additional supplementary (now referenced in the finalised policy as 'conservation') measures were required for WSW. The policy also states that:

supplementary measures are other measures that are likely to lead to improvements in biodiversity that do not necessarily need to meet all the principles for offsets.

Furthermore, the policy also provides a hierarchy of supplementary measures and methods for calculating supplementary measures. These additional supplementary/conservation measures can also be considered when determining whether an impact that requires further consideration is acceptable, as referenced in item 7 of the policy.

In accordance with this hierarchy, the additional supplementary/conservation measures proposed are considered 'tier 1 measures, that being actions which are delivered to the entity that is being impacted on'. Please refer to Section 2.4.5(i).

2.4.3 Warkworth Sands Woodland

As identified during assessment of proposed impacts, WSW EEC will require further consideration. Below is an outline of the listing of WSW, its current extant, conservation significance and risk to extinction.

i Mapping of WSW

Differences of opinion exist between various ecologists on the interpretation of the NSW Scientific Committee's listing of WSW. These differences are due to the ambiguity of the listing, as outlined below; differing opinions on floristics; and/or differences in opinion on quality caused by disturbance (natural or man-made) and regeneration.

The University of New England (UNE) found that areas within the NBA contained components of WSW, in particular 'several significant remnants that contain *A. floribunda* and re-growth *B. integrifolia*. Significantly there are many large 'sentinel' trees of *A. floribunda*, *E. mollucana*, *E. crebra* and *E. tereticornis*.' and 'the area is a very valuable area in which to plan the re-establishment of WSW' (C.L. Gross (UNE) Vegetation Survey Warkworth Sands Woodlands December 2007).

In the L&E Court judgment (par. 220 – 227), Dr Robertson and Dr Clements mapped large areas of the NBA as WSW which Mr Bell, an ecologist for the appellant, described as better characterised as being of vegetation communities other than WSW.

During the L&E court case Dr Robertson described the extant WSW as 746ha, compared to Mr Peake's calculation of 464.8ha. Justice Preston found that the extant of WSW was closer to 464.8ha (par. 98 of L&E Court judgment).

Taking a conservative approach, the EIS uses the areas from the L&E Court judgment for its assessment of WSW, being 464.8ha.

ii Listing of WSW

Under the NSW *Threatened Species Conservation Act 1995* (TSC Act), the WSW in the Sydney Basin Bioregion is listed as an EEC. The NSW Scientific Committee's listing states:

1. Warkworth Sands Woodland in the Sydney Basin Bioregion is the name given to the ecological community occurring on aeolian sand deposits south east of Singleton in the Hunter Valley. This ecological community is currently known to occur in the local government area of Singleton but may occur elsewhere in the Bioregion.
2. Warkworth Sands Woodland is characterised by the following assemblage of species.

| | | |
|---------------------------------|----------------------------------|------------------------------|
| <i>Acacia falcata</i> | <i>Cheilanthes sieberi</i> | <i>Hovea linearis</i> |
| <i>Acacia filicifolia</i> | <i>Chrysocephalum apiculatum</i> | <i>Hypoxis hygrometrica</i> |
| <i>Ajuga australis</i> | <i>Desmodium varians</i> | <i>Imperata cylindrica</i> |
| <i>Allocasuarina littoralis</i> | <i>Dianella revoluta</i> | <i>Indigofera australis</i> |
| <i>Allocasuarina luehmannii</i> | <i>Dichondraspecies A</i> | <i>Jacksonia scoparia</i> |
| <i>Amyema pendulum</i> | <i>Echinopogon caespitosus</i> | <i>Lomandra glauca</i> |
| <i>Angophora floribunda</i> | <i>Echinopogon intermedius</i> | <i>Lomandra leucocephala</i> |
| <i>Aristida calycina</i> | <i>Einadia trigonos</i> | <i>Lomandra muticus</i> |
| <i>Aristida ramosa</i> | <i>Entolasia stricta</i> | <i>Melaleuca decora</i> |
| <i>Aristida vagans</i> | <i>Eucalyptus glaucina</i> | <i>Melaleuca thymifolia</i> |

| | | |
|------------------------------|---|-----------------------------|
| <i>Acacia falcata</i> | <i>Cheilanthes sieberi</i> | <i>Hovea linearis</i> |
| <i>Aristida warburgii</i> | <i>Eucalyptus blakelyi/tereticornis</i> intergrades | <i>Persoonia linearis</i> |
| <i>Banksia integrifolia</i> | <i>Eucalyptus crebra</i> | <i>Pimelea linifolia</i> |
| <i>Brachyloma daphnoides</i> | <i>Exocarpos cupressiformis</i> | <i>Pomax umbellata</i> |
| <i>Breynia oblongifolia</i> | <i>Exocarpos strictus</i> | <i>Pteridium esculentum</i> |
| <i>Callitris endlicheri</i> | <i>Hardenbergia violacea</i> | <i>Solanum prinophyllum</i> |
| <i>Calotis cuneifolia</i> | <i>Hibbertia linearis</i> | <i>Vittadina sulcata</i> |

3. The total species list of the community is considerably larger than that given above, with many species present in only one or two sites or in very small quantity. The species composition of a site will be influenced by the size of the site, recent rainfall or drought condition and by its disturbance (including fire) history. The number of species, and the above ground relative abundance of species will change with time since fire, and may also change in response to changes in fire regime (including changes in fire frequency). At any one time, above ground individuals of some species may be absent, but the species may be represented below ground in the soil seed banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers. The list of species given above is of vascular plant species, the community also includes micro-organisms, fungi, cryptogamic plants and a diverse fauna, both vertebrate and invertebrate. These components of the community are poorly documented.
4. Warkworth Sands Woodland is generally of woodland to low woodland structure with trees of *Angophora floribunda* and *Banksia integrifolia*, and shrubs and ground species including *Acacia filicifolia*, *Pteridium esculentum*, *Imperata cylindrica*, *Brachyloma daphnoides* and *Melaleuca thymifolia*.
5. Small drainage lines within the community may support a higher abundance of certain species (such as *Melaleuca thymifolia*) and less of others (such as *Banksia integrifolia*). Such areas are included as part of this community. In addition, adjacent areas, where woodland occurs on a shallow A horizon of sand, are included within this community.
6. The community supports a number of threatened species including squirrel glider (*Petaurus norfolcensis*), speckled warbler (*Pyrrholaemus sagittata*), brown treecreeper (*Climacteris picumnis* subsp. *victoriae*) and grey-crowned babbler (*Pomatosomus temporalis* subsp. *temporalis*).
7. Warkworth Sands Woodland occupies sand dunes generally 1-6 m high, resting on a river terrace. The main dune deposit is aligned NW-SE. The sand deposit is thought to be of Pleistocene age (Story et al. 1963).
8. Woodlands occurring adjacent to the sand dunes on Permian clays share many species with Warkworth Sands Woodland but also have a higher abundance of Permian substrate species, such as *Corymbia maculata*, *Eucalyptus moluccana*, *Allocasuarina luehmannii* and *Eucalyptus crebra*. These areas are not considered to be part of this community, except in ecotones where there is a dominant abundance of the species of the Warkworth Sands Woodland. This is generally where a thin sandy veneer overlies the Permian substrate.

9. Warkworth Sands Woodland is now mainly confined to a small area near Warkworth, about 15 km south east of Singleton in the Hunter Valley. This occurrence now comprises nearly 80% of the extant vegetation. Due to the extent of vegetation clearing and modification in other areas, the original extent is now difficult to estimate, though assuming the community occurred on most of the other occurrences of the Warkworth Land System (Story et al. 1963), except that at Kurri Kurri which is clearly different, the current Warkworth Sands Woodland extent may be as little as 13% of its pre-settlement extent.
10. Approximately 800ha of Warkworth Sands Woodland (based on air photo interpretation, GIS mapping and field reconnaissance) remains. Ongoing threats include open-cut coalmining, sandmining and the construction of mining infrastructure as well as pressures from agricultural clearing, altered fire frequency, weed invasion and grazing.
11. No areas of Warkworth Sands Woodland occur within a conservation reserve.
12. In view of the above the Scientific Committee is of the opinion that the Warkworth Sands Woodland in the Sydney Basin Bioregion is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Proposed Gazettal date: 13/12/02.

iii Significance of WSW

The extant of WSW needs to be one of the considerations in the assessment of significance of the proposed impacts. Other considerations include the significance of WSW, status of conservation protection, risk of extinction of WSW, the offset strategy and consistency with existing government offsetting policy.

Other considerations include social and economic benefits that accrue to NSW as a consequence of the proposal and balancing these with impacts on WSW and the offset strategy.

Since the listing of WSW as an EEC there have been amendments to the TSC Act adding an additional listing category 'Critically Endangered'. The current extant and possibly the pre-European extant of WSW may qualify as a CEEC under the TSC Act, due to its limited extent. Regardless of the listing category, the WSW is a significant community and changes to the listing category will have only minor conservation outcomes for the WSW community. A change in listing would not alter the considerations required by the consent authority, or change current management practices.

The NSW Scientific Committee, in its final determination in 2002 listing WSW as an EEC, found that WSW is now mainly confined to a small area near Warkworth, around 15km south-east of Singleton. This occurrence now comprises nearly 80 per cent of the extant of WSW. The current WSW extant may be as little as 13 per cent of its pre-settlement occurrence (par. 88 of L&E Court judgment).

iv Current status of conservation protection for WSW

Currently, no areas of WSW occur within a conservation reserve. However, some areas of WSW have been required to be protected 'under conditions of approval for the Wambo Coal Mine, but these are not permanently protected as subsequent approvals can revoke the requirement to conserve the areas of WSW' (par. 103 of L&E Court judgment).

Since the L&E Court judgment 70ha of WSW required to be offset under the 2003 development consent, have been protected in perpetuity. The remaining WSW is still without conservation protection.

The final determinations of WSW points out ongoing threats to WSW that include open-cut coal mining. In response to this WML has developed a significant BOS, see Section 2.4.5 as well as the Warkworth Sands Woodland Restoration Manual (Niche, 2013) and the draft Local Offset Management Plan (LOMP) which outlines management of the proposed offset areas to ensure its long-term viability.

The Biodiversity Assessment has been undertaken in the ecology study (EIS Appendix H) and supports the recommendation that the proposal will have a low risk of WSW not being viable in the short-term, and the viability of the community should be increased in the long-term. This is due to:

- clearing of WSW being progressive;
- 75.5ha of existing WSW of varying quality (from low to high), being protected and managed to transition to a higher quality WSW in the short-term;
- approximately 160ha of Warkworth Sands Grassland (WSG) proposed to be re-established to WSW from former grazing lands;
- the long-term conservation goal of the offset strategy for WSW providing a greater extant of WSW, this represents approximately 87ha more than the current extant in the long-term;
- improvements in protection mechanisms, ie BioBanking agreements on the WSW within the proposed SBA and NBA;
- under the 2003 development consent, areas of WSG in the SBA and NBA were identified for re-establishment but not protected as part of the offset. These will be protected using BioBanking agreements; and
- increase in patch size in the SBA and the development of a separate patch of WSW in the NBA. This reduces catastrophic risk of fire and disease to the WSW.

If the proposal is not approved and the BOS secured then:

- only approximately 75ha of existing WSW required to be protected by the 2003 development consent (DA-300-9-2002) will remain protected and managed;
- the WSW required to be re-established under the 2003 development consent will remain unprotected;
- the remaining WSW will not be permanently protected (ie 75.5ha in SBA and NBA as proposed);
- the opportunity for long-term extant to be increased by approximately 19 per cent (or net increase of approximately 87ha) to the current 465ha WSW extant through implementation of a re-establishment programme will not be realised;
- key threatening processes (for example, weeds, fire and catastrophic failure) to WSW would not be managed through a regime of ongoing regular and systematic site management practices;
- no ongoing funding to manage and protect the WSW; and
- less education and knowledge transfer among restoration ecologists and practitioners through the development and implementation of conservation management and re-establishment practices.

WML is committed to the successful re-establishment of WSW in the areas mapped as WSG in the SBA and NBA. The flora species that make up the unique assemblage that is WSW are not in themselves unique and are found in various other ecosystems. Propagation of most species such as the keystone eucalyptus in the over storey and understorey species such as banksia, acacia and native grasses have been successfully germinated in the UNE greenhouse and elsewhere. The re-establishment areas are on in-situ sand deposits that once would have grown WSW. These sand deposits have the same water regimes, micro-organisms, climate, and in many cases component species already present.

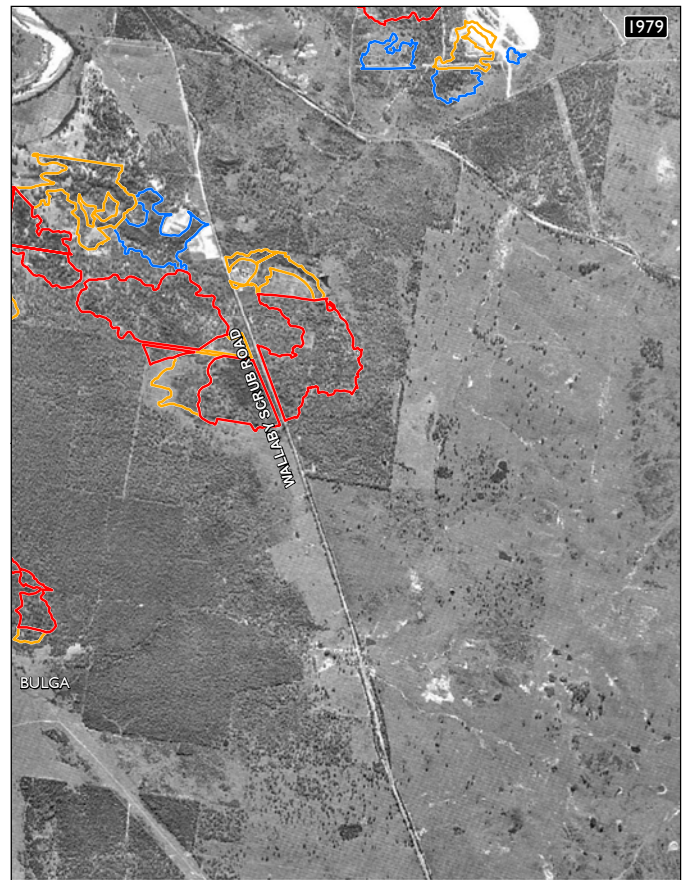
Re-establishment would provide a large, fully functioning example of the EEC through the enhancement of areas that are currently in reasonable ecological condition, and by re-establishing the community in areas where it is currently degraded. A review of the WSW in Figure 5.2 of the ecology study (EIS Appendix H) and the historical aerials shown in Figure 4.3 (EIS Appendix H) indicate that the existing WSW was heavily cleared in the early 1960s. This comparison is shown in Figure 2.12. By 1979, the vegetation had undergone significant regeneration and is now considered a good quality example of this community. Modern restoration techniques when applied to similar areas will enhance the natural regeneration of the WSW providing a high likelihood of successfully re-establishing WSG to WSW.

Further, the proposed WSW re-establishment programme in the SBA and NBA builds on comprehensive scientific understanding of the vegetation community compiled with the assistance of the UNE and other regeneration practitioners.

The WSW Restoration Manual (provided in Appendix A of this report) also sets out a process for tracking the recovery of WSW sites toward a reference state as a result of appropriate applied land management restoration interventions.

A draft LOMP has also been developed. The LOMP establishes conservation objectives, key performance criteria and indicators for the SBA and NBA, as well as outlining conservation management actions and monitoring programmes that have been formulated based on the existing ecological condition of the SBA and NBA to achieve the conservation objectives.

The WSW / WSG offset areas add to existing protected areas containing WSW and other extant vegetation in the locality. Together, these would form the largest known area of WSW under long-term conservation in the region. The proposal is likely to provide the best long-term viable community of WSW. Assessments indicate that this will increase the long-term viability of WSW and result in a net increase of approximately 19 per cent when compared to its prospects of long-term viability if the proposal does not proceed.



Source: Bower (2004); Coal & Allied (2014); EMM (2014)

Warkworth Sands Woodland historic regeneration and condition (Bower 2004)

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Figure 2.12

2.4.4 Summary of proposed impacts

The proposal would require the progressive clearing of 611ha of native vegetation, including approximately 72ha of WSW, 372ha of Central Hunter Grey Box- – Ironbark Woodland EEC and 15ha of Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC (including regenerating vegetation). The remaining 152ha is Central Hunter Grey – Box Ironbark derived grassland.

The impacts of the proposal have been separated into the following components in accordance with the Secretary's requirements:

- Component 1: WSW/WSG vegetation impacted by the proposal;
- Component 2: Non-WSW/WSG vegetation impacted by the proposal; and
- Component 3: Non-WSW/WSG vegetation impacted by the 2003 extension.

Component 3 has been included within the BCAM assessments, as the proposal would impact portions of HMAs and NDAs established for the 2003 extension. As such, the proposal includes the provision of alternative offset areas to compensate for the BCAM credit requirement for the impacts to non WSW/WSG vegetation for the 2003 extension.

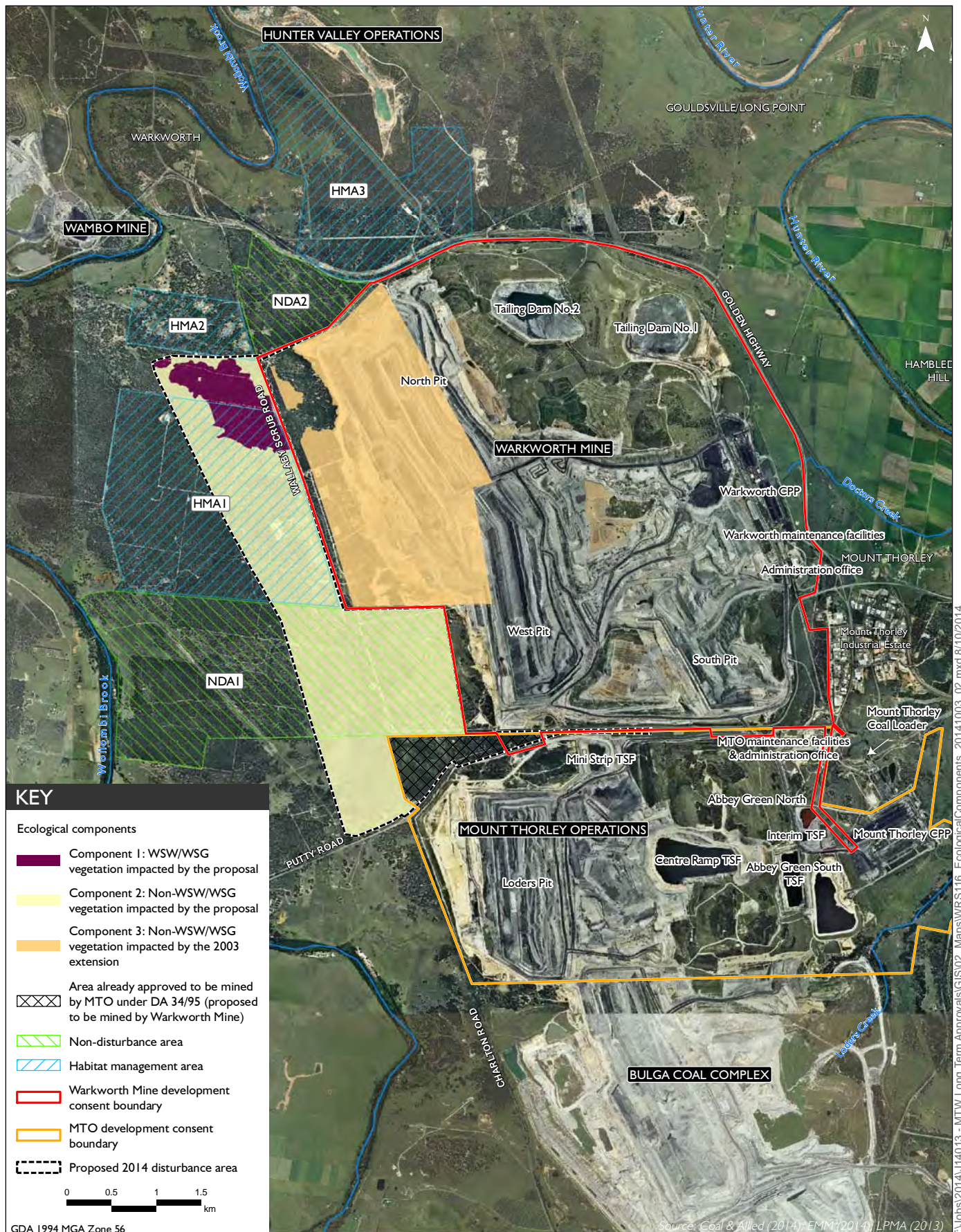
The three components can be seen in Figure 2.13.

Impact credits are outlined below in Table 2.1, these have been calculated utilising the BCAM methodology, as amended by the UHSA:

Table 2.1 **Impact summary**

| Component | Ecosystem credit* | Species credit* | Total* |
|------------------|--------------------------|------------------------|---------------|
| Component 1 | 3,059 | 2,798 | 5,857 |
| Component 2 | 16,649 | 22,132 | 38,781 |
| Component 3 | 11,992 | 12,360 | 24,352 |

Notes: * Number of credits has been updated from the EIS following consultation with OEH.



Ecological components
Warkworth Continuation 2014
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Figure 2.13

2.4.5 Biodiversity Offset Strategy

WML proposes the following BOS to retire the above impact credits for each component. This strategy meets the Secretary's requirements for the proposal and provides the following benefits:

- land-based offset areas which are like for like and provide additionality to the EECs and the habitats they provide. These offset areas will be protected in perpetuity by BioBanking agreements;
- rehabilitation of EECs which provides connectivity to the land-based offset areas and provides an increase in native vegetation across the valley floor in the long-term;
- retirement of credits via the rules of the UHSA which will be used to benefit the EECs impacted; and
- additional supplementary/conservation measures for WSW will provide substantial conservation outcomes for WSW.

i Component 1: Offsetting of WSW/WSG vegetation impacted by the proposal

Component 1 relates to the offsetting of 72ha of WSW that requires unavoidable clearing for the proposal. The proposed offset for Component 1 includes land-based offset areas, retiring residual credits via the rules of the UHSA and additional supplementary/conservation measures.

The BCAM/BBAM assessment methodology is discussed in Section 2.4.1. The offsetting approach for Component 1 is summarised in Table 2.2 and illustrated below in Figure 2.14. Note that supplementary/conservation measures are also proposed to offset the impact on WSW.



Note: * Supplementary/conservation measures are also included.

Figure 2.14 Component 1 BCAM/BBAM offsetting approach

Table 2.2 Component 1 credit summary¹

| | Impact credits (BCAM) | Offset | | Remaining |
|--------------|--------------------------|----------------------------|----------------------------|--------------|
| | | Land-based – SBA (BBAM) | Land-based – NBA (BBAM) | UHSA (BBAM) |
| Ecosystem | 3,059 | 427 | 1,897 | 735 |
| Species | 2,798 | 397 | 117 | 2,284 |
| Total | 5,857 | 824 | 2,014 | 3,019 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEH.

ii Land-based offset areas

Specifically in regard to WSW, WML has made all reasonable attempts to locate appropriate land-based offset areas. The land-based offset areas provide, to the greatest extent possible, conservation of available WSW and re-establishment of WSG to WSW on the remaining Aeolian sands.

Land-based offset areas would be established in two areas, the SBA and NBA (refer to Figures 2.15 to 2.16). These land-based offset areas will be secured using BioBanking agreements following project approval.

A total of 75.5ha of WSW (approximately 19.5ha of existing WSW in the NBA and 56ha of WSW in the SBA) is available to offset the proposal's impacts. Additionally, approximately 160ha of WSG is available for re-establishment of WSW on Aeolian sand.

Furthermore, the proposed WSW re-establishment programme in the SBA and NBA builds on comprehensive scientific understanding of the vegetation community compiled with the assistance of the UNE and other regeneration practitioners. Please refer to Section 2.4.3 (vi).

These measures would form the largest known area of WSW under long-term conservation and result in a net increase of 87ha (or 19 per cent) to the current 465ha extant in the region. Assessments indicate that this is likely to provide a long-term viable community of WSW.

iii Retirement of credits under the UHSA

It should be noted that the EIS only provided an indicative number of BBAM credits to offset WSW. The remaining offsetting credits equivalent will be retired via the rules of UHSA. The rules allow either providing further land-based offset areas or contribution to the UHSA Fund or supplementary measures.

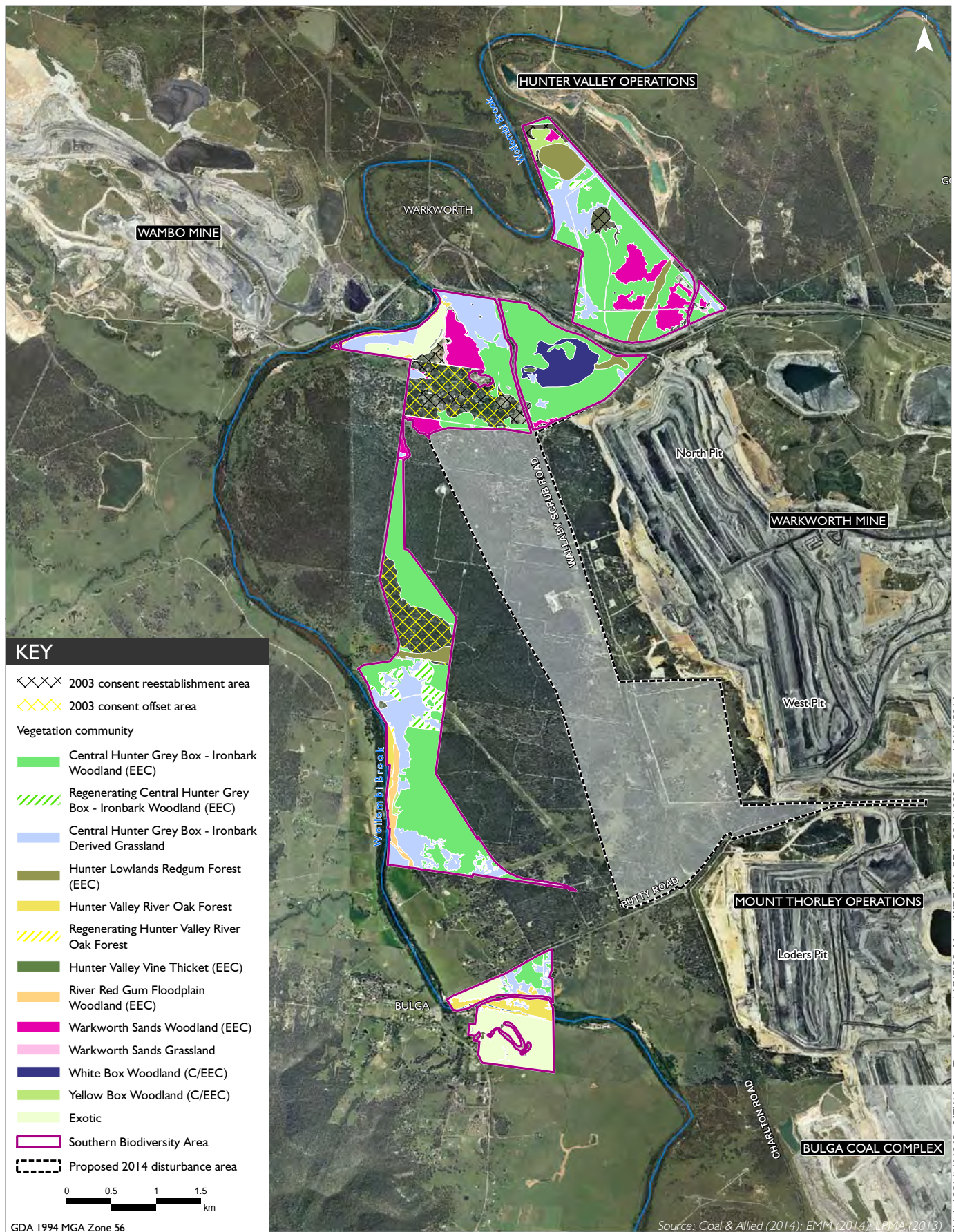
The now rescinded approval for the Warkworth Extension 2010 granted by the PAC prior to it being overturned by the L&E Court, required \$500,000 to be spent on research for WSW. This research was targeted towards provenance testing using genetics. It is proposed that this contribution to research be assigned to retire the remaining 735 ecosystem credits as a supplementary/conservation measure.

Using the BCAM calculators, outlined in Section 2.4.5 of this report, the \$500,000 already spent on research for WSW as part of the Warkworth Extension 2010 is equivalent to more than twice the residual 735 WSW credits to be retired. The 735 credits is equivalent to approximately \$240,000. That is $735 \text{ credits} \div 9.3 \text{ credits per ha} \times \$3,000 \text{ per ha}$.

As part of this research already undertaken, provenances testing included; climatic variables, germinate, stress in glasshouse experiments, survivors in the field, and also germination in the field with concurrent genetic trials. The results showed genetic differentiation among provenances was weak but heterozygosity was positively associated with plant health in the plants that survived the stress experiments. The stress testing results also informed target species, and how specific species will act during drought and flooding. The research also indicated that seed can be sourced from outside the Hunter Valley, if required.

Species credits are not specific to WSW, and can be found in other ecosystems. These remaining 2,284 species credits will be retired using the rules UHSA.

Should approval be granted, WML will lodge a BioBanking agreement to OEH for its approval which will include the certified BBAM credit calculation of any WML sourced land-based offset.

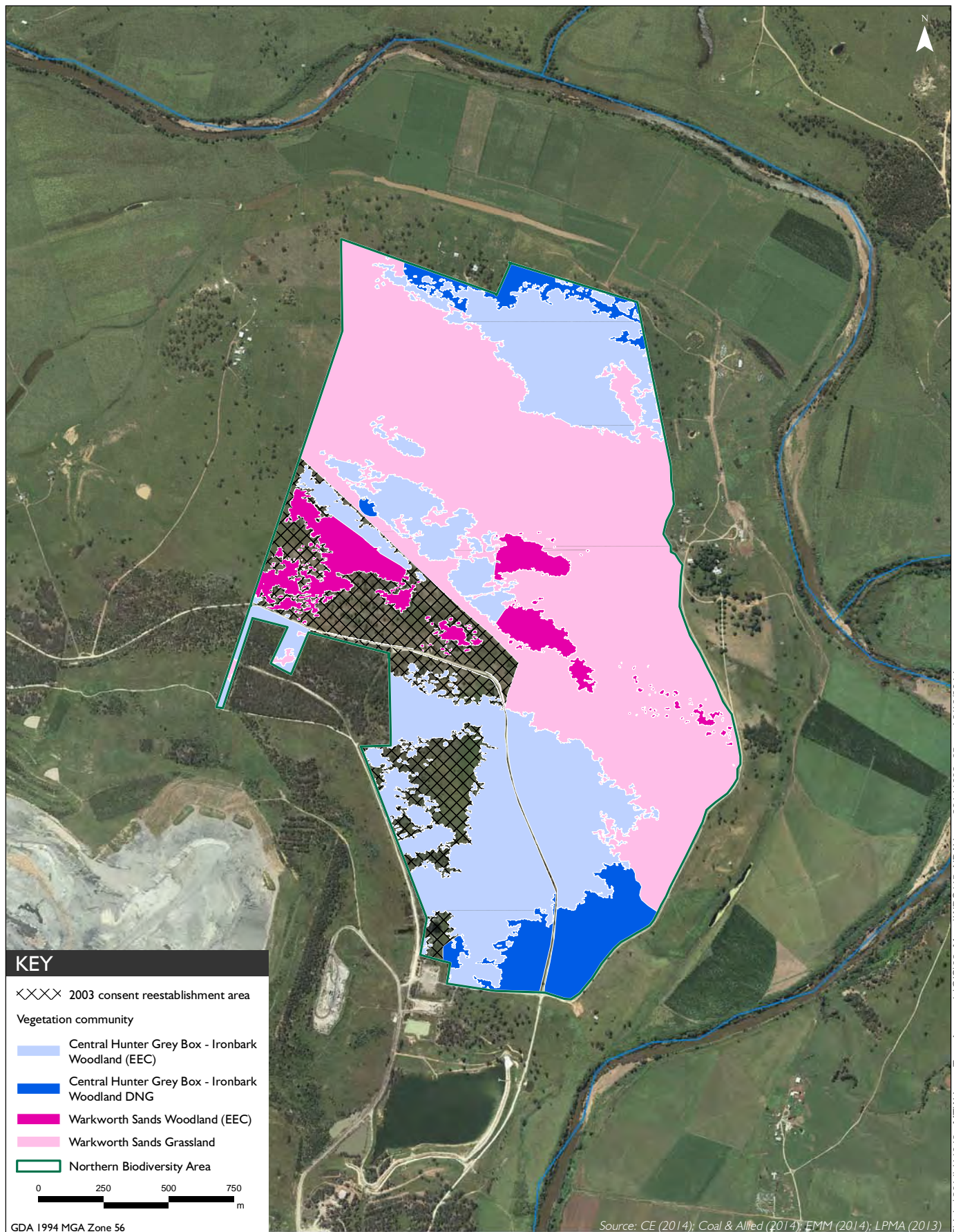


Vegetation communities in the Southern Biodiversity Area

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Response to Submissions

Figure 2.15



Vegetation communities in the Northern Biodiversity Area
Warkworth Continuation 2014
Response to Submissions

Figure 2.16

iv Additional supplementary / conservation measures

As stated above, WML acknowledges that due to the limited extent of WSW, consideration of additional supplementary/conservation measures is required. In calculating the quantum of the additional supplementary/conservation measure WML has implemented a transparent and conservative approach.

As all of the WSW offset requirements can be met via land-based offset areas and retirement of the remaining impact credits using the rules of the UHSA, WML's proposed additional supplementary/conservation measures are additional to the 'normal' offset requirements. These additional supplementary/conservation measures do not retire credits but provide significant conservation value for WSW.

Although the policy provides guidance on supplementary measures there is no guidance on the quantum of an additional supplementary/conservation measure for any individual impact that requires further consideration.

The additional supplementary/conservation measures proposed by WML to offset the impacts of the proposal on the WSW include:

- Integrated Management Plan;
- contribution to Saving Our Species – Regent Honeyeater;
- implementation bond;
- conservation of WSG established under 2003 development consent;
- the development of completion criteria for WSW; and
- commitment to secure and manage land-based offsets of equal or greater biodiversity value to the 72ha of WSW impacted by the proposal with a spend of up to \$3million within 12 months of development consent.

Each of these is outlined in further detail below.

a. Integrated Management Plan

An Integrated Management Plan will be prepared to establish an effective mechanism to work with neighbouring owners of WSW to provide improved conservation outcomes through:

- coordinated management and re-establishment activities;
- exchange of knowledge;
- education; and
- consistency in monitoring programmes.

The Integrated Management Plan for WSW will be prepared by WML in consultation with relevant stakeholders, including OEH and neighbouring mines. This plan will form a significant conservation initiative for WSW, and consider the requirements of WSW across the known extant. It will identify the actions to be taken to ensure the long-term viability of the WSW, and the parties who will undertake these actions.

The Integrated Management Plan will collect information on the description of WSW, its distribution, land tenure and zoning, habitat and ecology, ecological processes and ability to recover. This plan will also examine threats, management issues, and limits to current knowledge including; fire frequencies, inter-fire intervals, seasonality and intensity. The preliminary priority actions for WSW that have been identified that may be included in the Integrated Management Plan are in Table 2.3.

The plan will also examine proposed recovery actions including; active restoration, re-establishment techniques, regrowth control, passive restoration, weed control, pest and animal control and fire management. The biodiversity benefits of the conservation and study of WSW will benefit numerous threatened species that occur in the WSW community.

Table 2.3 Preliminary priority actions for WSW EEC

| Action | Priority |
|---|----------|
| Accurately survey and map the extent and condition of all remnants | High |
| Undertake an assessment of the conservation significance of remnants and prioritise sites for protection and active management on this basis of this assessment | High |
| Nominate WSW as an EEC under the EPBC Act | High |
| Notify landowners / managers and other stakeholders of the presence of WSW remnants under their care and / or control | High |
| Determine the tenure of all remnants of the EEC and identify relevant stakeholders | High |
| Prepare community profile and EIA guidelines and provide to Singleton Council, the DP&E and any other bodies that have a consent or approval role | High |
| Seek to increase the level of legislative protection for sites through landuse planning mechanisms and conservation agreements | High |
| Undertake rehabilitation works at priority sites using approved bush regeneration techniques | Medium |
| Undertake regeneration works to maintain or improve connectivity between remnants | Medium |
| Fence remnants to exclude livestock and encourage regeneration | Medium |
| Prepare best practice management guidelines for remnants and provide to landowners / managers as well as other stakeholders (consent / determining authorities) | Medium |
| Establish incentives programs to promote and encourage best practice management of remnants on private land | Medium |
| Determine location, species composition and threats to remaining remnants to assist with prioritising restoration works | Medium |
| Collect seed for NSW Seedbank. Develop collection program in collaboration with BGT - all known provenances (conservation collection) | Medium |
| Investigate seed viability, germination, dormancy and longevity (in natural environment and in storage) | Medium |
| Undertake management-focused research (including investigation of an appropriate fire regime, population viability analysis) | Medium |
| Prepare a recommendation for the identification of critical habitat on the basis of the outcomes of extent, condition and tenure assessment | Medium |
| Assess opportunities for incorporating land supporting WSW into the reserve estate (BioBanking) | Low |

Preliminary discussions have been undertaken with the relevant stakeholders and WML will be responsible for the drafting of the plan. Stakeholders have expressed interest in forming a conservation working group to aid the development of the plan. The plan will be made publically available via the Rio Tinto Coal Australia website.

As stated in Section 2.4.4, the ecosystem credits for the proposed impact on Component 1 is 3,059. When placed in the BCAM calculator, this produces 328.9ha (screen shots of the calculators are above). The estimated cost of providing 328.9ha of land and management in perpetuity was calculated using the UHSA's multiplier of \$3,000 per hectare. This is calculated as:

$$328.9\text{ha} \times \$3,000 = \$986,774$$

This amount has been voluntarily increased by WML to a contribution of \$1million.

The details of the implementation of this contribution will be discussed with OEH following the determination of the proposal.

c. Implementation bond

OEH identified that re-establishment of WSW on WSG has a risk that the re-establishment objectives may not be achieved. WML considers the risk of this occurring as being very low but recognises the concern, which has also been expressed by other stakeholders.

WML proposes managing the risk through a well-designed re-establishment programme of the WSW that leads to long-term conservation outcomes. Allocation of funding and resourcing for the re-establishment programme is committed.

Research has been undertaken by UNE since 2006 on WSW. Also, as part of the now rescinded project approval for the Warkworth Extension 2010, \$500,000 was spent on research for WSW. This research has helped inform several programmes in place to assist with the re-establishment of WSW; these are outlined in the Restoration Manual and LOMP (provided in Appendix A and B of this report, respectively).

Implementation of the re-establishment activities is well resourced and supported by a substantial operational budget, an internal Offsets Manager, Offsets Specialist, Rehabilitation Specialist and external restoration technical experts.

WML recognises that demonstrable results for re-establishment of WSW need to be provided within a reasonable timeframe but acknowledges stakeholders perceptions that there is a risk that this may not occur, despite the historical regeneration and scientific research.

WML commits to demonstrating that WSW will be on a trajectory towards a reference state as a result of appropriate applied land management restoration interventions within 15 years from approval. WML propose to provide an upfront implementation bond of \$1million to OEH, as security that the expected results will be achieved. It is envisaged that this bond will be held by Government in the form of a bank guarantee, which can be drawn upon if results are not demonstrated. This is in addition to the conservation bond which is included in contemporary project approvals.

Calculation of \$1million for the implementation bond was based on the same rationale as calculation for the contribution to the SOS programme. The \$1million is equivalent to retiring the entire proposed impact credit of WSW.

If the 15 year targets are not met, the proposed implementation bond does not remove the requirement to deliver the WSW re-establishment programme. This bond provides WML an incentive to continually commit resources to delivering WSW in a timely manner.

The monitoring of the trajectory of re-establishment will be reported in the annual report. The annual reports will be a critical tool to review re-establishment performance and adapt conservation management strategies. The reports will include a summary of monitoring data and management highlights in the land-based offset areas and the outcome of those actions, including identifying any need for improved management. The annual reports will be prepared and submitted to DP&E (as part of the Annual Environmental Review).

The sharing of information will be facilitated through an online Biodiversity Offsets Portal. This portal has been designed to centralise and share information among authorised users and will include spatial data, an image library, reports and other non-spatial data as well as project management information such as stakeholder details and safety information. The portal will greatly improve communication among stakeholders, transparency of management and monitoring activities and will ensure data security and integrity (for example, preventing risks of data loss due to staff turnover and minimising the risk of using superseded information). Ultimately, this innovation tool will result in improved decision making and adaptive management that is responsive to seasonal conditions and current operational challenges.

The annual reports and Biodiversity Offsets Portal will provide OEH with a process to monitor and regulate the annual performance of the re-establishment of WSW. This initiative provides an incentive for WML to remain diligent to the re-establishment of WSW whilst providing absolute transparency the relevant stakeholder's surety of results.

d. Conservation of WSG established under 2003 development consent

Under the 2003 development consent, areas of WSG in the SBA and NBA were identified for re-establishment but not protected as part of the offset. As part of this proposal, these re-established areas will now be protected and conserved as part of the proposed BOS in the long-term; the mechanism for conservation in perpetuity will be BioBanking agreements. This results in an increased area of WSW being protected and managed in the long-term.

e. Development of completion criteria

Since the lodgement of the EIS, the draft LOMP has been developed, and outlines the completion criteria for WSW.

To offset the impacts of Component 1 the BOS was objectively assessed in accordance with the requirements outlined in the Secretary's requirements and is considered adequate. As described previously, the OEH has extensively considered and assessed the BOS and provided certification in accordance with clause 14(3) of the Mining SEPP which requires the consent authority to consider any certification by the Chief Executive of the OEH that measures to mitigate or offset the biodiversity impact of the proposal (ie the BOS) will be adequate. The BOS certification from OEH is provided in Appendix L.

f. Security of land-based offsets within 12 months of development consent

Subsequent to the exhibition of the EIS, OEH has requested a commitment to secure additional supplementary measures in the form of land-based offsets of equal or greater biodiversity value to the 72ha of WSW impacted by the proposal.

In accordance with this request, WML has confirmed that it will use its best endeavours to secure and manage such lands with a spend of up to \$3million within 12 months of development consent. This would enable purchase and protection of such lands that are likely to be at a higher cost per hectare than those that can be secured under the UHSA.

v Component 2: Offsetting of Non-WSW/WSG vegetation impacted by the proposal

The Component 2 relates to the offsetting of approximately 538.5ha of non WSW/WSG vegetation communities that requires unavoidable clearing for the Proposal. The proposed offset for Component 2 includes mine rehabilitation and retirement of credits under UHSA.

The BCAM/BBAM assessment methodology is discussed in Section 2.4.1. The offsetting approach for Component 2 is summarised in Table 2.4 and illustrated below in Figure 2.19.



Figure 2.19 Component 2 offsetting approach

Table 2.4 Component 2 credit summary¹

| | Impact | Offset | Remaining |
|--------------|----------------|----------------------------|---------------|
| | Credits (BCAM) | Mine rehabilitation (BBAM) | UHSA (BBAM) |
| Ecosystem | 16,649 | 6,650 | 9,999 |
| Species | 22,132 | N/A | 22,132 |
| Total | 38,781 | 6,650 | 32,131 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEH.

a. Mine rehabilitation

The proposed BOS includes the rehabilitation of mined land for a proportion of Component 2. Under the UHSA up to 25 per cent of the credit requirements for the proposal can be met through the provision of mine rehabilitation.

The EIS provided an indicative number of BBAM credits for rehabilitation which includes a conservative discount of 50 per cent of the land value scores. It is noted that due to the UHSA still being in draft phase, the quantum of the rehabilitation discount is yet to be finalised.

The rehabilitation proposed for Component 2 is approximately 1,227.5ha.

Should approval be granted, WML will lodge a BioBanking agreement to OEH for its approval which will include the certified BBAM credit calculation for proposed rehabilitation.

b. Retirement of credits under UHSA

The remaining offsetting credits equivalent will be retired via the rules of UHSA. The rules allow either providing further land-based offset areas or contribution to the UHSA Fund.

Should approval be granted, WML will lodge a BioBanking agreement to OEH for its approval which will include the certified BBAM credit calculation of any sourced land-based offset.

To offset the impacts of Component 2 the BOS was objectively assessed in accordance with the requirements outlined in the Secretary’s requirements and is considered adequate. As described previously, the OEH has extensively considered and assessed the BOS and provided certification in accordance with clause 14(3) of the Mining SEPP which requires the consent authority to consider any certification by the Chief Executive of the OEH that measures to mitigate or offset the biodiversity impact of the proposal (ie the BOS) will be adequate. The BOS certification from OEH is provided in Appendix L.

vi **Component 3: Offsetting of Non-WSW/WSG vegetation impacted by the 2003 extension**

The Component 3 relates to the offsetting of approximately 477.5ha of non-WSW/WSG vegetation impacted by the 2003 extension. The proposed offset for Component 3 includes land-based offset areas, mine rehabilitation and purchase of credits in open market.

The BCAM/BBAM assessment methodology is discussed in Section 2.4.1. The offsetting approach for Component 3 is summarised in Table 2.5 and illustrated below in Figure 2.20.

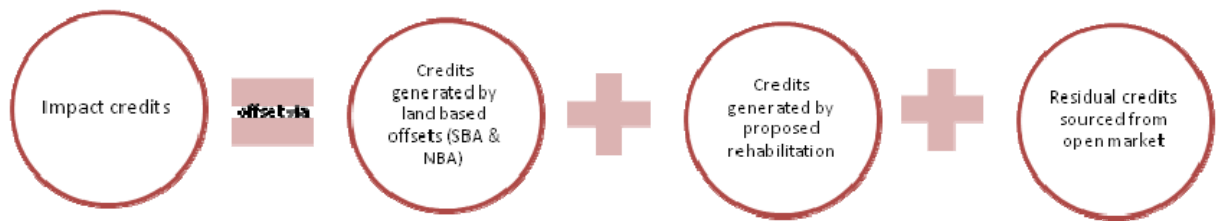


Figure 2.20 Component 3 offsetting approach

Table 2.5 Component 3 credit summary¹

| | Impact | | Offsets | | Remaining |
|--------------|----------------|-------------------------|-------------------------|----------------------------|-------------------------|
| | Credits (BCAM) | Land-based – SBA (BBAM) | Land-based – NBA (BBAM) | Mine rehabilitation (BBAM) | Residual credits (BBAM) |
| Ecosystem | 11,992 | 6,515 | 1,452 | 4,654 | -629 |
| Species | 12,360 | 3,952 | 623 | N/A | 7,785 |
| Total | 24,352 | 10,467 | 2,075 | 4,654 | 7,156 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEH.

a. **Land-based offset areas**

Some of the BBAM credits calculated for Component 3 would be retired using land-based offset areas in the SBA and NBA (Figures 2.15 and 2.16). These land-based offset areas will be secured using BioBanking agreements following development consent.

b. Mine rehabilitation

The proposed BOS includes the rehabilitation of mined land for a proportion of Component 3. As stated previously, under the UHSA up to 25 per cent of the credit requirements for the proposal can be met through the provision of mine rehabilitation.

The EIS provided an indicative amount of BBAM credits for rehabilitation which includes a conservative discount of 50 per cent of the land value scores, due to the UHSA still being in draft phase, the quantum of the rehabilitation discount is yet to be finalised.

The rehabilitation proposed for Component 3 is approximately 872.5ha.

Should approval be granted, WML will lodge a BioBanking agreement to OEH for its approval which will include the certified BBAM credit calculation for the rehabilitation area.

c. Residual credits sourced from open market

The EIS provided an indicative number of BBAM credits; however, should approval be granted, WML will lodge BioBanking agreement to OEH for its approval which will include the certified BBAM credit calculation.

The residual credits will be retired by purchasing further land-based offset areas which contain equivalent BBAM credits, and securing with BioBanking agreements, or purchasing BioBanking agreements with equivalent BBAM credits from the BioBanking market.

To offset the impacts of Component 3 the BOS was objectively assessed in accordance with the requirements outlined in the Secretary's requirements and is considered adequate. As described previously, the OEH has extensively considered and assessed the BOS and provided certification in accordance with clause 14(3) of the Mining SEPP which requires the consent authority to consider any certification by the Chief Executive of the OEH that measures to mitigate or offset the biodiversity impact of the proposal (ie the BOS) will be adequate. The BOS certification from OEH is provided in Appendix L.

vii Summary

Impact credits have been calculated utilising the BCAM methodology, as amended by the UHSA for:

- Component 1: WSW/WSG vegetation impacted by the proposal;
- Component 2: Non-WSW/WSG vegetation impacted by the proposal; and
- Component 3: Non-WSW/WSG vegetation impacted by the 2003 extension.

WML proposes the following BOS to fully retire the impact credits for each component as follows in accordance with the Secretary's requirements:

- retirement of credits for land-based offset areas which are like for like and provide additionality to the EECs and the habitats they provide. These offset areas will be protected in perpetuity by BioBanking agreements;
- retirement of credits for rehabilitation to EECs which provides connectivity to the land-based offset areas and provides an increase in native vegetation across the Hunter Valley floor in the long-term;
- retirement of credits via the rules of the UHSA; and

- additional supplementary/conservation measures for WSW will provide additional conservation outcomes for WSW.

The BOS provides a net positive impact of biodiversity and has been developed in accordance with the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final). Following public exhibition of the EIS, the OEHL has extensively considered and assessed the BOS and provided certification in accordance with clause 14(3) of the Mining SEPP which requires the consent authority to consider any certification by the Chief Executive of the OEHL that measures to mitigate or offset the biodiversity impact of the proposal (ie the BOS) will be adequate. The BOS certification from OEHL is provided in Appendix L.

Chapter 3

Submissions analysis



Chapter 3 — Submissions analysis

- 3.1 Exhibition details
- 3.2 Submissions received
- 3.3 Matters raised

3 Submissions analysis

3.1 Exhibition details

The EIS was publically exhibited for six weeks from 25 June to 6 August 2014. It is noted that extensions to the timeframe for lodging a submission with DP&E were granted to Singleton Council and the BMPA. These submissions were received on 19 August 2014 and 20 August 2014, respectively.

All submissions are available on DP&E's website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6464

3.2 Submissions received

Submissions were received from the following government authorities, special interest groups (including businesses), and individuals:

- NSW Government authorities:
 - NSW Trade and Investment:
 - Division of Resources and Energy (DRE);
 - NSW Office of Water (NOW);
 - Agriculture NSW;
 - Crown Lands;
 - Office of Environment and Heritage (OEH);
 - NSW Health – Hunter New England Local Health District;
 - Roads and Maritime Services (RMS);
 - Heritage Council of New South Wales;
 - Environment Protection Authority (EPA);
- local government – Singleton Council;
- special interest groups (52 submissions received); and
- individuals (1,915 submissions received).

WML acknowledges and thanks all stakeholders for taking the time to review the EIS, and prepare and submit a response.

3.3 Matters raised

3.3.1 Overview

All submissions received were reviewed. Submissions from government agencies and Singleton Council are summarised and considered in Chapter 4. Of importance, there were no government agency or council objections to the proposal, subject to conditions.

Matters raised by individuals and special interest groups are collectively, rather than individually. Chapter 5 includes responses to submissions of support and, Chapter 6, responses to submissions of objection. Appendix A contains the matter raised in each of the individual and special interest group submissions. The ratio of submissions in support and opposing the proposal from individual and special interest groups, form letters and origin of submissions received are discussed below.

i Analysis of submissions in support and opposing the proposal

Of the 1,967 submissions received from individuals and special interest groups, 1,670 submissions were in support of the proposal. This represents approximately 85 per cent of all submissions received. The remaining 297 submissions or approximately 15 per cent objected to the proposal. One special interest group neither supported nor opposed the proposal, but provided notes for consideration.

The percentage of submissions in support and opposed to the proposal is shown in Figure 3.1.

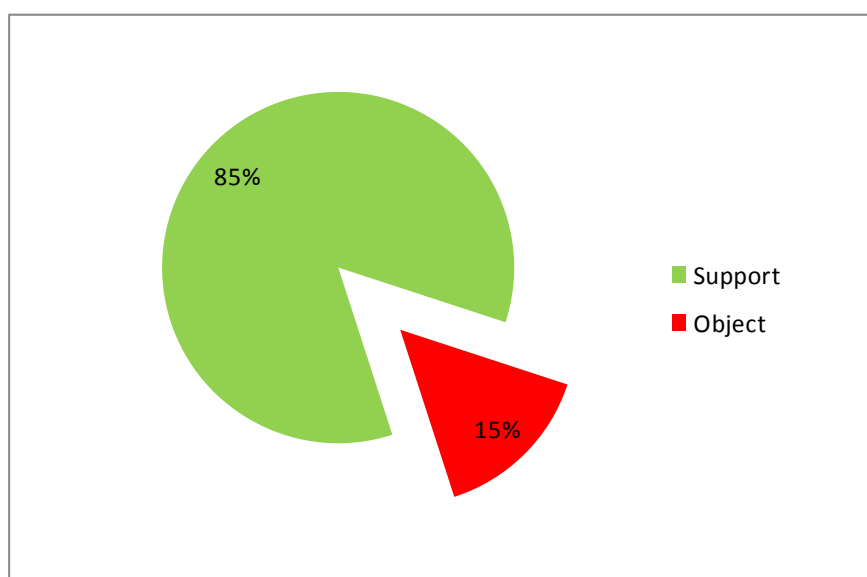


Figure 3.1 Percentage of submissions in support and objecting to the proposal

ii Form letters

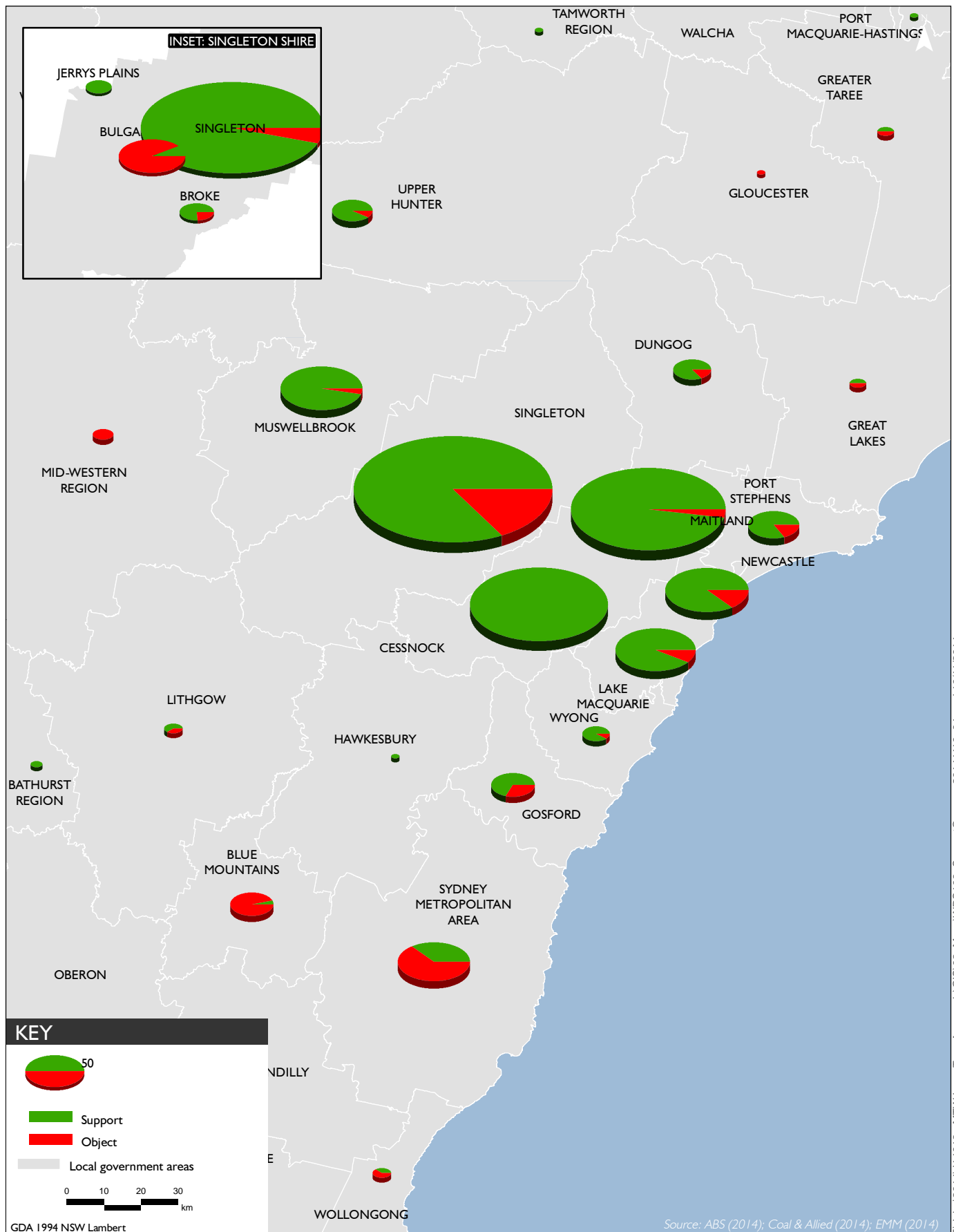
A number of submissions received were form letters. A form letter is a template letter rather than specifically composed by a submitter. A total of 177 form letters were received (approximately nine per cent of total submissions received). Of these, 146 form letters objected to the proposal. This represents approximately 49 per cent of the objections received. Thirty one form letters were in support of the proposal. This represents approximately two per cent of submissions in support of the proposal.

iii Origin of submissions

The origin of the submissions supporting and objecting to the proposal is shown graphically and diagrammatically in Figures 3.2 and 3.3, respectively. It is noted the size of the disks presented in Figure 3.3 are proportional to the number of submissions in support and objection.



Figure 3.2 Supporting and objecting by locality



Support/objection by locality
Warkworth Continuation 2014
Response to Submissions
Figure 3.3

As shown in Figure 3.2, the majority of submissions in support originated from Singleton, Maitland and Cessnock LGAs (29.2 per cent, 20.2 per cent and 16.4 per cent of total submissions in support, respectively). Of the submissions from Singleton LGA, 94.3 per cent were from Singleton, with the remaining 5.7 per cent received from the villages of Bulga, Broke and Jerrys Plains.

The highest number of objecting submissions originated from the Singleton LGA (27.6 per cent), the Sydney Metropolitan Area (15.8 per cent) and from interstate (12.5 per cent). Of the objecting submissions originating from Singleton LGA, 72 per cent were from Bulga.

As can be seen in Figure 3.3, the proportion of submissions in support and objecting to the proposal can clearly be observed to change with distance from the Singleton LGA: a much higher proportion of submissions originating from LGAs in the region are in support of the proposal. For example, the ratio of submissions in support is much higher not only in Singleton (as noted in the paragraph below), but also from the Muswellbrook, Cessnock, Maitland, Newcastle, and Lake Macquarie LGAs. This trend is reversed in areas further from the Singleton LGA with a higher proportion of objections to the proposal originating from interstate and the Wollongong, Sydney Metropolitan area, Blue Mountains, Mid-Western Region, Great Lake and Gloucester LGAs.

A total of 570 submissions originated from the Singleton LGA in which the Warkworth Mine is located; 488 supporting and 82 objecting to the proposal. This equates to approximately 86 per cent of submissions originating from the Singleton LGA being in support of the proposal.

3.3.2 Analysis of submissions in support

As noted above, 85 per cent of total submissions were in support of the proposal. This comprised 1,638 submissions from individuals and 32 submissions from special interest groups.

Matters raised in submissions predominantly related to employment, economic contributions and social impacts, particularly health and wellbeing, and environmental management. A number of more general or 'other matters' were raised including the historical context of the Site and the mining industry in the region and the proposal's status as continuation of operations as opposed to a greenfield site. Frequency of matters raised is shown in Figure 3.4. It is noted that submissions generally referenced more than one matter and, therefore, the number of matters raised as shown in Figure 3.4 totals more than 1,638. This approach to identifying the number of times a matter was raised in community and special interest group submissions is applied consistently in this report.

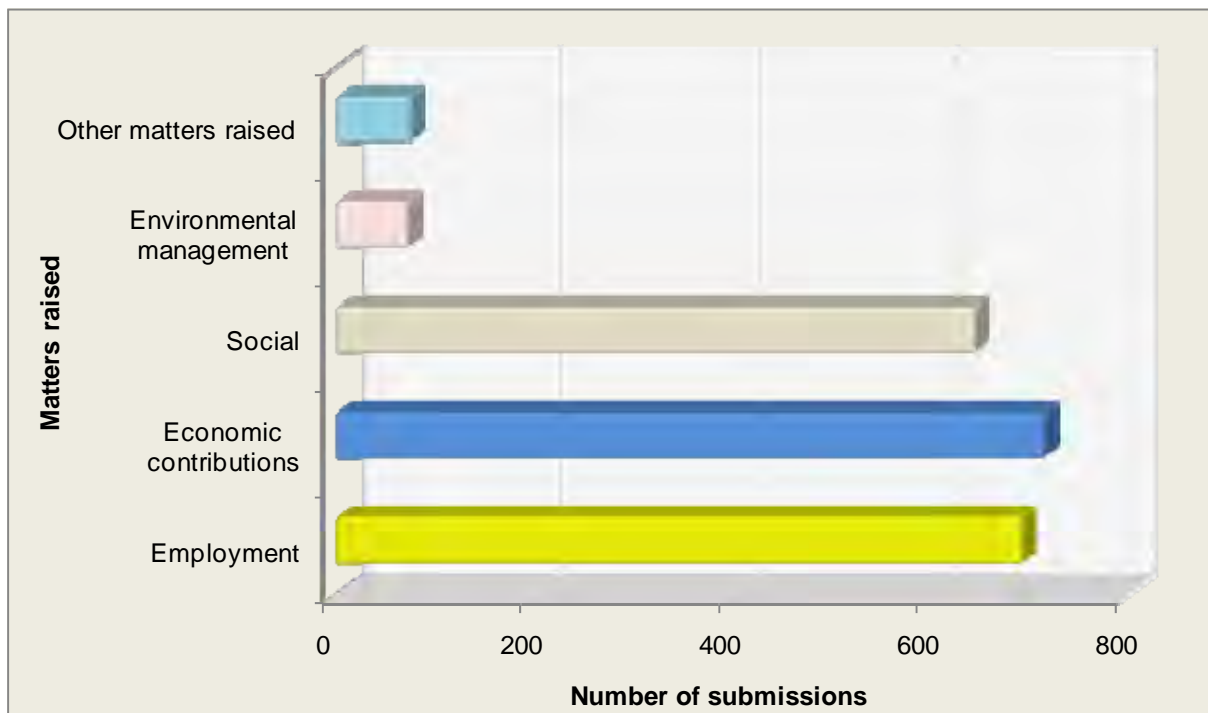


Figure 3.4 Matters raised in support

It is noted that more than one matter was often raised in a submissions. As shown, economic contributions (716 submissions) impacts were most commonly raised, followed by employment (693 submissions) and social, both the positive social impacts of the proposal proceeding and the negative social impacts of the proposal not proceeding. Analysis of topics raised within each matter is provided in Section 5.1.

3.3.3 Analysis of submissions in objection

As noted above, approximately 15 per cent of total submissions objected to the proposal. This is comprised of 277 submissions from individuals and 20 submissions from special interest groups. As noted in Section 3.3.1ii, approximately 49 per cent of objecting submissions were form letters.

Figure 3.5 provides a summary of technical matters raised in objecting submissions.

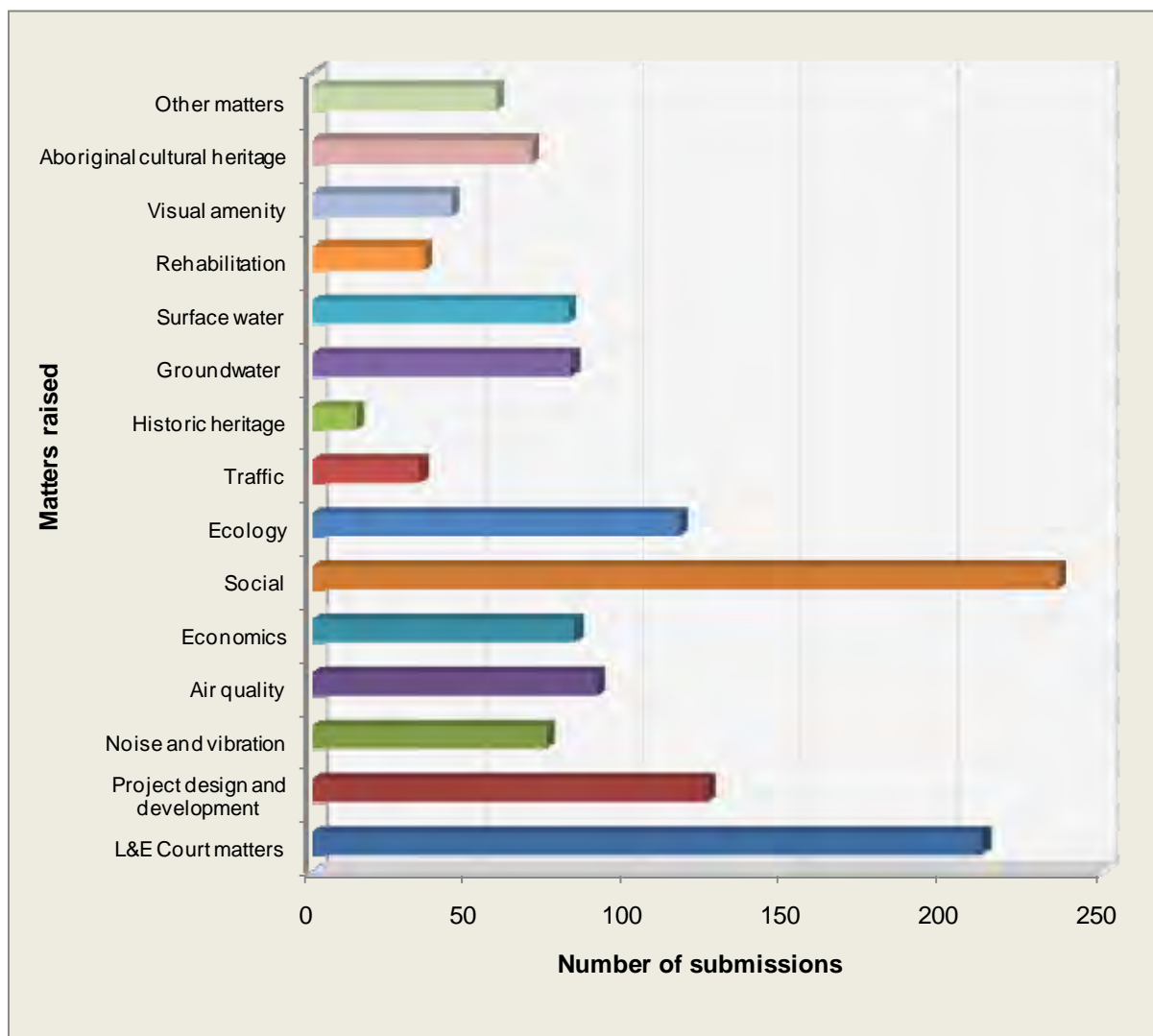


Figure 3.5 Matters raised in objection

As shown, social matters (236 submissions), L&E Court matters (212 submissions), ecology impacts (116 submissions), project design and development (125 submissions), air quality (90 submissions) and noise and vibration (74 submissions) were most commonly raised. Analysis of topics raised within each matter is provided where relevant in Chapter 6. It is noted that the vast majority of submissions regarding 'other matters' related to general objection of the proposal.

Chapter 4

Government submissions



Chapter 4 — Government submissions

- 4.1 Introduction
- 4.2 Office of Environment and Heritage
- 4.3 Environment Protection Authority
- 4.4 NSW Office of Water
- 4.5 Crown Lands
- 4.6 Department of Health
- 4.7 Agriculture NSW
- 4.8 Division of Resources and Energy
- 4.9 Heritage Council of NSW
- 4.10 Roads and Maritime Services
- 4.11 Singleton Council

4 Government submissions

4.1 Introduction

Singleton Council and nine government agency submissions (including interagencies) were received on the proposal. These submissions are summarised and addressed in this chapter.

Table 4.1 below provides an overview of the outcomes of these submissions. Of note, there were no objections to the proposal, subject to conditions.

Table 4.1 Summary of government agency submission outcomes

| Agency | Outcome |
|--|---------------------------------------|
| NSW Office of Environment and Heritage | No objection |
| Environment Protection Authority | No objection - conditions recommended |
| NSW Office of Water | No objection - conditions recommended |
| NSW Roads and Maritime | No objection - conditions recommended |
| Crown Lands | No objection - conditions recommended |
| Department of Health | No objection |
| Agriculture NSW | No objection |
| Division of Resources and Energy | No objection - conditions recommended |
| Heritage Council of NSW | No objection |
| Singleton Council | No objection |

4.2 Office of Environment and Heritage

The OEH submission raised no objection to the proposal. The submission considered the EIS with respect to ecology, Aboriginal cultural heritage and flooding. These matters are addressed in the sections below.

4.2.1 Ecology

The following matters regarding the ecology study (EIS Appendix H) were raised:

- BCAM assessment of the development footprint;
- indirect impacts;
- BBAM assessment of the proposed offset areas;
- offsetting the 'Green Offsets';
- mine rehabilitation performance; and
- re-establishment of WSW.

Points made regarding each matter are indented, with a response provided below each point.

i BCAM assessment of the development footprint

In regards to the percentage cover of native vegetation, within the 1,000 hectare (ha) circle OEH notes that a 'Before Certification' cover range percentage of 41-50% was used where in fact it should be in the 51-60% cover range...

The correct 'before certification' cover range was used in the ecology study.

Review of the native vegetation cover BCAM inputs within the 1,000ha circle was completed as part of the ecology study. It should be stated that the OEH reference to the 1,000ha assessment circle is a typographical error as the correct reference should be to a 3,000ha assessment circle, which is also denoted in Table 1 of the OEH submission.

This review considered recent high resolution aerial photography as well as areas approved to be cleared under existing approvals. OEH advised on 23 September 2014 that the known clearing of an existing approval can be taken into account when mapping the percentage native vegetation cover.

Based on this advice, revisions were made to the percentage native vegetation cover mapping to exclude areas of vegetation at the Site approved to be cleared by approvals granted in 1995 (DA 20/95) and 2003 (DA 300-9-2002-i). This resulted in a native vegetation cover of 1,439.6ha within the 3,000ha assessment circle.

Application of these revisions confirmed that the 'before certification' percentage cover is estimated at approximately 48 per cent and, accordingly, the range categorisation of 41 to 50 per cent was used. The 'after certification' percentage cover is estimated at approximately 33 per cent. The applicant supplied the electronic files with revised vegetation cover, inclusive of images demonstrating the revision of vegetation mapping based on the high resolution aerial photography to OEH in September 2014.

...OEH notes that a west-flowing stream occurs in the proposed development footprint. Based on the Strahler stream order system assessment of drainage on local 1:25,000-scale topographic maps this is a second order stream. This stream therefore qualifies as a 'Minor Creek' in accordance with the BCAM [methodology]...

Site investigations have confirmed that the stream referenced in the topographic maps does not include surface water bodies with only small drainage lines within the proposed 2014 disturbance area. Therefore, according to BCAM methodology, the stream is classified as a 'Minor Watercourse' rather than a 'Minor Creek'. This approach was agreed to by OEH on 15 July 2014.

The BioCertification Credit Calculator (BCCC) has been updated to incorporate the 'Minor Watercourse' and credits required for the proposal recalculated. The applicant supplied the electronic files to OEH on 5 September 2014.

In addition, OEH notes that no details were provided in the EIS on how the species credits were calculated for the Regent Honeyeater.

The Regent Honeyeater species credits were calculated using Equation 10 of the BCAM:

- Equation 10: $(H_{loss}/T_{gspp1}) \times 10$
 - H_{loss} (Area of habitat loss) = 459.21ha
 - T_{gspp1} (Tg value) = 0.375 (as per the value in the species profile in BioNet)

The above information as well as an expert report for the Regent Honeyeater (Debus 2009) was provided to OEH assessment officers on 15 July 2014 by the applicant. These calculations were required to be undertaken manually, as advised by OEH during the preparation of the EIS, rather than entered into the BCCC and displayed in the BCAM calculator reports in the EIS, due to the limitations of the tool. This approach was agreed with OEH.

ii Indirect impacts

OEH is of the opinion that [the proposal] would result in an intensification of indirect impacts to biodiversity above what that area is currently experiencing. Due to these potential indirect impacts measures to mitigate any negative indirect impacts to biodiversity offset areas from this, and any subsequent proposals should be provided.

Indirect impacts are addressed in Section 5.5 of the ecology study (EIS Appendix H). When comparing currently approved activities to the Proposal, the ratio of mining disturbance to rehabilitation decreases with time. Therefore, indirect impacts such as dust, noise and light will not intensify and over the long-term, the indirect impacts will decrease.

In regards to indirect impacts to perched aquifers beneath the WSW, Section 16.3.2 (v) of the EIS outlined that the water table formed at the base of the Warkworth Sands is perched and is not directly connected with the underlying Permian. Further, the Warkworth Sands does not occur as one large sand sheet, but many smaller isolated sheets, separated by areas where sand is not present. In between these sand sheets, clay based bedrock derived soils occur at the surface. The topography of the area also means that these separate sand sheets can be considered different and not interconnected hydrogeologic units. The northern boundary of the proposed 2014 disturbance area largely follows a natural division between the sand sheets (AGE 2011). Groundwater flow in the area to be disturbed by mining is predominantly to the west, whereas groundwater in the sand sheets outside the proposed 2014 disturbance area flows to north. This is shown in Figure 16.6 of the EIS.

iii BBAM assessment of the proposed offset areas

The EIS does not contain vegetation community descriptions for vegetation communities in the Southern Biodiversity Area that are not found also in the proposed development footprint (ie White Box Woodland, Yellow Box Woodland, Hunter Valley Vine Thicket, Hunter Lowlands Redgum Forest, River Red Gum Floodplain Woodland, Hunter Valley River Oak Forest or Regenerating Hunter Valley River Oak Forest). OEH requests that these descriptions are provided in the Response to Submission report.

The proponent needs to provide a report on the BBAM Calculation Results similar to the 'BCAM Calculation Results' given in Chapter 6 and also the 'Upper Hunter Strategic Assessment Biodiversity Report' of Appendix G Ecology Report in the EIS, but with the provision of additional details that demonstrates where all of the data run in the tool comes from, and how it was derived.

It should be noted that the EIS only provided an indicative amount of BCAM and BBAM credits. Since receiving the OEH submission, updated BBAM and BCAM calculations have been provided, and are presented in summary below in Tables 4.2 to 4.4.

Table 4.2 **Component 1 credit summary¹**

| | Impact credits (BCAM) | Offset | | Remaining |
|--------------|--------------------------|----------------------------|----------------------------|--------------|
| | | Land-based – SBA (BBAM) | Land-based – NBA (BBAM) | UHSA (BBAM) |
| Ecosystem | 3,059 | 427 | 1,897 | 735 |
| Species | 2,798 | 397 | 117 | 2,284 |
| Total | 5,857 | 824 | 2,014 | 3,019 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEH.

Table 4.3 **Component 2 credit summary¹**

| | Impact | Offset | Remaining |
|--------------|----------------|----------------------------|---------------|
| | Credits (BCAM) | Mine rehabilitation (BBAM) | UHSA (BBAM) |
| Ecosystem | 16,649 | 6,650 | 9,999 |
| Species | 22,132 | N/A | 22,132 |
| Total | 38,781 | 6,650 | 32,131 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEH.

Table 4.4 **Component 3 credit summary¹**

| | Impact | Offsets | | | Remaining |
|--------------|----------------|----------------------------|-------------------------|----------------------------|-------------------------|
| | Credits (BCAM) | Land-based – SBA (BBAM) | Land-based – NBA (BBAM) | Mine rehabilitation (BBAM) | Residual credits (BBAM) |
| Ecosystem | 11,992 | 6,515 | 1,452 | 4,654 | -629 |
| Species | 12,360 | 3,952 | 623 | N/A | 7,785 |
| Total | 24,352 | 10,467 | 2,075 | 4,654 | 7,156 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEH.

The remaining offsetting credits equivalent will be retired via the rules of UHSA. The rules allow either providing further land-based offset areas or contribution to the UHSA Fund.

Should approval be granted, WML will lodge a BioBanking agreement which will include the certified BBAM credit calculation of any land-based offset to OEH for its approval.

Clarification is sought as to whether the relatively large areas of cleared and farmed land are included in the Southern Biodiversity Area, particularly in its southern end near Bulga, are to be managed for conservation.

The relatively large areas of cleared farmed land are included in the SBA and will be managed for conservation.

A draft LOMP has also been developed. The LOMP establishes conservation objectives, key performance criteria and indicators for the SBA and NBA, as well as outlining conservation management actions and monitoring programmes that have been formulated based on the existing ecological condition of the SBA and NBA to achieve the conservation objectives.

As outlined in Section 4.3 of the LOMP, 72ha of exotic grassland will be re-established to increase the extent of the Ironbark communities and the adjoining Hunter Valley River Oak Forests in the southern part of the SBA that is intersected by Wollombi Brook.

iv Offsetting the 'Green offsets'

OEH understands that the offset component 3 is a proposed offset for the ca. 480 ha of 'Green Offsets' generated in consent DA 300-9-2002-i. OEH recommends that the Response to Submissions report includes separate maps of BCAM assessment components 2 and 3 to clearly differentiate between these components.

BCAM maps for Components 2 and 3 are produced below in Figures 4.1 and 4.2.

The EIS reassesses the original 2003 ecological impact and provides an alternative BOS (Component 3). Component 3 reassessed the original 2003 impact on native woodland and regrowth which equated to approximately 186ha, as outlined in the Green Offsets Strategy. The assessment of impact and offsetting uses contemporary standards and policies.

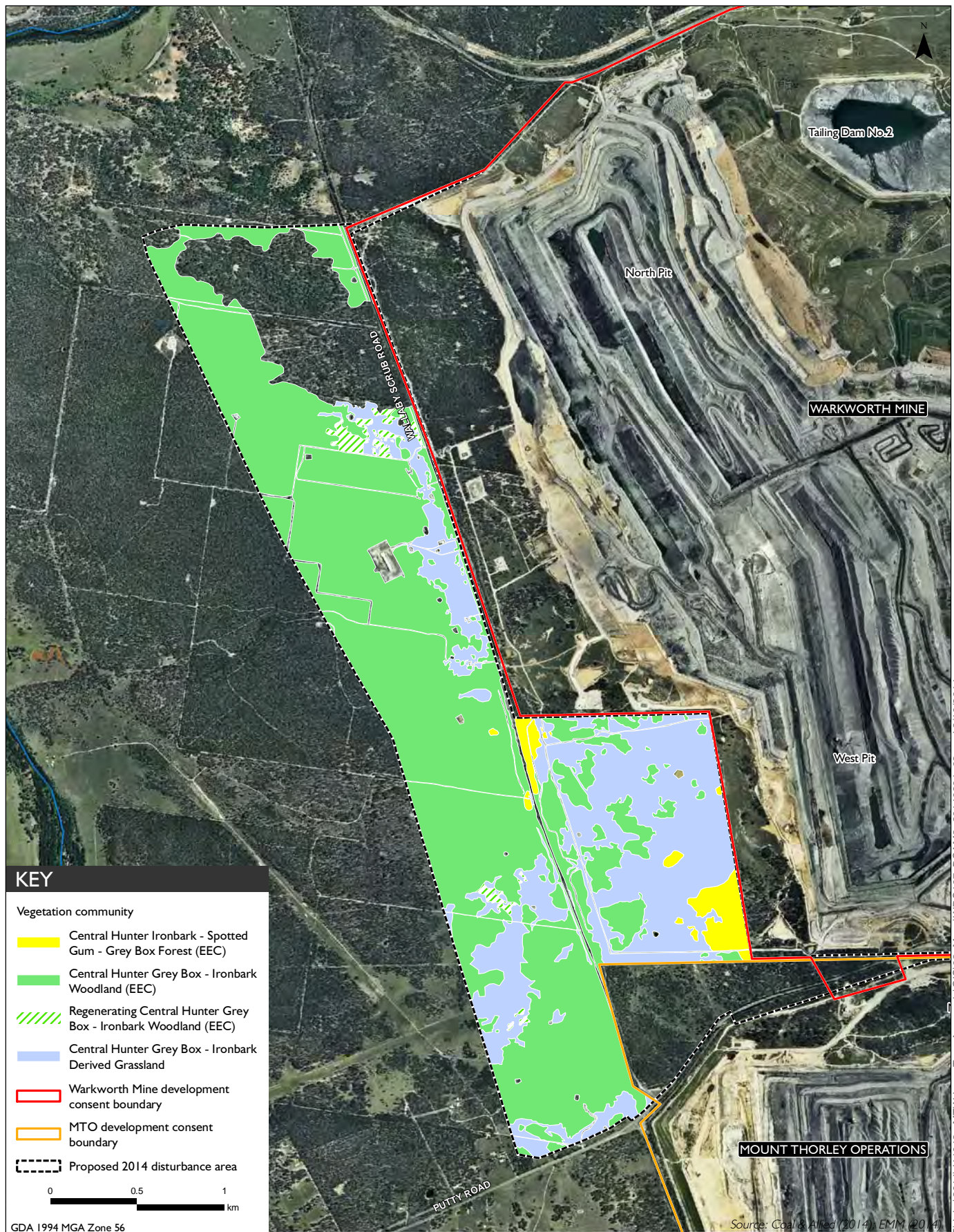
OEH typically does not support the development of offsets, for which a penalty may be applied, and thus there is a need to clearly understand how the offsetting of part of the Green Offsets package has been dealt with for the proposal.

The 2002 Green Offsets package was one of the first projects in NSW to provide an offset package. The primary reason for mining through the existing offset areas, including parts of the Non Disturbance Areas is that the resources underlying these offset areas which were previously uneconomic to mine are now fundamental to the continuation of Warkworth Mine.

The Department of Planning and Infrastructure (now DP&E) acknowledged in its Warkworth Extension 2010 assessment report that the design of the original offset was flawed, and should be replaced as soon as possible with a better offset that would not sterilise coal resources and could be safely protected in perpetuity.

The PAC, in its assessment report for the Warkworth Extension 2010, also noted the 'questionable condition and ecological value of much of the offset area' contained in the area.

Warkworth Mine has reassessed the Non-WSW vegetation impacted by the 2003 extension using contemporary assessment methodologies, BCAM, and provided a new offset strategy. A penalty is not appropriate under these circumstances and this has been confirmed by OEH subsequent to its submission.



BCAM component 2: Non-WSW/WSG vegetation impacted by the proposal

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Figure 4.1



BCAM component 3: Non-WSW/WSG vegetation impacted by the proposal

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Figure 4.2

v Mine rehabilitation performance

The number of ecosystem credits generated by rehabilitation is dependent upon the increase in site value scores on a piece of land. Such details have not been provided or justified in the EIS and OEHL is unable to comment on the veracity on the credits that such rehabilitation may generate for this project.

The site value scores were provided by Cumberland Ecology to OEHL in September 2014 for each of the 10 variables. The data confirmed that the site value scores were all zeroes as adopted in the ecology study.

The data indicates that there is no vegetation in the mined areas (ie due to mining activities) and represents the land prior to commencement of any rehabilitation management activities.

This approach was discussed with OEHL during the preparation of the ecology study and has been used on similar mining projects for mine rehabilitation.

vi Re-establishment of WSW

Rehabilitation of vegetation includes the risk that end outcomes may not be achieved...OEHL recommends that consideration is given to an independent audit of rehabilitation works done to date in and around Warkworth, particularly of Warkworth Sands Woodland to determine if these objectives may be achieved more efficiently.

For ease of understanding, WML describes rehabilitation works associated in the offset areas as re-establishment.

The draft LOMP and WSW Restoration Manual have already undertaken consideration of previous works to ensure the objectives of re-establishing WSW are achieved more efficiently.

WML is committed to the successful re-establishment of WSW in the areas mapped as WSG in the SBA and NBA. The flora species that make up the unique assemblage that is WSW are not in themselves unique and are found in various other ecosystems. Propagation of most species such as the keystone eucalyptus in the over storey and understorey species such as banksia, acacia and native grasses have been successfully germinated in the UNE greenhouse and elsewhere. The re-establishment areas are on in-situ sand deposits that once would have grown WSW. These sand deposits have the same water regimes, micro-organisms, climate, and in many cases component species already present.

Re-establishment would provide a large, fully functioning example of the EEC through the enhancement of areas that are currently in reasonable ecological condition, and by re-establishing the community in areas where it is currently degraded. A review of the WSW in Figure 5.2 of the ecology study (EIS Appendix H) and the historical aerials shown in Figure 4.3 (EIS Appendix H) indicate that the existing WSW was heavily cleared in the early 1960s. This comparison is shown in Figure 2.12 of this report. By 1979, the vegetation had undergone significant regeneration and is now considered a good quality example of this community. Modern restoration techniques when applied to similar areas will enhance the natural regeneration of the WSW providing a high likelihood of successfully re-establishing WSG to WSW.

Further, the proposed WSW re-establishment programme in the SBA and NBA builds on comprehensive scientific understanding of the vegetation community compiled with the assistance of the UNE and other regeneration practitioners.

A WSW Restoration Manual also sets out a process for tracking the recovery of WSW sites toward a reference state as a result of appropriate applied land management restoration interventions.

A draft LOMP has also been developed. The LOMP establishes conservation objectives, key performance criteria and indicators for the SBA and NBA, as well as outlining conservation management actions and monitoring programmes that have been formulated based on the existing ecological condition of the SBA and NBA to achieve the conservation objectives.

The WSW/WSG offset areas add to existing protected areas containing WSW and other extant vegetation in the locality. Together, these would form the largest known area of WSW under long-term conservation in the region. The proposal is likely to provide the best long-term viable community of WSW. Assessments also indicate that this will increase the long-term viability of WSW as a whole compared to its prospects of long-term viability of the proposal does not proceed.

Subsequent to the exhibition of the EIS, OEH has requested a commitment to secure additional supplementary measures in the form of land-based offsets of equal or greater biodiversity value to the 72ha of WSW impacted by the proposal.

In accordance with this request, WML has confirmed that it will use its best endeavours to secure and manage such lands with a spend of up to \$3million within 12 months of development consent. This would enable purchase and protection of such lands that are likely to be at a higher cost per hectare than those that can be secured under the UHSA.

For the reasons outlined above regarding the development of the re-establishment programme building on a considerable wealth of information gathered over an extended period of time, an independent audit of rehabilitation works done to date is not considered necessary.

OEH also recommends that consideration is given to wider access to monitoring data and at least some of the monitoring sites to enable independent verification of the results.

As per OEH's submission, further consideration has been given to wider access to monitoring data to enable independent verification of the results. This is reflected in the draft LOMP which states:

The monitoring programme comprises three aspects to capture environmental change at different scales:

- Landscape monitoring: to assess vegetation changes and habitat connectivity at the landscape scale in the long-term (7-10 years);
- Ecological monitoring: Vegetation and bird assemblage to quantify changes in vegetation structure, key fauna habitat features and bird assemblages in the medium-term (biennially); and
- Restoration monitoring: Rapid Condition Assessments to identify threats and inform management activities consistent with the adaptive management approach in the short-term (annually) and survival assessments to assess the performance of planting activities.

The sharing of information will be facilitated through the online Biodiversity Offsets Portal. This Portal has been designed to centralise and share information among authorised users and will include spatial data, an image library, reports and other non-spatial data as well as project management information such as stakeholder details and safety information. The Portal will greatly improve communication among stakeholders, transparency of management and monitoring activities and will ensure data security and integrity (for example, preventing risks of data loss due to staff turnover and minimising the risk of using superseded information). Ultimately, this will result in improved decision making and adaptive management that is responsive to seasonal conditions and current operational challenges.

Finally, OEH recommends consideration of a bond or some other contingency plan in the event that rehabilitation objectives are not achieved.

WML has considered the use of a bond for Component 1 in the event that re-establishment objectives are not achieved and this is outlined below.

Implementation bond

OEH identified that re-establishment of WSW on WSG has a risk that the re-establishment objectives may not be achieved. WML considers the risk of this occurring as being very low but recognises that demonstrable results for re-establishment of WSW need to be provided within a reasonable timeframe.

WML commits to demonstrating that WSW will be on a trajectory towards a reference state as a result of appropriate applied land management restoration interventions within 15 years from approval. WML proposes to provide an upfront implementation bond of \$1million to OEH, as security that the expected results will be achieved. It is envisaged that this bond will be held by Government in the form of a bank guarantee, which can be drawn upon if results are not demonstrated. This implementation bond is in addition to the conservation bond which is included in contemporary project approvals.

Calculation of \$1million for the implantation bond was based on the same rationale as calculation the contribution to the SOS programme, as outlined above in Section 2.4.5(iv). The \$1million is equivalent to retiring the entire proposed impact credit of WSW.

If the 15 year targets are not met, the proposed implementation bond does not remove the requirement to deliver the WSW re-establishment programme and WML will continue to meet its obligations under any development consent. However, this bond provides WML an incentive to continually commit resources to delivering WSW in a timely manner.

The monitoring of the trajectory of re-establishment will be reported in the annual report. The annual reports will be a critical tool to review re-establishment performance and adapt conservation management strategies. The reports will include a summary of monitoring data and management highlights in the land-based offset areas and the outcome of those actions, including identifying any need for improved management. The Annual reports will be prepared and submitted to the Commonwealth Department of the Environment and DP&E (as part of the Annual Environmental Review).

As described above, the sharing of information will be facilitated through the online Biodiversity Offsets Portal. This portal has been designed to centralise and share information among authorised users and will include spatial data, an image library, reports and other non-spatial data as well as project management information such as stakeholder details and safety information. The Portal will greatly improve communication among stakeholders, transparency of management and monitoring activities and will ensure data security and integrity (for example, preventing risks of data loss due to staff turnover and minimising the risk of using superseded information). Ultimately, this will result in improved decision making and adaptive management that is responsive to seasonal conditions and current operational challenges.

The annual reports and Biodiversity Offsets Portal will provide OEH with a process to monitor and regulate the annual performance of the re-establishment of WSW. This initiative provides an incentive for WML to remain diligent to the re-establishment of WSW whilst providing the relevant stakeholders surety of results.

4.2.2 Aboriginal cultural heritage

The OEH submission considered the following matters relating to the Aboriginal cultural heritage assessment:

- provision of an Aboriginal cultural heritage conservation area which will be managed by Coal & Allied in collaboration with the Coal & Allied Aboriginal Cultural Heritage Working Group (CHWG);
- consultation requirements; and
- management commitments.

i Aboriginal cultural heritage conservation area

OEH strongly supports the proposal to ultimately develop a cultural heritage management plan accord between Coal & Allied and the Aboriginal community that could deliver secure management of important cultural places, as well as a balance of outcomes that could deliver inter-generational equity and enhance the cultural and social strength and cohesion of the Aboriginal community in the Upper Hunter Valley.

OEH strongly supports such proposals and co-management initiatives but cannot make any informed comment until such conservation areas are established and access to resourcing is defined.

With respect to the Aboriginal cultural heritage conservation areas initiative it is noted that consultation with the CHWG has been ongoing since 2009, and management principles have been jointly developed along with a draft Plan of Management for the WBACHCA for review by the CHWG. Consultation with OEH was conducted at that time on the concept for Aboriginal cultural heritage conservation areas and on the provisions and mechanisms/timeframes with respect to the long-term protection of these lands under a Conservation Agreement (section 69 of the *National Parks and Wildlife Act 1974*) with OEH. These considerations were directly relevant to and considered in the development of the draft Plan of Management for the WBACHCA developed at the time in compliance with the conditions of consent for the now disapproved Warkworth Extension 2010 (PA 09_0202).

Coal & Allied values the continued contribution of OEH as a key stakeholder in the consultation process during the establishment of both Aboriginal cultural heritage conservation areas and the development of their associated management plans. Coal & Allied will continue to engage with OEH on the progress made towards developing the Aboriginal cultural heritage conservation areas initiative.

Coal & Allied also reaffirms its previous invitations to OEH to directly participate in CHWG meetings and the CHWG Conservation Areas Steering Group meetings as convened to discuss these matters. Coal & Allied will continue to provide OEH with regular updates on the outcomes of consultation and provide draft management plans and other relevant documentation for OEH review and comment.

ii Consultation requirements

OEH notes that there has not been any formal or informal opposition to the proposal expressed by any RAP's or CHWG stakeholders...OEH considers that all reasonable attempts have been made to consult with Mr Franks regarding this proposal and that as long as consultation is maintained, the consultation process to date has been adequate and reasonable.

The *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (ACHCRP - OEH 2010) establishes a framework to guide applicants in implementing an effective Aboriginal community consultation process for Aboriginal cultural heritage impact assessments, primarily for assessment of Aboriginal Heritage Impact Permit applications. Although the outcomes, and therefore necessarily the discussions required with the Aboriginal community, differ for the EIS process, Coal & Allied has aligned its Aboriginal community consultation for the proposal to comply with the ACHCRP process, as detailed in the Aboriginal cultural heritage study, notably Sections 3.3, 3.4 and Appendix 1.

Coal & Allied welcomes OEH's comments in support of the Aboriginal community consultation approach undertaken for this assessment, specifically noting that that no formal or informal opposition to the management measures proposed in the assessment had been received by OEH from any Registered Aboriginal Party prior to the public exhibition. Furthermore, it is noted that OEH acknowledges and supports Coal & Allied's approach in affording the CHWG the opportunity to consider the impacts and management of Aboriginal cultural heritage at a landscape level leading to a focus on the long-term management of a range of significant Aboriginal cultural heritage places and areas of high cultural significance within the broader regional context.

iii Management commitments

OEH strongly supports all the [above] management commitments proposed with respect to Aboriginal cultural heritage for the proposed Warkworth Continuation Project 2014. OEH has no further comments or requirements for Aboriginal cultural heritage within the extension footprint.

OEH's response is noted.

4.2.3 Flooding

The OEH submission considered the EIS with respect to floodplain management. Specifically, the OEH requested an assessment of the probable maximum flood (PMF, or Q100) and potential effects on the existing levee at MTO across Salt Pan Creek.

The existing levee associated with Salt Pan Creek is adjacent to the south-west corner of MTO and has been integrated into the establishment of a larger (and higher) visual bund along the eastern side of Charlton Road. The potential flooding of the Wollombi Brook and its interactions with this levee via Salt Pan Creek will not impact Warkworth Mine. Irrespective of this, the levee is approximately 5m above the Q100 level.

The submission states that OEH is currently working with Singleton Council on the Wollombi Brook Flood Study, which extends from Paynes Crossing to Warkworth. Should these investigations indicate that the PMF may be higher than currently determined the applicant will review whether the levee should be raised for the remaining duration of the activities occurring at MTO, subject to approval of the MTO proposal, in consultation with OEH.

4.3 Environment Protection Authority

The EPA submission raised no objections to the proposal. The submission considered the EIS with respect to noise and vibration, air quality and surface water. Matters raised in the submission are summarised and addressed in the sections below.

4.3.1 Noise and vibration

Attachment 3 of the EPA submission raised a number of matters relating to the noise and vibration study, provided in EIS Appendix F. These matters are outlined and addressed below.

i Low frequency noise

The EPA submission raised low frequency noise (LFN), specifically in regard to the additional LFN analysis it had completed since its letter to DP&E in December 2010 that is reproduced in Appendix G of the noise and vibration study. In its submission, the EPA states:

DECCW's letter to the Department of Planning and Environment (Planning) of December 2010 is mentioned in relation to the Ombudsman's letter quoted in the NVS. In the letter to Planning, DECCW stated that it agreed with Planning that the INP Low Frequency Noise (LFN) modification factor would be applied except where it is shown that it results in perverse outcomes. For example, where the INP method results in a noise sensitive receiver further from a noise source being eligible for acquisition when another receiver closer to the source and receiving higher dBA noise levels is not.

Since the letter EPA has done further analysis and considers that situations could arise where the C – A differential is 15dB or more but the assessment criteria proposed by the UK Department of Environment, Food and Rural Affairs (DEFRA) indicates that no LFN impact occurs. Section 10.9.2 of the NVS presents the results of some noise measurements outside and inside a dwelling that show that the DEFRA criteria are not exceeded. However the C - A differential during the measurements was not 15 or more, therefore the example in the NVS does not demonstrate that the DEFRA criteria are not exceeded when the INP criterion is exceeded. EPA therefore proposes to apply the methodology for LFN in Table 4.1 of the INP unless further information is provided.

The INP defines LFN as noise with major components in the range 20Hz to 250Hz. The majority of the noise energy of mining noise sources is at frequencies up to and including 630Hz based on EMM's experience and available published monitoring data. The amount of noise energy at or below 250Hz needs to be significant in relative terms to other frequencies for LFN to become prominent. Of note, human hearing diminishes with reducing frequency and, therefore, there needs to be more energy at the lower frequencies for it to be perceptible.

The INP definition of LFN does not presently align with the community's perception of LFN. LFN is often perceived as noise energy that is heard or discerned of 'lower' frequency than the surrounding noise climate. For example, comparison may be made between domestic or natural sounds and mining noise, with the latter more 'obvious' and of lower frequency content than the non-mining sounds. This point of view is valid and demonstrated through observations by EMM acoustic specialists at Warkworth Mine and other mining operations. That is, the community's definition of LFN obtained via observation does not necessarily align with the INP's technical definition.

Wind induced LFN is very common in the natural environment and EMM has measured dB(C) minus dB(A) level differences that are greater than the INP's 15dB criteria for example even though mining noise was not audible or present.

Noise generating sources that contain relatively elevated noise energy at frequencies of 250Hz or lower were reviewed to address LFN in a technical sense for the proposal. The primary sources are pumps and centrifuges within the CPP on the eastern side of Warkworth Mine. No changes to the CPP are proposed under the proposal and, therefore, the main source of LFN will remain unchanged. No new plant or equipment will be required to support the proposal. Further, the proposed noise suppression of plant will include reductions in the lower frequencies via 'in-service' target noise level specifications that include dB(A) and dB(L) (or linear) parameters.

Attenuation of noise with distance is greater and far more effective for high frequency noise than it is for LFN due to atmospheric absorption. At significant distance from a noise source (such as private residences near Warkworth Mine) this often results in large differentials between LA_{eq} (or the 'A-weight' energy average noise used for compliance limits - simulating human hearing) and LC_{eq} (or the 'C-weighted' energy average, which is an almost unfiltered metric and hence depicts low frequency content in an almost raw form). The INP requires the modifying factor to be applied in these instances, irrespective of actual low frequency affectation.

As a consequence of the aforementioned effect of noise attenuation due to distance for LFN, the application of the modifying factor as currently described in the INP does not achieve the intended outcome for open cut mines in semi-rural and rural settings. The current threshold for LFN in the INP of dB(C) minus dB(A) of 15 dB is one of the more stringent thresholds prescribed in jurisdictions worldwide.

The German standard DIN45680 (1997) for instance uses preliminary measurement where the dB(A) and dB(C) difference is found to be greater than 20dB, then further investigation using a nominated reference curve is to be undertaken. This preliminary measurement criterion is less stringent than the 15dB threshold prescribed in the INP.

Notwithstanding this, despite the INP standard for LFN not being applied to existing operations, the EPA has advised in its submission that it will apply to the proposal, unless further information is provided.

An assessment of LFN from the proposal has been undertaken as part of this report using the noise model developed for the EIS to quantify the L_{eq} dB(C) minus L_{eq} dB(A) levels. This was done for a representative set of residential locations in and around Bulga as shown in Figure 4.3 and therefore covering a wide expanse of that community. The results are shown in Table 4.5 for proposed Year 9 (or nominally 2023) which is generally worst case for Bulga residences.

Predicted L_{eq} dB(C) minus L_{eq} dB(A) are less than 15dB and, therefore, demonstrate the INP penalty is not expected to apply during times when mine noise is predicted to be at its highest (ie worst case weather). The results reaffirm the predicted noise levels in the EIS for these areas in accordance with the INP and that the LFN penalty does not apply to the proposal. Since the results satisfy the strict INP LFN criteria, criteria for other methods of assessing LFN such as Broner and DEFRA would also be met.

Table 4.5 Modelled indicative Year 9 dBC and dBA mine noise levels - Bulga area

| Location ID | dB(A) | dB(C) | Difference, dB | INP criteria, dB |
|-------------|-------|-------|----------------|------------------|
| 1 | 35 | 48 | 14 | 15 |
| 14 | 38 | 50 | 12 | 15 |
| 19 | 40 | 51 | 11 | 15 |
| 237 | 38 | 51 | 13 | 15 |
| 65 | 39 | 51 | 11 | 15 |
| 87 | 40 | 50 | 11 | 15 |

Notes: 1. Note that quoted levels are rounded to the nearest whole number.

Another consideration in assessing LFN is that measurements need to quantify dB(C) levels from the mine only in order to assess potential impacts. That is, the mine is not responsible for LFN outside of its control. This is often very difficult in practice, particularly at large distances because of influences from the ambient environment (for example, wind or road vehicles), leading to the C minus A INP approach being very impractical and unrepresentative of a mine's contribution. Other complications in the subject case are delineating LFN from neighbouring mines.

Further, the 'in-service' target noise levels presented in the EIS (Table 10.3 of the noise and vibration study) include both a linear (dB(L)) as well as a weighted (dB(A)) target to ensure attenuation does address LFN. Having these two targets means the attenuation cannot focus on the dB(A) while ignoring dB(L), which is important in reducing LFN.

To demonstrate this, the attenuation package used on trucks, for example, have been tested to show the improvement (at source) of the differential between dB(C) and dB(A).

Table 4.6 presents the test results from a truck (CAT795) at Warkworth Mine with noise attenuation package applied. From this test data, it is shown that attenuated trucks under dynamic conditions have a smaller differential between C and A weighted noise. This at source improvement will also hold true at distance and mean a better outcome for the community with respect to LFN. Given that truck noise is one of the dominant off site sources of noise, these improvements will be realised off site in the most part.

It is acknowledged in reported compliance monitoring data that on some occasions existing site noise does not meet the INP's 15dB LFN rule. The noise profile of unattenuated plant is one factor for this.

Table 4.6 CAT795 at source noise emission, dB

| | dB(C) | dB(A) | dB(C) minus dB(A) |
|------------------|-------|-------|-------------------|
| Dynamic, forward | | | |
| Baseline | 132 | 122 | 10 |
| Attenuated | 123 | 115 | 8 |

Source: Global Acoustics Reports:

"Mount Thorley Mount Thorley Warkworth - Sound Power Survey September 2013", Global Acoustics, 2012.

Caterpillar 795FXQ AC Mt Thorley Warkworth "Caterpillar 795FXQ AC Mt Thorley Warkworth Unit 434 - Sound power and operator noise exposure assessment", Global Acoustics, 2014.



INP LFN assessment locations
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Figure 4.3

ii Urban/industrial interface classification

The EPA noted that the noise and vibration study did not discuss that the 'urban/industrial interface' category may be more appropriately categorised as 'rural/industrial interface' as per the INP Application Note.

The urban/industrial interface is defined in the INP (Section 2.2.1) as follows, and was considered the most appropriate for the assessment locations located at Warkworth village and Mount Thorley:

an area defined as for 'urban' above that is in close proximity to industrial premises and that extends out to a point where the existing industrial noise from the source has fallen by 5 dB. Beyond this region the amenity criteria for the 'urban' category applies. This category may be used only for existing situations. (See example of how this category is used in Appendix A, Section A5).

The rural/industrial interface category is not discussed or defined in the INP. The INP Application Notes are only found on the EPA's website and provide further guidance on 'When to apply the urban/industrial interface amenity category'. Again, there is no specific definition of rural/industrial interface in the Application Notes.

The 'rural/industrial interface' category could be appropriate for the assessment locations of Warkworth village and those adjacent the Mount Thorley Industrial Estate.

Definitions are not provided specific to rural/industrial interface. EMM's interpretation of the EPA's submission is that by adopting a rural/industrial interface category, a 5dB stricter amenity criteria is derived for Warkworth village and Mount Thorley residences only, and would be 55dB(A), 50dB(A) and 45dB(A) for the daytime, evening and night periods, respectively. For other properties the strictest INP amenity category was adopted in the EIS (ie rural residences).

As outlined in Section 9.1 of the noise and vibration study, the INP requires that both the amenity and intrusive criteria are satisfied and the more limiting becomes the project specific noise level (PSNL). Applying the stricter rural/industrial amenity criteria referenced above to Warkworth village and Mount Thorley residences does not alter the PSNL for these properties. The intrusive criteria for these locations are lower and, therefore, define the PSNL. Hence, the assessment of potential noise impacts from the proposal does not change from that outlined in Section 9.1 of the noise and vibration study irrespective of either the rural/industrial or urban/industrial interface being applied. This is noted by the EPA at Attachment 3 Item 3.

iii Amenity

The EPA noted that the noise and vibration study suggested that Warkworth Mine's noise contribution should be included when deriving the amenity criteria. In its submission, the EPA states:

The NVS references 2.2.4 of the INP in relation to amenity criteria and seems to be suggesting that Warkworth's noise contribution should be included when deriving the amenity criteria. Appendix A of the INP appears to indicate that noise from an existing premises should not be included when deriving amenity criteria. However, EPA notes that use of the intrusive criteria is appropriate as the PSNL would not change if this was corrected.

Whether Warkworth Mine's existing noise is or is not included as part of the existing industrial noise for the purposes of deriving amenity criteria is inconsequential to the impact assessment. This is because the holistic approach of having an overall cap on amenity noise (for example, 40dB(A) at night) does not change and noise from all sites combined need to satisfy this target.

The EIS noise and vibration study does not rely on Warkworth Mine's existing noise contribution for derivation of amenity criteria. A holistic approach is adopted for amenity and cumulative noise as described in Section 9.1.2 of the EIS noise and vibration study.

As outlined in Section 9.1 of the noise and vibration study, the INP requires that both the amenity and intrusive criteria are satisfied and the more limiting becomes the PSNL. As noted by the EPA, the intrusive criteria are appropriate as the PSNL would not change. Hence, the assessment of potential noise impacts from the proposal does not change from that outlined in Section 9.1 of the EIS. The outcome of the assessment is unchanged as detailed and demonstrated in Section 9.1.2, Table 9.2 and Section 11 of the noise and vibration study.

iv Modelling algorithm

The EPA noted that the algorithm used in the noise modelling was not provided in the noise and vibration study. In its submission, the EPA states:

The prediction algorithm (eg CONCAWE, ISO9613) that was utilised for the noise modelling within the Bruel and Kjaer Predictor software is not stated. Most current algorithms base their predictions for atmospheric inversion conditions in terms of Stability Categories. The predictions in the NVS describe atmospheric inversions in terms of degrees C per 100m and it's not clear what, if any, conversion was undertaken. However, EPA considers that the prediction method and results appear reasonable and proposes to set the predicted values as noise limits, which it will be the responsibility of the proponent to meet.

The modelling algorithm adopted was Environmental Noise Model (ENM) (via B&K Predictor software) and is known to conservatively predict noise levels during adverse weather conditions as described in Section 10.2 of the noise and vibration study. The temperature inversion value used was 3.9 degrees Celsius per 100m (refer to in Section 10.4.1 of noise and vibration study), being the upper end of Pasquill Stability Class F, which produces the worst case predictions.

v Frequency occurrence of F and G stability categories

The EPA noted that the reported frequency (8 per cent) of F and G stability categories for winter nights was low. However, the EPA also noted that the noise and vibration study assessed impacts for inversion conditions.

The modelling adopted a conservative approach of assessing noise using the highest temperature gradient value within F stability category (3.9 degrees Celsius per 100m) even though the test for its prevalence was low. This adds further conservatism to the results presented in the noise and vibration study.

4.3.2 Air quality

Attachment 2 of the EPA submission raised matters regarding the air quality and greenhouse gas study. These are addressed in the sections below.

i Modelled scenarios

The EPA noted that details of selection of the future years modelled were not provided in the air quality and greenhouse gas study. In its submission, the EPA states:

EPA recommends that the proponent provides details of the selection process for the future years modelled including justification for how the selected modelling scenarios represent potential worst-case. Section 2.4.2 of the EIS provides the justification of which years were chosen for modelling. The modelled indicative mine plan scenarios were selected to show the progression of the mine over time and to ensure that the maximum likely impacts at the receivers to the east, north and west were captured in the assessment.

To achieve these objectives, the study considered three indicative mine plan years; namely, Year 3, 9 and 14. Beyond the indicative Year 14 mine plan, the mining footprint would not extend any further west and would only deepen, which would shield plant from assessment locations more than in any previous years. Therefore, dust predictions would not exceed those modelled in selected scenarios.

The indicative Year 3 mine plan represents the initial stage of the proposal when activity has potential to generate the highest impacts at the eastward receptors resulting from the overburden material emplacement behind the extraction area as it progresses to the west.

The indicative Year 9 mine plan represents the alignment of the mine pit along the prevailing wind direction most likely to impact receivers to the north in the vicinity of Warkworth village.

The indicative Year 14 mine plan represents the most westward position (maximum surface area of disturbance) of the mine and is nearest to the westward receivers. Given this, it provides the worst case scenario for westward receivers.

Further details on the mine plan scenarios selected for assessment are provided in Section 5 and Figure 5.1 of the air quality and greenhouse gas study.

ii 24-hour PM₁₀ cumulative assessment

Several matters regarding the 24-hour PM₁₀ cumulative assessment were raised in the EPA submission. These are addressed in the following sub-sections.

a. Accounting for 2012 impacts

The EPA noted that details of how 2012 impacts were accounted for were not provided in the air quality and greenhouse gas study. In its submission, the EPA states:

It is unclear from the tables in Appendix F of the Warkworth AQIA how 2012 impacts have been accounted for in the cumulative assessment. There appears to be inconsistencies in the methodology to account for predicted 2012 MTW results.... In the table below from Appendix F, the predicted increment decreases in the future mining years at the Bulga monitor on 7 October 2012 (one of the days where the top ten highest measured data was recorded). However, a review of the top ten highest predicted increment on 14 June 2012 shows [sic] increases in the future years.

| Year | Date | Measured (µg/m ³) | Predicted (µg/m ³) | Total (µg/m ³) |
|---------|-----------|-------------------------------|--|----------------------------|
| Year 3 | 7/10/2012 | 40.9 | -4.1 | 36.8 |
| Year 9 | 7/10/2012 | 40.9 | -6.0 | 34.9 |
| Year 14 | 7/10/2012 | 40.9 | -10.7 | 30.1 |
| Year | Date | Measured (µg/m ³) | Highest Predicted (µg/m ³) | Total (µg/m ³) |
| Year 3 | 14/6/2012 | ND | 5.2 | 5.2 |
| Year 9 | 14/6/2012 | ND | 14.8 | 14.8 |
| Year 14 | 14/6/2012 | ND | 18.9 | 18.9 |

On certain days where the model may have predicted higher impacts for the future mining years compared to 2012 (or vice versa if 2012 results were subtracted from future predicted results), the predicted increment was a negative value. As a result of the negative predicted increments, there are days where the cumulative assessment resulted in lower concentrations than the original measured data...

...The Proponent has not provided enough information and justification in the 24-hour PM₁₀ cumulative assessment to determine if the potential worst-case impacts have been assessed.

EPA recommends that the proponent provides details of the 2012 emissions inventory and the methodology to account for 2012 impacts in the cumulative assessment. The cumulative assessment should be conservative enough to take into consideration worst case conditions that are likely to arise in the future mining years. Therefore, the proponent should provide justification for the methodology used in the cumulative assessment and reasoning that the potential worst-case impacts on nearby sensitive receptors have been assessed.

The above matters have been addressed under the following sub-sections.

Justification for the methodology used in the cumulative assessment

The cumulative assessment was conducted in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (the Approved Methods). The 2012 emissions inventory used in the cumulative assessment is detailed in Appendix D of this report. The emissions inventory was developed based on information provided in the *Mount Thorley Warkworth 2012 Annual Review* and additional information provided by the applicant.

To determine the cumulative impacts, the incremental impact was modelled for future years and added to the measured background dust level for each hour of the day. The incremental impact, which arises due to the project in isolation, was determined by the difference between the modelled 2012 level (existing incremental impact of the project in isolation) and the modelled future level due to the emissions of the project in isolation.

To account for background levels when assessing total (cumulative) 24-hour average PM₁₀ impacts, only incremental levels were added to the total measured ambient dust levels (per the NSW EPA contemporaneous assessment guidance). Background dust levels were estimated for the cumulative assessment by modelling the past (known) mining activities (including MTO, Bulga, Wambo, Hunter Valley Operations and Rix's Creek coal mines) during January 2012 to December 2012. The modelled data was compared with the actual measured data from the corresponding monitoring stations over this period, to identify the contribution of non-modelled dust sources. The resultant future predicted values model the worse-case impacts on nearby sensitive receptors.

Inconsistencies in the methodology to account for predicted 2012 MTW results

The EPA submission incorrectly asserts that the predicted impact will be higher on every single day, such as on 7 October 2012. As shown in Figure 4.4, the winds on this day did not blow from the Warkworth Mine towards the Bulga monitor, but blew from the east-southeast to the south-southwest (ie from the MTO area and locations further south to south southwest towards the monitor).

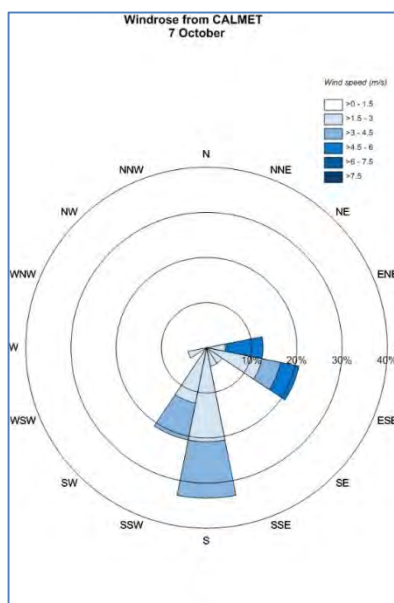


Figure 4.4 Windrose for 7 October 2012

The EPA submission asserts that ‘on certain days where the model may have predicted higher impacts for the future mining years compared to 2012...the predicted increment was a negative value.’ This is not substantiated by the technical assessment in the EIS (Appendix G).

It is then reasonable to expect that as the Warkworth Mine progresses westwards its incremental impacts, on average, increase to the west, however it is incorrect to expect that the predicted impact will be higher on every single day such as on 7 October 2012.

On different days the wind patterns will be different. Sources of mine dust in various years will also be in different locations (and as in this case, some of these sources will be in locations that in the future are not upwind on a given modelling day) and the short-term results will therefore be different due to these factors.

It is noted that MTO mining activities cease in future years and that MTO does not progress westward, however Warkworth Mine activities will occur on the land occupied by MTO (ie Warkworth Mine trucks traverse the MTO site carrying ROM coal to the MTO CPP and trucks carrying overburden for emplacement at MTO). ROM coal haulage occurs to the east of MTO land, and is concentrated around the CPP. There is also mining activity in Abbey Green near the MTO CPP which is also included in the analysis. The future activity in MTO occurs predominantly in its eastern part and at a lower rate than the current activity which predominantly occurs in the western part (ie Lodgers Pit).

Thus there is no reason to expect that increased future impacts would occur on a modelling day such as 7 October 2012 when winds were not from Warkworth Mine but were from the direction of MTO land on which there is reduced activity and reduced dust generation in future years.

Under conditions such as those experienced on 7 October 2012, it is reasonable to expect that the incremental impacts of future operations would reduce as a result of the operation winding down and the extent of rehabilitated area increasing.

It is noted that the full tables for the contemporaneous 24-hour cumulative impact assessment were not correctly transcribed into the report, which may have led to some confusion. The full data are presented in Appendix D1 of this report.

As a result, there are no 'inconsistencies in the methodology to account for predicted 2012 MTW results' and the approach is explicitly as per the Approved Methods, as described in the air quality and greenhouse gas study. The worked example at Section 11.2 of the Approved Methods has been followed. Background levels and incremental impact levels applied in the air quality study are as defined in the glossary of the Approved Methods. Potential worst-case impacts on nearby sensitive receptors have been assessed.

b. Representative assessment locations in 24-hour average PM₁₀ cumulative assessment

The EPA noted that the nearby TEOMs were used to represent clusters of sensitive receptors, rather than using the closest receptors in the air quality and greenhouse gas study. In its submission, the EPA states:

Predicted results have been extracted at the nearby tapered element oscillating microbalances (TEOMs) to represent clusters of sensitive receptors rather than directly at the sensitive receptors. The reasoning provided was that the TEOMs are typically located closer to mining activities and therefore are likely to experience greater impacts.

Whilst the majority of the residences are located further from the MTW mining operations compared to the TEOMs, there are a few residences located closer to mining operations than the TEOMs assessed. An example of private receptors located close to mining operations includes receptors 81,102,118,126,259, 262 and 264. Hence, the potential impacts at these residences would be higher than those of the nearby TEOMs.

In accordance with the Approved Methods, the 24-hour average PM₁₀ cumulative assessment should be undertaken at the nearest existing or future off-site sensitive receptor. EPA recommends that additional 24-hour average PM₁₀ cumulative analysis should be completed at the sensitive receptors close to mining operations.

The 24-hour average PM₁₀ cumulative assessment in the air quality and greenhouse gas study was undertaken in accordance with the Approved Methods and, as demonstrated below, additional analysis is not required.

The Approved Methods use a general hierarchy to assess cumulative impacts on receptors. The Level 1 methods assess the nearest (or most exposed) receptor with the highest measured background level which tends to overstate impacts. If impacts do arise, a more detailed Level 2 methods is required and needs to encompass all likely impacted receptors.

The assessment of the proposal used the more detailed Level 2 assessment which consists of adding each individual dispersion model prediction to the corresponding measured background concentration for the contemporaneous modelling period.

Literal interpretation of the Approved Methods is not always appropriate. The EPA generally recognises the accepted practice to use a Level 2 assessment in certain circumstances, for example it is understood that the nearest receptor may not be the most affected, as is the case with the proposal.

Using this approach, all potentially affected assessment locations (81, 102, 118, 126, 259, 262 and 264) referenced in the EPA submission were considered, but were excluded from further explicit analysis given they would not experience materially different impacts to those already present in the air quality and greenhouse gas study.

For example, assessment location 81 does not experience greater incremental impacts than predicted at the monitor nearby, as can be seen by examination of the incremental impact isopleths.

Assessment location 102 is the Warkworth Hall and receptor 264 is also in Warkworth village. Both are significantly impacted (for example, the incremental impact exceeds criteria) and are afforded acquisition rights. These assessment locations are identified in Table 9.7 of the air quality and greenhouse gas study with assessment location 102 shown in orange highlighting. Hence no further detailed assessment was warranted.

Assessment locations 126 and 262 are close together, with the Mount Thorley Industrial Estate (MTIE) monitor considered the most representative for this area. As can be seen in the isopleth figures they do not experience greater incremental impacts than predicted at the monitor location. These assessment locations are east of the westwardly progressing Warkworth Mine and experience decreasing future impacts. The assessment locations are not impacted in the most affected year, and are in an area that generally would not be impacted from the proposal.

Assessment locations 118 and 259 are also close together and are to the north. Similar to the previous example, impacts are not predicted in the worst case year and they would experience decreasing impacts in future years. There is a small separation between these receptors and the monitor, and the area is remote from both the mine and locations of high impact, thus the difference in the predicted impacts between the receptor and monitor are small and cannot affect the conclusions.

To ensure absolute clarity, the assessment locations listed in EPA's submission have been included in the tabled results in Appendix D2 and Figure 4.5.

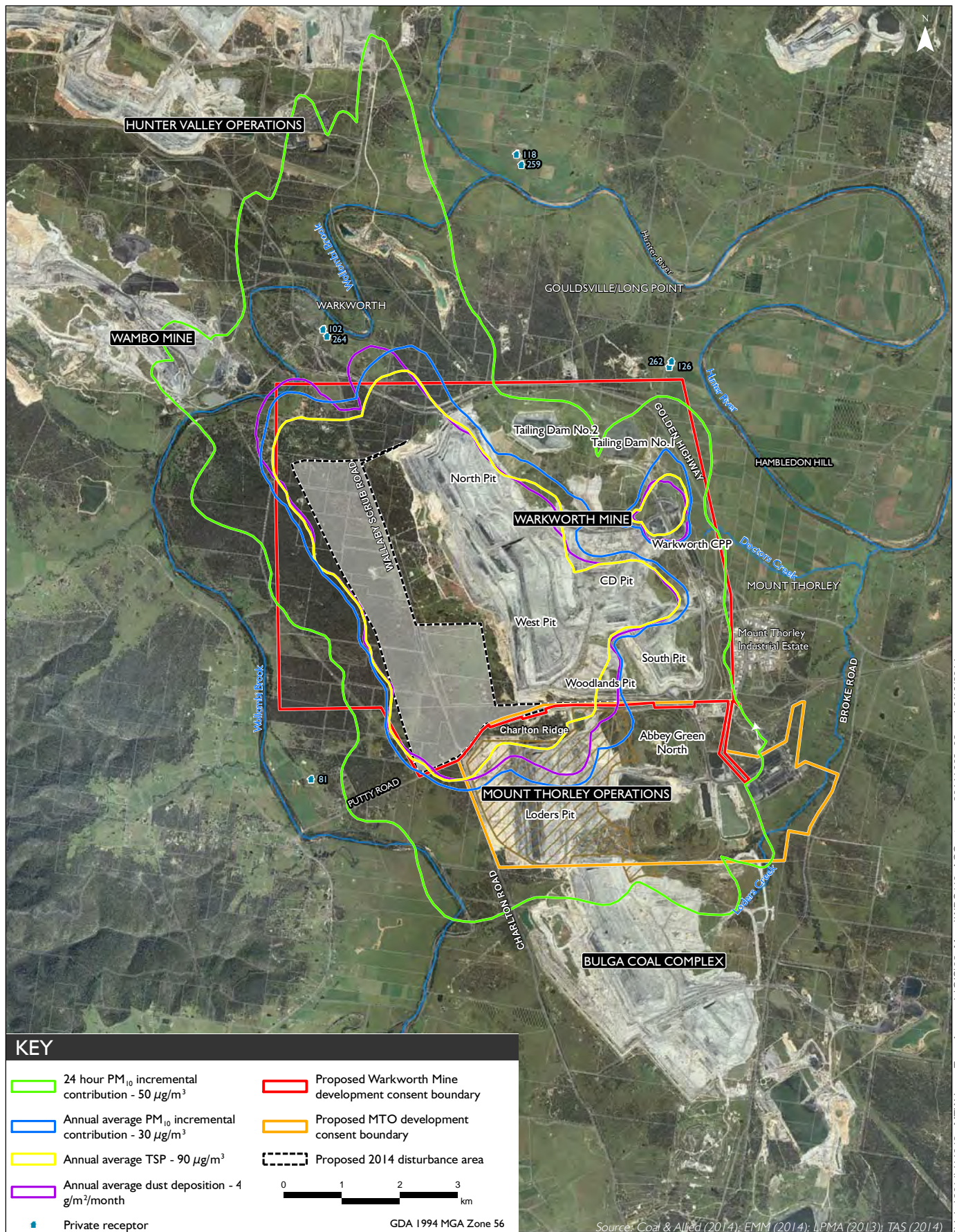
The results of the detailed analysis of these listed receptors do not alter any conclusions in the air quality and greenhouse gas study. A summary of the results is presented in Table 4.7 below for each assessment location referenced in the EPA submission. Significant impacts were only identified for the Warkworth village, as described in the air quality and greenhouse gas study.

Table 4.7 **Summary of additional days above 24-hour average criterion**

| Assessment location (closest representative monitor location) | Indicative Year 3 | Indicative Year 9 | Indicative Year 14 |
|---|-------------------|-------------------|--------------------|
| 81 (Bulga village) | 0 | 0 | 0 |
| 102 (Warkworth village) | 1 | 14 ² | 5 ² |
| 118 (Knodlers Lane) | 0 | 2 | 1 |
| 126 (MTIE ¹) | 0 | 0 | 0 |
| 259 (Knodlers Lane) | 1 | 2 | 1 |
| 262 (MTIE) | 0 | 0 | 0 |
| 264 (Warkworth village) | 1 | 14 ² | 5 ² |

Notes: 1. MTIE – Mount Thorley Industrial Estate.

2. Significant impact identified (levels systemically above the criterion (for example, on more than five days).



All years, worst case air quality modelling results

Warkworth Continuation 2014

Response to Submissions

Figure 4.5

c. Contemporaneous PM₁₀ impact assessment

In its submission, the EPA states the following in relation to the contemporaneous assessment:

... The data shown in Table 9-8 summarising the predicted maximum number of additional days above 24-hour average criterion does not match with the tables shown in Appendix F. The number of additional days above the 24-hour criterion based on Appendix F is shown below.

| Location | Year 3 | Year 9 | Year 14 |
|--------------------|--------|--------|---------|
| Bulga | 0 | 0 | 0 |
| Wallaby Scrub Road | 0 | 0 | 0 |
| Warkworth | 1 | 7 | 2 |
| Knodlers Lane | 0 | 3 | 2 |
| MTIE | 0 | 2 | 1 |

EPA recommends that a full year of assessment should be provided for the cumulative analysis and Table 9.8 of the AQIA revised accordingly.

It is acknowledged that the full tables for the contemporaneous 24-hour cumulative impact assessment were not correctly transcribed into the air quality and greenhouse gas study.

The full data are presented in Appendix D2 of this report along with assessment tables for the assessment locations listed by the EPA. The data shows the contemporaneous assessment over a full year as requested.

The tables in Appendix D2 have been colour coded to aid interpretation. Bold red values exceed the 50µg/m³ criteria. Orange cells represent background levels already above 50µg/m³ criteria and hence are not considered. Green cell represent levels which can be considered for the assessment. The data set presented has been sorted according to the highest background level (left hand side of table) and the highest predicted level (right hand side of table). Background levels are added to the corresponding incremental levels to find the total (cumulative) value for each day.

In consideration of the full set of contemporaneous impact assessment results shown in Appendix D2 of this report, Table 9.8 of the air quality and greenhouse gas study has also been updated and is presented in Table 4.8.

The results are consistent with the data in Table 9.8 of the air quality and greenhouse gas study, with the exception of the double counting one impact day in Year 14 for Warkworth. It is unclear how the EPA obtained the data it presents in regard to the number of days over criteria.

Table 4.8 NSW EPA contemporaneous assessment – maximum number of additional days above 24-hour average criterion depending on background level at monitoring sites

| Location | Indicative Year 3 | Indicative Year 9 | Indicative Year 14 |
|--------------------|-------------------|-------------------|--------------------|
| Bulga | 0 | 0 | 0 |
| Wallaby Scrub Road | 0 | 0 | 0 |
| Warkworth | 1 | 6 | 3 |
| Knodlers Lane | 0 | 2 | 1 |
| MTIE | 0 | 3 | 0 |

iii Diesel assessment

In its submission regarding the NO₂ emissions assessment, the EPA states:

NO₂ emissions from diesel powered equipment items were modelled... and were assumed to be operating at full power 20 per cent of the time. The assessment does not specify for the remaining 80 per cent of the time whether the equipment items were assumed to be operating at a reduced rate or were not operational. EPA has conducted studies which have demonstrated that haul trucks generally operate at approximately 40 per cent load capacity. A 20 per cent operating capacity over a full year would result in underestimation of potential 1-hour average NO₂ impacts from operation of diesel equipment.

It is noted that the cumulative assessments for dust in the AQIA has been completed using the predicted concentrations from MTW due to the interactions between the two mines. However, the NO₂ assessment appears to have only used data from MTO alone. Due to the integrated operations between MTO and Warkworth and for consistency with the cumulative approach for dust in the AQIA, the NO₂ cumulative assessment should include emissions from diesel from mining operations at Warkworth.

Background NO₂ data was obtained from the Singleton monitor and the levels used for the cumulative assessment were 41.41Jg/m³ for 1-hour average and 16.91Jg/m³ for annual average. Table 10-2 of the assessment shows NO₂ impacts from diesel emissions from the Project and background. A review of the isopleths in Appendix G for the predicted 1-hour and annual average NO₂ concentrations from the Project alone are the same as Table 10-2. The proponent should check that background levels have been included in the predicted results in Table 10-2.

The proponent should clarify the operating capacity of 20% used in the diesel assessment and provide justification for the capacity assessed. EPA recommends that Warkworth should be included in the NO₂ assessment, consistent with the cumulative approach for dust in the AQIA. The proponent should also check that the results presented in Table 10.2 and Appendix G are correct.

The EPA submission is not clear regarding the studies conducted and referred to or whether it is considering engine power and load capacity interchangeably. For the purpose of the response below, it is noted that for the existing operation to continue under the proposal there is only a relatively small change in the number of plant to be used at the mine. Accordingly, there would only be a small change in NO₂ emissions as a result of the proposal.

The NO₂ emissions assessment has assessed the impacts associated with the total maximum proposed fleet and added these results to the total existing background levels (which include the contribution from the existing operation).

The assumed operation of plant at 20 per cent full power was applied to the total maximum proposed fleet and is nominally equivalent to an incremental increase of 25 per cent of the existing fleet (which is the additional increase in plant items anticipated under the proposal) operating at full power all of the time. The approach results in a conservative estimate of the predicted impacts associated with the proposal when added to the existing background levels. This was done as it permitted the same model (with all sources in it) to also be used in the NO_x assessment to represent the incremental effect of the proposed additional plant operating at full power, and to which the total measured background levels were added to establish the total cumulative levels.

It appears that the EPA may be implying that a factor of 40 per cent of full power should be applied for the additional fleet. This would result in lower predicted impacts than those presented in the air quality and greenhouse gas study, as the current incremental modelling results are already approximately 2.5 times higher than the levels that EPA seeks.

Regardless of the above, the Warkworth Mine and MTO are one of many contributors to NO₂ emissions in the area. The NO₂ levels in the area are measured at low levels. The maximum measured 1-hour NO₂ level in the area is approximately one third of the criteria and the 70th percentile level is approximately one sixth of the criteria. The annual average level is approximately one quarter of the applicable criteria.

The fraction that the Warkworth Mine and MTO contributes to the total emissions would be a relatively small fraction of the low existing levels, however it is recognised that this may be larger on some days, depending on ozone levels and other factors that affect chemical transformation of NO_x.

After release of NO_x compounds, chemical reactions occur in the atmosphere that transform NO_x compounds to NO₂. The reaction times vary according to atmospheric chemistry and meteorological conditions. However due to the length of time required for the maximum NO₂ condition to occur, it will be the case in most circumstances that the maximum off site impact occurs some significant distance away, (beyond the nearest assessment locations) and hence it would not be correct to assume that on all days significant NO₂ contributions would occur nearest to the mine, and indeed it is unlikely to be correct to assume that the maximum effect over the year would occur nearest to the mine.

It is however evident that a change in operational plant of approximately 25 per cent in just one of many sources in the area, will not result in total levels increasing by factors of three to four times (as necessary for cumulative levels to approach the criteria), particularly when the adjacent sources reduce activity and emissions.

For an impact to occur through an approximate 25 per cent increase in emissions from one of the many contributing sources to total NO₂ levels in the area, the existing NO₂ levels would need to be close to the criteria. In fact the existing levels would need to be significantly more than 75 per cent of the criteria levels, or in other words at levels that are significantly more than 2.5 times higher than the maximum measured level in any hour, and approximately three times higher than the measured annual average level.

It is therefore not plausible that inclusion of the Warkworth Mine and MTO in the emissions assessment would significantly increase cumulative NO₂ levels in the area, and thus no further assessment is required.

It is noted that the labelling on the isopleths figure in the air quality and greenhouse gas study could be interpreted ambiguously, but to clarify, the EPA correctly observes that the data in the table and in the isopleths are the same, and these data represent cumulative levels (with background data included).

The results in Table 10.2 and Appendix G have been re-verified and they are correct.

iv Blast assessment

In its submission regarding the blast assessment, the EPA states:

The proponent should provide details of the weather conditions that lead to a halt in blasting. In addition, the hours of blasting in the modelling should be cross checked to ensure that all permitted hours between 7am and 5pm have been assessed.

As per EPA's request, hours of blasting in the modelling have been cross-checked. Hours assessed were 7am to 6pm, not 7am to 5pm as noted in the EPA submission.

Additional blast assessment isopleths spanning the licensed hours within which blasting is permitted are provided in Appendix D3 of this report. The scale of the figures presented in the appendix is consistent with those presented in the air quality and greenhouse gas study. It is noted that the predicted impacts are based on the maximum 1-hour average level for any one point in the modelling domain, during the hour, assessed over the entire year.

Overall the assessment shows that the blast permissions have minimal effect at the times of predicted maximum impact, and makes it clear that the permissions are only a part of the management regime as outlined in the blasting management plan publically available on Rio Tinto Coal Australia's website.

The internal mine operational procedures for blast events require a number of steps for consideration to ensure the potential for blast impacts are minimised, including various factors such as the prevailing meteorological conditions.

As outlined in the air quality and greenhouse gas study, Warkworth Mine is transitioning to the primary use of a predictive blast system to aid with the overall management of blast impacts. It is expected that as the proposal moves west, this predictive blast system will provide the means for ensuring blast impacts are acceptable.

4.3.3 Surface water

The EPA raised no matters relating to surface water.

4.3.4 Recommended conditions of approval

The following conditions of approval were recommended by the EPA:

i General

1. Except as provided by these conditions of approval, the works and conditions must be undertaken in accordance with the proposal contained in:
 - Warkworth Continuation 2014 – Environmental Impact Statement (Vols 1-6), dated 15 June 2014, prepared by EMGA Mitchell McLennan.
 - unless otherwise specified in these conditions of approval.

EPA's response is noted.

2. The licensee must provide the EPA with an updated premises description diagram/map prior to the commencement of any site works associated with the project. This diagram/map must be:

- Titled and dated;
- Prepared by a registered surveyor;
- Clearly identify the boundary of the premises for which Warkworth Mining Ltd is the occupier;
- Illustrate location and GPS coordinates of all discharge and/or monitoring sites; and
- In size A1 in both electronic and hard copy format.

EPA's response is noted.

ii Noise

3. Noise generated at the premises must not exceed the noise limits in the Table below. The location numbers in this table are taken from Table D.1 of the report Warkworth Continuation 2014 – Noise and Vibration Study prepared by EMGA Mitchell McLennan, dated 12 June 2014. [emphasis added]

| Location | Noise limits | | | |
|---|------------------------------|------------------------------|------------------------------|----------------------------|
| | Day | Evening | Night | |
| | L _{Aeq} (15 minute) | L _{Aeq} (15 minute) | L _{Aeq} (15 minute) | L _{A1} (1 minute) |
| 1, 2, 3, 5, 218, 219, 220, 224, 267, 268, 904, 905, 909, 911, 927, 928, 936, 127, 134, 141, 167, 168, 169, 170, 172, 173, 174, 175, 176, 177, 178, 179, 248, 249, 250, 251, 937, 120, 121, 122, 123, 124, 160, 161, 162, 163, 244, 245, 246, 247, 256, 257, 258, 260, 261, 193, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 923, 926, 149, 150, 190, 932 | 35 | 35 | 35 | 45 |
| 33, 922 | 37 | 37 | 37 | 47 |
| 16, 21, 24, 30, 31, 35, 42, 53, 54, 55, 56, 57, 58, 60, 61, 67, 70, 74, 80, 84, 89, 215, 234, 235, 237, 238, 243, 254, 255, 903, 917, 918, 919, 929 | 38 | 38 | 38 | 48 |

In the conclusion of Attachment 3 to the EPA's submission, it is confirmed that the EPL will contain limits up to 5dB above PSNL, subject to these levels also being adopted in the development consent, if granted. This statement is reproduced below.

"Where noise limits in Planning's Project Approval, if issued, are above the PSNLs, the EPA will include them as limits in the licence, provided they do not exceed the PSNLs by more than 5dB and suitable arrangements are made to mitigate the impact."

This approach is consistent with historic and contemporary approvals for open cut mining projects. It is anticipated that the development consent would accord with Table D.1 of the noise and vibration study for predictions up to 5dB above PSNL.

It is considered that the intent of the table, however, would be more appropriately captured if the introductory sentence to the table was modified to state that the noise limits related exclusively to privately-owned residences.

It is noted that assessment location 937 (highlighted in grey in table above) should be removed from the EPA's table on the basis of EPA's approach to only include receptors in the table that are predicted below the PSNL. It appears to be an error since 937 is not included in chronological order.

4. For the purpose of condition 3:
- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
 - Evening is defined as the period 6pm to 10pm.
 - Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

EPA's response is noted.

5. The noise limits set out in condition 3 apply under all meteorological conditions except for the following:

- (a) Wind speeds greater than 3 metres/second at 10 metres above ground level;
- (b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- (c) Stability category G temperature inversion conditions.

The proposed condition is a divergence from the EPA's policy (INP Chapter 5), which states an upper temperature inversion limit of 3 degrees Celsius per 100m should be adopted. The condition would also be inconsistent with other contemporary approvals for open cut mining projects. It is considered that the exclusion list above should include an additional item "Temperature gradients greater than 3 degrees Celsius per 100m".

6. For the purposes of condition 5:

- (a) Data recorded by a meteorological station installed on site must be used to determine meteorological conditions; and
- (b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

EPA's response is noted.

7. To determine compliance:

- (a) With the $L_{eq(15 \text{ minute})}$ noise limits in condition 3, the noise measurement equipment must be located:
 - Approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - Within 30m of a dwelling façade, but not closer than 3m where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable; or
 - Within approximately 50m of the boundary of a National Park or a Nature Reserve.
- (b) With the $L_{A1(1 \text{ minute})}$ noise limited in condition 3, the noise measurement equipment must be located within 1m of a dwelling façade.
- (c) With the noise limits in condition 3, the noise measurement equipment must be located:
 - At the most affected point at a location where there is no dwelling at the location; or
 - At the most affected point within an area at a location prescribed by conditions 7(a) or 7(b).

Item (c) is inconsistent with historic conditions used by the EPA and implies annoyance based criteria apply to vacant land - where there is no one to annoy. This is also inconsistent with the EPA's policy (INP), which is clear about the application of criteria listed in the conditions are to apply to dwellings/residence as described in items (a) and (b) above. It is considered appropriate that point (c) is removed and vacant land to be addressed by DP&E as the case has been historically.

8. A non-compliance of condition 3 will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- At a location other than an area prescribed by conditions 7(a) and 7(b); and/or
- At a point other than the most affected point at a location.

EPA's response is noted.

Condition 3 assumes the listed property numbers represent residences where dwellings exist. Please refer to the response regarding Condition 3.

9. For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

Further information is provided in Section 4.3.1 of this report. It demonstrates that predicted dB(C) minus dB(A) is less than 15 dB and therefore the LFN penalty should not apply to model predictions for the proposal. Noise level measurements for compliance purposes will consider Section 4 of the INP as appropriate.

10. A noise compliance assessment report must be submitted to the EPA within 30 days of the completion of the yearly monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:

- (a) An assessment of compliance with noise limits presented in condition 3; and
- (b) An outline of any management actions taken within the monitoring period to address any exceedences of the limits contained in condition 3.

EPA's response is noted.

11. To assess compliance with condition 3, attended noise monitoring must be undertaken in accordance with condition 7 and:

- (a) At each one of the locations listed in Condition 3;
- (b) Occur annually in the reporting period;
- (c) Occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:
 - 1.5 hours during the day;
 - 30 minutes during the evening; and
 - 1 hour during the night.

- (d) Occur for three consecutive operating days.

The applicant considers it appropriate that compliance monitoring is completed at representative locations, similar to current practice, as it would be impractical for compliance monitoring to be implemented at each property listed in the proposed Condition 3 (some 109 residences).

- 12. Offensive blast fume must not be emitted from the premises.

Definition: Offensive blast fume means post-blast gases (whether visible or invisible, odorous or odourless) from the detonation of explosives at the premises that by reason of their nature, duration, character or quality, or the time at which they are emitted, or any other circumstances:

- (i) Are harmful to (or is likely to be harmful to) a person that is outside the premises from which it is emitted, or
- (ii) Interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted).

It is requested the EPA revise or remove this condition on the basis that current EPA noise and air quality policy for blasts be followed by the applicant.

4.4 NSW Office of Water

The NSW Office of Water (NOW) raised no objection to the proposal.

Two matters were raised in its submission; namely, licensing requirements and alluvial groundwater quality. These matters are addressed below. Recommended conditions of approval were also provided.

4.4.1 Licensing requirements

The following water licensing matters were raised by NOW:

Groundwater – the proponent should demonstrate compliance with their licensing requirements for the peak predicted take of water from the Wollombi Brook Alluvium, Hunter River Alluvium and the Permian Coal Measures prior to commencement of works under this proposal.

The applicant commits to providing the necessary clarification regarding licensing requirements prior to commencement of the works under this proposal, should it be approved.

Surface water (Hunter Regulated River) – it is unclear what is meant by the proponent having an ‘entitlement’ from Singleton Council’s licence.

WML will ensure that the necessary licences are held with a sufficient share component and water allocation to account for all water taken from a groundwater or surface water source prior to commencement of works under the proposal.

In regards to ‘entitlement’ from Singleton’s licence, it is noted that an important objective of the management of water use at MTW is to minimise the raw water extraction from the Hunter River where possible. However, where this is not possible, raw water is and would continue to be sourced from the Hunter River via the Mount Thorley Joint Venture (MTJV) water supply scheme.

Singleton Council holds the high security water licence on behalf of the MTJV scheme members. Singleton Council maintains and operates the scheme to supply raw water to MTW, Glencore's Bulga Coal Complex and to meet Council's own needs. MTW's share of the scheme allocation (entitlement) is 1,012ML per financial year and the majority of any water requested from the joint venture arrangement is used to meet the demands of the CPP.

Surface water (Singleton Water Source and Lower Wollombi Water Source) – No details are provided in the EIS on any water access licences held, or applicable exemptions, from the Singleton Water Source; any reductions in the water yield from creeks needs to be calculated and accounted for; details of the capture, harvestable rights, exemptions and licences required to account for the take from this water have not been described.

MTW does not have any water access licenses (WALs) for the Singleton Water Source. If required, water from this source is obtained through the WAL held and managed by Singleton Council via the allocation provided in the private agreement between Council and the signatory industry partners, which include MTW. The WALs that are managed by MTW are routinely reported in the MTW Annual Reviews and are available on the NOW's Water Access Licence Conditions Register.

As reported in Section 17.4.7 of the EIS, water captured by the site water management structures, with the exception of rainfall runoff from undisturbed natural catchments, are not subject to licensing.

The NOW submission requested clarification regarding the characterisation of the Wollombi Brook Alluvium. The submission states:

The salinity values provided by the proponent in Appendix B of the GIA are inconsistent with data collected from Office of Water observation bores within the Lower Wollombi Brook Water Source and Hunter Regulated River Alluvium. It is unlikely that the nearby irrigators would be using saline groundwater. This indicates the proponent's piezometers may not be representative of the alluvial aquifer's highest beneficial use, or alternatively that the proponent's observation bores are observing impacts from the existing mining activities. The proponent needs to revisit the details for the bore alluvial network and review why the data is inconsistent with other information sources. This may require adjustments to the water management plan.

Subsequent to receipt of NOW's submission, discussions have been held between the applicant and NOW on, amongst other matters, the existing alluvial piezometer network. While NOW has agreed that current piezometer's are adequate, WML has committed to the installation of three additional piezometers where required to provide clarity on the matter raised above. The data from these piezometers will be examined to assist in the understanding of the salinity values in this area. The MTW water management plan will be modified as required to incorporate the installation of these additional monitoring points.

4.4.2 Recommended conditions of approval

The following conditions of approval were recommended by the NOW:

The proponent meets with the Office of Water to provide clarification in relation to water licensing arrangements.

The proponent investigates the details for their alluvial bore network to review why its salinity data is inconsistent with other information sources and consider any necessary adjustments to the water management plan, which may require additional monitoring sites.

The applicant has complied with the above recommended conditions and will continue to liaise with NOW with regard to water licencing and the water monitoring network at MTW under the proposal. A commitment to install three additional piezometers will provide some clarity regarding the source of any inconsistency between the datasets.

4.5 Crown Lands

Crown Lands raised no objection to the proposal.

Its submission recommended conditions of approval which are provided below:

1. Within 12 months from the date of this approval the Proponent shall acquire Lot 2011 DP 1137289 from the Crown by way of an application sale.
2. Any other Crown reserves significantly affected by the Project must be acquired by the Proponent by way of an application sale.
3. Any Crown roads identified within the Project boundary should either be closed and purchased by the Proponent or, if required to remain open, be transferred to Singleton Shire Council as the relevant roads authority.

Lot 2011 DP 1137289 is within the approval area of DA 300-9-2002-I and has already been mined. There was no requirement to purchase this lot in the conditions of approval. Transactions of land need to be investigated for matters such as tenure, native title and capital availability. WML cannot commit to the conditions as described, however commit to ongoing discussions on the appropriate resolution of crown land within the disturbance footprint of the existing and future mining areas.

4.6 Department of Health

The Department of Health raised no objection to the proposal. Matters raised related to potential air quality, noise and social impacts. These are addressed below.

4.6.1 Air quality

The Department of Health request that:

The proponent should clarify whether these [mine-owned] properties will be occupied and, if so, what measures will be implemented to minimise exposure of residents.

In response to the matter raised, the extract below from Section 5.3 of the currently approved MTW Air Quality and Greenhouse Gas Management Plan (2014) regarding the management of mine-owned residences is provided. The management of air quality and greenhouse gas will continue in accordance with the plan under the proposal.

Schedule 4, Condition 13 and Schedule 5, Conditions 1(b), 2 and 3 of the WML development consent outline specific requirements for the management of mine-owned residences. Specifically, WML:

1. Must ensure that the air quality criteria listed in Schedule 4 are not exceeded at any occupied residence on mine-owned land (including land owned by adjacent mines), unless a range of administrative measures are undertaken; and
2. Must ensure that prescribed notification requirements are met.

To comply with these requirements at Coal & Allied owned and occupied residences MTW will:

- as soon as practicable after an exceedance of WML Air Quality criteria:
 - provide the tenant with written notice of the exceedance;
 - provide the tenant with regular monitoring results until the development is again complying with the relevant criteria previously exceeded;
 - provide the tenant with a copy of the NSW Health fact sheet entitled “Mine Dust and You” (if not recently provided); and
 - provide the tenant with a copy of the most recent ‘monthly meaningful summary’, submitted to the EPA in accordance with the data reporting requirements of the PoEO Act. The data is in an appropriate format for the tenant’s medical practitioner to assist them in making an informed decision on the health risks associated with continued occupation of the property.
- Subject to giving reasonable written notice, permit tenants to terminate their tenancy agreement with Coal & Allied without penalty. A clause making provision for this will be inserted into new tenancy arrangements entered into post 30 September 2013.
- Install air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) at the residence if the tenant so requests.
- Provide particulate matter monitoring data collected from existing nearby monitors (see Appendix A – Air Quality Monitoring Programme). This data will be presented in a form suitable for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property.

To comply with the relevant requirements for tenants and landowners of residences owned by mining companies, other than Coal & Allied, MTW will:

- As soon as practicable after an exceedance of applicable WML air quality criteria:
 - Provide the landowner with a notice of an exceedance;
 - Provide the landowner with regular monitoring results until the development is again complying with the relevant criteria previously exceeded;
 - Provide the landowner with a copy of the NSW Health fact sheet entitled “Mine Dust and You” (if not recently provided);
 - Provide the landowner with a copy of the most recent ‘monthly meaningful summary’, submitted to the EPA in accordance with the data reporting requirements of the PoEO Act. The data is in an appropriate format for the tenant’s medical practitioner to assist them in making an informed decision on the health risks associated with continued occupation of the property; and
 - Request that the landowner provide a copy of all this information to any tenant occupying those residences.

- Install air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) at the residence if the tenant and landowner jointly requests such, unless:
 - the listed mitigation measures are required as a condition in the neighbouring mine's existing project approval; and/or
 - the listed mitigation measures are already installed at the affected property.
- Provide particulate matter monitoring data collected from existing nearby monitors (see Appendix A – Air Quality Monitoring Programme). This data will be presented in a form suitable for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property.

In accordance with MTW Air Quality and Greenhouse Gas Management Plan, Coal & Allied has provided written notification of these rights to the landowners and requested that a copy of the notification is passed on to the tenants of those properties which are occupied now or in the future.

4.6.2 Noise

The Department of Health request that:

Given there is a predicted increase in noise for residents, it is recommended that consideration is given to whether there are additional reasonable mitigation measures that could reduce the impact. It is also suggested that an operational review is conducted to ensure noise impacts are not greater than predicted.

The marginal (1-2dB) increase predicted for some Bulga residences was reviewed with respect to additional noise mitigation measures as described in the noise and vibration study. In accordance with the EPA's INP, all reasonable and feasible noise mitigation has been considered and will be adopted. These include a significant investment in providing best practice noise suppression to equipment fleet (see details in Section 10.2.1 of the noise and vibration study) and limiting plant and equipment operation during worst case meteorological conditions. Further, the EPA's submission states: "The EPA's view of the proposed noise mitigation measures is that they reasonably represent current best practices at similar mines. The EPA considers it unlikely that there are further feasible and reasonable measures that would provide significant additional noise mitigation."

To achieve an additional 1-2dB reduction in predicted levels (ie to achieve PSNL at all Bulga residences), further plant would need to be disengaged. The expected frequency and duration required to achieve this reduction due to the presence of adverse meteorological conditions, would result in a cost exceeding \$100million in NPV over the life of the proposal.

Measures proposed in combination with the established real-time noise monitoring and management system will assist in keeping noise levels to within or below 1-2dB of PSNL for approximately 90 percent of the assessment locations considered - this is a reasonable and feasible outcome for the viability of the proposal.

As described in further detail in Section 6.4.6i(a) of this report, the predictive modelling interface (PMI) that is currently being developed will utilise predictive meteorological forecast data coupled with detailed mine plans and equipment sound power level information to predict noise levels at residences. The PMI will further improve compliance management through proactive planning.

Acquisition rights for this property [assessment location 264] need to be confirmed, as the EIS states this property, while falling in the Warkworth zone of acquisition, should be afforded acquisition rights from Wambo Mine, though it is not included in that mine's approval.

It is anticipated that acquisition rights will be afforded to this property from Wambo and WML proportionate to corresponding impacts.

4.6.3 Social

The Department of Health request that:

We found it difficult to interpret the key figures in the Social Impact Assessment – Figure 5.6... It is recommended that this section of the social impact assessment should be clarified to show the proportion of people concerned about air quality.

As detailed in the methodology in Section 2.4.2 of the SIA (EIS Appendix P), semi-structured interviews were conducted with 151 stakeholders from the local area and region, either as one-on-one interviews or in small group settings (see Table 2.1 of the SIA for proportional representation of stakeholder groups). The interviews discussed key themes which are listed in Section 6.7.10 of this report.

Thematic coding and analysis of the interviews was undertaken to identify key social impacts and opportunities stakeholders associated with the proposal. These are listed in the Figure 5.6 of the SIA. As described in the figure notes, the percentages represent the number of times a particular social impact/opportunity is identified by stakeholders divided by the total number of identified social impacts and opportunities (ie 1,673 impacts/opportunities)—thereby providing an illustration of those social impacts and opportunities most frequently identified by stakeholders. Approximately 9.4 per cent of the 1,673 matters raised related to air quality.

4.7 Agriculture NSW

Agriculture NSW raised no objection to the proposal.

The submission noted that an agricultural impact statement was not required as part of the EIS, however did suggest an assessment of potential impacts from groundwater drawdown and decreased baseflow on nearby viticultural industry be undertaken.

The groundwater study (EIS Appendix K) provided an assessment of groundwater drawdown and baseflow impacts predicted to result from the proposal. These results were also compared to the minimum harm criteria of the NSW Aquifer Interference Policy (AIP). The AIP forms the basis for assessment of aquifer interference activities under the EP&A Act.

The majority of private bores in proximity to Warkworth Mine are screened in the Wollombi Brook alluvium. Groundwater modelling predicts there would be no groundwater drawdown at any privately-owned bore greater than 2m. The AIP stipulates that for any bores where the maximum cumulative decline in groundwater levels is predicted to exceed 2m due to mining a make good agreement between the landholder and the applicant should be in place. A reduction of less than 2m is unlikely to noticeably reduce the pumping yield from any bore. Further, the groundwater study reported that model results do not predict a significant change in baseflow to the Wollombi Brook (less than 1m) or Hunter River (negligible).

Given these findings, there is no predicted discernible drawdown on groundwater or baseflow decrease on the viticulture industry that is sited some distance from the proposed continuation of the existing operations.

4.8 Division of Resources and Energy

The Division of Resources and Energy (DRE) raised no objection to the proposal. Matters raised are addressed below.

4.8.1 Mining titles

The DRE submission notes that the proposed activities are within Consolidated Coal Lease 753, Mining Leases 1412 and 1590 and Coal Lease 219 held by the applicant and Mining Lease Applications 352 and 353.

DRE's comment is noted.

4.8.2 Rehabilitation

The DRE submission states that specific performance objective and standards of each domain were not sufficiently described in the EIS. As such, the DRE recommends the following conditions of approval:

1. Rehabilitation objectives and commitments

The Proponent must rehabilitate the site to the satisfaction of the Secretary of Department of Trade and Investment, Regional Infrastructure and Services. Rehabilitation must be substantially consistent with the Rehabilitation Objectives described in the Warkworth Continuation 2014 EIS, the Statement of Commitments in Appendix Q and the following objectives in Table 1.

Table 1 **Rehabilitation objectives**

| Rehabilitation feature | Objective |
|--|--|
| Mine site (as a whole of the disturbed land and water) | Safe, stable and non-polluting, fit for the purpose of the intended post-mining land use(s). Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprising local native plant species. |
| Rehabilitation materials | Materials (including topsoils, substrates and seeds of the disturbed areas) are recovered, appropriately managed and used effectively as resources in the rehabilitation of the site. |
| Landforms | Final landforms sustain the intended land use for the post-mining domain(s). Final landforms are consistent with and complement the topography of the surrounding region to minimise the visual prominence of the final landform in the post-mining landscape. Final landforms incorporate design relief patterns and principles consistent with natural drainage. |

Table 1 Rehabilitation objectives

| Rehabilitation feature | Objective |
|-----------------------------------|---|
| Final void | <p>Minimise the size and depth of final voids so far as is reasonable and feasible.</p> <p>Minimise the drainage catchment of final voids so far as reasonable and feasible.</p> <p>Minimise high wall instability risk so far as is reasonable and feasible.</p> <p>The size and depth of final voids must be designed having regard to their function as long-term groundwater sinks and to maximise groundwater inflows across backfilled pits to the void.</p> <p>Minimise risk of flood interaction for all flood events up to and including the Probable Maximum Flood.</p> |
| Water quality | <p>Water retained on site is fit for intended land use(s) for the post-mining domain(s).</p> <p>Water discharged from site is consistent with the baseline ecological, hydrological and geomorphic conditions of the creeks prior to mining disturbance.</p> <p>Water management is consistent with the regional catchment management strategy.</p> |
| Surface infrastructure | To be decommissioned and removed, unless the Secretary of Department of Trade and Investment, Regional Infrastructure and Services agrees otherwise. |
| Biodiversity | Establish 1,617ha of Endangered Ecological Communities (EEC). |
| Native flora and fauna | <p>Size, locations and species of native tree lots and corridors are established to sustain biodiversity habitats.</p> <p>Species are selected that re-establishes and complements regional and local biodiversity.</p> |
| Post-mining agricultural pursuits | The land capability classification for the relevant nominated agricultural pursuit for each domain is established and self-sustaining within 5 years of land use establishment (first planting of vegetation). |
| Community | <p>Ensure public safety.</p> <p>Minimise the adverse socio-economic effects associated with mine closure.</p> |

The applicant considers that the recommended condition is appropriate. It is noted, however, that a detailed description of the strategies and techniques utilised in the progressive rehabilitation of the disturbed areas are outlined in the MTW Mining Operations Plan (MOP). While the objectives presented above are predominately consistent with those outlined in the existing MOP, the MOP will be reviewed and updated in accordance with the proposal.

2. Progressive rehabilitation

The Proponent shall carry out surface disturbing activities (eg pre-stripping in advance of mining operations) in a manner that, as far as is reasonably practicable, minimise potential for dust emissions and shall carry out rehabilitation of disturbed areas progressively, as soon as reasonably practicable, to the satisfaction of the Secretary of Department of Trade and Investment, Regional Infrastructure and Services.

The applicant considers that the recommended condition is appropriate.

All surface disturbances will be kept to a minimum to reduce the potential for dust generation. Progressive rehabilitation will be undertaken as soon as practicable with the strategies and techniques outlined in the MTW MOP. The MOP will have rehabilitation targets based on the progression of mining.

As per the requirements of the mining lease, an Annual Review will be submitted to the Department of Trade and Investment, Regional Infrastructure and Services via the DRE which illustrates the rehabilitation undertaken during that reporting year. The Annual Review is a public document and, following approval from the Department, is available from the Rio Tinto Coal Australia website.

In the 2013 MTW Annual Review, which reported on the activities undertaken during the 2013 calendar year, the area sown for rehabilitation (61.6ha) exceeded the target for that year (54.5ha).

3. Rehabilitation Plan

The Proponent must prepare and implement a Rehabilitation Plan to the satisfaction of the Secretary of Department of Trade and Investment, Regional Infrastructure and Services. The Rehabilitation Plan must:

- Be submitted and approved by the Secretary of Department of Trade and Investment, Regional Infrastructure and Services prior to carrying out any surface disturbing activities of the development, unless otherwise agreed by the Secretary;
- Be prepared in accordance with DRE guidelines and in consultation with the Department, the Office of Environment and Heritage, the Environment Protection Authority, NSW Office of Water, Council and the mine Community Consultative Committee;
- Incorporate and be consistent with the rehabilitation objectives in the EIS, the statement of commitments and Table 1;
- Integrate and build on, to the maximum extent practicable, the other management plans required under this approval; and
- Address all aspects of mine closure and rehabilitation, including post mining land use domains, rehabilitation objectives, completion criteria and rehabilitation monitoring and management.

Note: The approved Mining Operations Plan (which will become the REMP once the Mining Act Amendments have commenced), required as a condition of the Mining Lease(s) issued in relation to this project, will satisfy the requirements of this condition for a Rehabilitation Plan.

The applicant considers that recommended condition is appropriate.

The MTW MOP will be reviewed and updated as required to incorporate the proposal (and MTO proposal) and resubmitted to the Department of Trade and Investment, Regional Infrastructure and Services via the DRE. The MOP will incorporate the applicable commitments for both sites and be consistent with the approved rehabilitation objectives. The document will be prepared in accordance with the *ESG3 MOP Guidelines* to the satisfaction of the Secretary of Department of Trade and Investment, Regional Infrastructure and Services or its delegate.

4.8.3 Significance of the resource

The NSW Trade & Investment submission included consideration of the significance of the resource in comparison with other resources across NSW. It concluded that the resource, the subject of the proposal, is of state significance. Key aspects of the information provided in the submission are contained in the sections below.

i Regional context of the resource

[The proposals] will have significant benefits to State and the Hunter Valley, providing ongoing employment, both directly and indirectly, contributing to the Gross State Product and to the regional economy.

Mount Thorley and Warkworth mines are open cut operations. The benefits of open cut mining are that it maximise resource recovery and, is generally, more economic than underground mining. There are currently, no known unallocated open cut resources in the Upper Hunter Valley and therefore the State's focus must be on maximising the opportunities of existing mines.

DRE's response is noted.

The Hunter Valley is one of the most significant thermal coal deposits in the world due to the scale of the resource, coal quality (relatively high energy content, and low ash and trace elements), relatively short distance to port at Newcastle and access to existing infrastructure, including world-class ports and heavy gauge rail line.

Both Warkworth Mine and MTO are existing mines within the region, with over 30 years of continuous operation.

ii Size, quality and availability of the resource

DRE supports the Project's reported reserve estimate of 358Mt ROM coal, which was estimated in accordance with the JORC Code 2004.

DRE supports the Project mine plan as it optimises dragline strike length and hence dragline utilisation. Draglines represent a vital form of prime waste removal which is lower than truck and shovel costs. Without approval of the Project, mining constraints associated with dragline use are likely to reduce the viability of reserves within the current operation in addition to the 230Mt in the Project. DRE is firmly of the view that the Project mine plan optimises mine recovery.

Currently, Mount Thorley Warkworth is the third largest producing mine in both NSW and the Hunter Coalfield. Separately, the Warkworth Mine produced 7.9Mtpa of saleable coal in 2012-13, making it the sixth largest producing mine in NSW and the fifth largest in the Hunter Valley.

If approved the Project would be ranked sixth of the 56 producing NSW coal mines in 2013-14. The Project producing at a ROM rate of nearly 12Mtpa would be considered large when compared to other operating open cut mines in NSW, ie the average size of currently operating open cut coal mines in NSW in 2013-14 was around 7Mtpa.

Over the life of the Project assuming one quarter of production is sold on the export metallurgical market and nearly three quarters on the export thermal market (with a very small percentage sold on the domestic thermal market to Redbank Power Station), the value of the coal produced would be worth around \$14.3billion in current dollars. The net present value of this revenue stream has been estimated by DRE at approximately \$7.3billion.

DRE's response is noted.

iii Proximity to existing infrastructure

Product coal produced from the Project will continue to be loaded onto trains at the Mount Thorley Coal Loader and continue to utilise the existing rail line for export through the Port of Newcastle. Therefore the Project will utilise the extensive existing Hunter coalfield rail network. The Project would also allow continued supply to the port of Newcastle throughput. In addition, a small proportion of production would continue to be transported to Redbank Power Station.

DRE's response is noted.

iv Relationship of the resource to any existing mine, petroleum production facility or extractive industry

Approval of the Project will result in the continued employment of the existing Mount Thorley Warkworth mining complex workforce and use of existing mining equipment and infrastructure.

An important inter-relationship for this Project has is with the adjacent Mount Thorley mine is that when the Mount Thorley mine depletes its available economic reserves in 2022, the mining equipment from Mount Thorley will be transferred to Warkworth to enable production to be maintained at the current levels of around 12Mtpa product tonnes. This transfer of equipment will also allow current levels of employment (around 1,300) to be maintained across the Mount Thorley Warkworth mining complex until at least 2030.

Apart from the tight inter-linkage that the Project has with Mount Thorley mine the main relationship that the Project has with other existing mines in the region is common use of the existing rail network.

DRE's response is noted.

v Dependency of other industries on the resource project

Based on other mine projects, DRE believes the indirect employment within the region and in NSW as a whole from the Project (Mount Thorley Warkworth combined total) could be around 5,000 positions.

DRE's response is noted.

vi Other factors

In the last six months the Upper Hunter region has seen the loss of over 1,000 jobs in the mining sector and its supporting services industries due to mine closure and restructuring. If the Mount Thorley and Warkworth Extension Projects are not approved, there will be significant impacts on the community and mine-related service businesses in the local area and throughout the State.

DRE's response is noted.

vii Coal royalty

If the Project gains approval, DRE estimates the total additional royalty to the State will be in the order of \$1,200million in direct revenue in dollars of the day over the life of the Project and nearly \$60million per year. The net present value of this royalty stream has been estimated by DRE at approximately \$570million.

As all coal from the Project will be subjected to a full washing cycle a deduction of \$3.50 per tonne from the value of coal produced applies. A deduction for levies also applies which would amount to no more than \$1.00 per tonne. Hence allowable deductions for royalty for the Project would amount to \$4.50 per tonne.

For its royalty calculation DRE has taken a conservative approach and has used a long-term export thermal price of \$AU90 per tonne and \$115 per tonne for semi-soft coking coal.

DRE has estimated that if the Project is approved, around 8Mtpa of product coal would be able to be economically mined from the Project area from 2016 to 2022, and with the transfer of equipment and employees from the adjacent Mount Thorley Mine in 2022, a production rate of around 12Mtpa will be maintained from the Project until at least 2030.

Using the above parameters, DRE has calculated that in a typical full production year the State will receive nearly \$60million per annum and in dollars of the day total royalty payable from the Project would be nearly \$1,200million. The net present value of this royalty stream would be around \$570million using a 7 per cent real discount rate.

DRE's response is noted.

4.9 Heritage Council of NSW

The Heritage Council of NSW submission raised no objection to the proposal. Matters raised in the submission are addressed in the sections below.

4.9.1 Wambo Homestead

The proposed Warkworth Mine development consent boundary appears to abut the State Heritage Listed Wambo Homestead in Figures 19.1 and 19.2 in the EIS. The impacts of this, if any, have not been considered within the EIS and must be rectified.

The Wambo Homestead lies 300m from Wambo Mine and has been managed by Peabody Energy since 2006. A conservation management plan for the Wambo Homestead Complex has been developed for the site, which includes annual structural inspections and blast monitoring and associated reporting. The Wambo Homestead is situated approximately 3km from the north-western boundary of the proposed 2014 disturbance area (refer to EIS Chapter 19, Figure 19.1), and, at its closest point, approximately 2.5km from the proposed development consent boundary.

Given the distance between the Wambo Homestead and the proposal, it was determined that the proposal would not impact on the Wambo Homestead. Further, the noise and vibration study (refer to Chapter 10 of the EIS) concluded that no impacts from blasting would occur on structures outside the proposed development consent boundary.

4.9.2 Impacts on state significant items

The Heritage Council is unable to understand how impacts to two state significant items will be minor when they are going to be directly mined. It would appear that the cumulative impacts over Wallaby Scrub Road would be major and this should be discussed in the EIS.

Two non-registered state-significant items are in the vicinity of the proposal; the RAAF Base Bulga complex and the Great North Road complex. The heritage study found that while small portions of these items would be impacted by the proposal, heritage impacts are likely to be minor.

The level of impact to RAAF Base Bulga has been assessed as minor, as the proposal is anticipated to affect only a very small portion (approximately 1.75 per cent) of the RAAF Base Bulga complex. The anticipated area of disturbance comprises approximately 4.8ha at the very eastern end of the east-west runway (shown in Figure 2.3 of this report). This is an area of cleared ground situated beyond the end of the constructed runway. The affected area is to be largely incorporated within a 200m wide infrastructure corridor extending eastwards from the western boundary of the proposed 2014 disturbance area. This infrastructure corridor will not be mined and will be used for provision of services such as an access road, water pipelines, power and drainage and, therefore, the anticipated impacts will be minor.

In the context of the entirety of the Great North Road alignment, the historic heritage study determined that the disturbance of a 5.4km section (note Wallaby Scrub Road is approximately 6.7km long) of its total length of alignment of approximately 240km (between Sydney and Warkworth village) is considered a minor impact. This assessment is based upon the results of:

- an archaeological survey conducted along an 8.8km section of the Great North Road alignment situated on Coal & Allied owned lands within the MTW mining leases;
- previous disturbance to the road, resulting from 20th century road upgrades and maintenance activities (particularly over the last 40 years);
- general lack of integrity and intactness of this section of road as compared to other surviving sections of the road elsewhere along its total alignment, particularly those sections which are listed on the World- National- State- and local heritage registers/lists; and
- the survey undertaken for the preparation of the conservation management plan (CMP) that identified that large parts of the road had been subject to major works over the last 40 years, to provide for a more level and consistent road gradient. Consequently, the integrity of the road was assessed as being low. Within the 5.4km section of the road that would be subject to development disturbance only a few small areas of archaeological potential were identified, being associated with remnants of potential pavement (three areas), drainage (one) and quarrying (one).

Furthermore, the only section of the roadway and alignment with viable and demonstrable integrity and intactness is outside of the development impact area and as stated in the assessment, it is proposed that this surviving section be incorporated within the adjoining WBACHCA to ensure that section's long-term protection and conservation.

The historic heritage study recognised the alignment of the Great North Road as being a contributory factor in its significance. In consultation with the community stakeholders of the Coal & Allied Community Heritage Advisory Group, including representatives of the Convict Trail Project, Coal & Allied has made the commitment to develop an interpretation programme for the alignment which will include the provision of landscape features marking the original road alignment within the final landform design as an element of the mine rehabilitation plan at the completion of mining activities.

Based on the above, it is reasserted that the proposal's impacts on the RAAF base and Great North Road are minor.

Given the cumulative impact which mining has had on sections of the Great North Road alignment in this area, and the significance of the alignment, the Heritage Council considers that the proposal should be redesigned around Wallaby Scrub Road so that the road alignment can be left in situ.

As is explained in great detail throughout the EIS and this report, the Warkworth Mine is not economically viable in the long-term if strike length cannot be maintained, therefore it is not possible to avoid Wallaby Scrub Road as the proposed mine plan requires access to the coal measures below Wallaby Scrub Road to ensure the maintenance of strike length.

Further, Coal & Allied is unaware of any previous mining related impacts that have resulted in any cumulative impact on the Great North Road alignment in this area. The heritage study notes that changes occurred to the alignment of some parts of the Wallaby Scrub Road section of the former Great North Road during the 1890s. The alignment of the offset junction of Wallaby Scrub Road/Putty Road intersection occurred as a result of road works undertaken in the early 1970s. Major road works including straightening, widening, cuttings, embanking and surfacing of the greater part of the Charlton Road – Wallaby Scrub Road alignment have been undertaken since the 1970s. The Warkworth (Charlton Road – Wallaby Scrub Road) portion of the Great North Road has also been modified through road surface upgrades, however, these also are not mining related.

4.9.3 Management measures

It is also considered that any heritage interpretation should be undertaken by suitably qualified individuals...

Any heritage interpretation works will be undertaken by suitably qualified persons with demonstrated experience in the interpretation of historic heritage sites. It is proposed that this work would be undertaken by an historical archaeologist with demonstrated relevant historical archaeological experience, and the excavations would be led by an archaeologist who satisfies the Heritage Council's Excavation Director's Criteria. Further, the persons to be engaged to undertake any approved excavation and interpretation programmes will be determined in compliance with the requirements of any management plan approved by the DP&E.

Where will the moveable heritage items go if the local historical societies/museum do not want them?

Should local historical groups/museums not wish to take custody of salvaged archaeological material, Coal & Allied will store these materials securely at its Cultural Heritage Storage Facility located at its Hunter Valley Services complex, Lemington Road, Ravensworth. The possibility of repatriating archaeological materials will be considered as an element of the mine rehabilitation plan at the completion of mining activities.

Coal & Allied will manage any objects excavated or collected in a manner consistent with its current procedures for managing the storage and preservation of salvaged Aboriginal artefacts. Appropriate and specific management procedures for the collection, accession and storage of excavated and otherwise collected objects will be developed as an element of the heritage management plan with the advice of a suitably qualified historical archaeologist. All information collected during excavations and salvage activities will be recorded in a project GIS database.

What does the chance finds procedure comprise?

The specific measures incorporated into the chance finds procedure for the heritage management plan will be developed in consultation with the Heritage Division of the OEH and subject to the approval of the DP&E. The chance finds procedure will be incorporated as an element of the heritage management plan for the proposal.

Coal & Allied has existing cultural heritage site reporting and recording requirements under the Rio Tinto Coal Australia Cultural Heritage Management System that requires employees, contractors and visitors to report any chance finds (historic or Aboriginal) to the Coal & Allied Cultural Heritage Specialist (qualified archaeologist), of the Health, Safety, Environment and Communities team.

How much funding will there be?

The total funding will be \$700,000 as set out below.

As an outcome of consultation with the Coal & Allied Community Heritage Advisory Group Coal & Allied has committed to establishing two historic heritage conservation funds. The funds, which would be a voluntary Coal & Allied initiative, would be initiated to provide real historic heritage benefits. These commitments are documented in the EIS (refer to Chapters 19 and 22).

The MTW – Historic Heritage Conservation Fund is to be established to provide resources for historic heritage conservation and research projects proposed by the local community residing within the Singleton LGA. This fund is intended to provide a direct community benefit toward realising positive local historical and heritage conservation outcomes that are of importance to the local community.

It is proposed that the MTW Historic Heritage Conservation Fund would be administered by Singleton Council in conjunction with the Coal & Allied Community Heritage Advisory Group. Coal & Allied will provide an initial commitment of \$100,000 within 12 months (c.2016) of the approval of the proposal and then an additional \$20,000 per annum for the life of proposal, with a total expected commitment of \$500,000.

The MTW - Great North Road Conservation Fund is to be established to provide resources for priority heritage conservation works on significant surviving sections of the Great North Road within the Singleton LGA and/or other areas such as the Great North Road World Heritage Area. It is proposed that the MTW Great North Road Conservation Fund would be administered by Coal & Allied in consultation with Singleton Council, the Coal & Allied Community Heritage Advisory Group, the Convict Trail Project and the Heritage Division of the OEH.

Coal & Allied will provide an initial commitment of \$100,000 within 12 months of the approval of the proposal and then an additional \$100,000 in 2018 or upon commencing development disturbance works that impact the Wallaby Scrub Road section of the Great North Road, with a total expected commitment of \$200,000.

It is unclear if a historical archaeologist has been consulted regarding the viability of these mitigation measures.

Two qualified historical archaeologists were engaged to conduct the archaeological assessment fieldwork, the preparation of the historic heritage impact assessment report and in considering the initial proposed mitigation measures. The names and qualifications of authors of the historic heritage impact assessment study were given in Appendix B of the EIS and are as follows:

- Tina King (Environmental Resources Management – Australia):

BA (Archaeology and Anthropology) University of Queensland 2001; BA (Hons) Archaeology, University of Queensland 2002; Masters Cultural Heritage, Deakin University, 2012.

- Holly Maclean (Environmental Resources Management – Australia):

BA (Archaeology and Anthropology) University of Queensland 2001; BSocSc (Hons) Anthropology, University of Queensland 2002; Masters Cultural Heritage, Deakin University, 2012.

4.9.4 Conservation management plans

A review of the Conservation Management Plans supplied as Annex B and C of Appendix N show that they have not been updated to reflect the current planning pathway that the proposal now finds itself in as they reference conditions of approval granted in 2012.

As noted in the EIS the RAAF Bulga CMP and Great North Road CMP were prepared to comply with development consent conditions of the disapproved Warkworth Extension 2010. The CMPs were submitted with the EIS to provide additional historical and archaeological information and context on the assessment and proposed initial management measures associated with the proposal.

It is intended and expected that within 12 months of receiving development consent the CMPs would be reviewed and revised in accordance with any conditions of consent for the proposal. The CMPs would be core elements of the heritage management plan required for the development and they, along with all other mitigation and management measures would be developed in consultation with, and to the satisfaction of, the Heritage Division of the OEH, and DP&E.

The Brick Farmhouse (Golden Highway, Mt Thorley) CMP was developed independently of the Warkworth Extension 2010 consent condition requirements as part of Coal & Allied's broader programme for the management of buildings and places of historic heritage value that are on Coal & Allied owned lands. Coal & Allied will provide a copy of the Brick Farmhouse CMP to the Heritage Division of the OEH.

The CMPs do not appear to comply with Heritage Council guidelines in terms of their methodology and do not reference relevant pieces of legislation such as the 'relics' provisions of the Heritage Act.

The historic heritage study reviewed the methodology used to prepare the CMPs in accordance with the Heritage Council of NSW Conservation Management Plan Assessment Checklist (September 2003, Heritage Division of the OEH). The heritage specialists who undertook the historic heritage study hold that the methodology used in the preparation of the CMPs substantially complies with the requirements of the checklist.

Further, and as noted above, the CMPs will be reviewed and revised by Coal & Allied to address the Heritage Division's comments and also to incorporate relevant consent conditions requirements for the proposal. Proposed revisions to the CMPs will be developed in consultation with the Heritage Division to ensure they comply with their requirements.

With respect to the 'relics' provisions the *Heritage Act 1977* it is noted that Section 1.5.1 of RAAF Bulga CMP and Great North Road CMP makes reference to the *Heritage Act 1977* provision for the protection for subsurface relics and for heritage items of State significance listed on the State Heritage Register. Section 7.4.4 of the CMPs also provides a definition of 'relic' and provides detail on sections 139 and 140 of the Heritage Act. The Great North Road CMP also references relics in the context of the Singleton Local Environmental Plan (section 1.7.2).

These references will be refined during any review or update of these CMPs that may be required, including the additional reference to Heritage Act, Division 9, Part 6 (sections 138-142-139-146a-c) in the legislation Section 2, including information on Excavation Permits (section 139-140) required as part of Heritage Council approvals to prior to the disturbance of land identified relics.

4.9.5 Aboriginal heritage conservation areas

The Heritage Council is pleased with the increased area set aside for the Wollombi Brook Aboriginal Cultural Heritage Conservations Area, including the Bulga Bora Ground area.

The Heritage Council considers the proponent's statement of commitments in Section 18.4.1 of the EIS very positive and will ensure the Bulga Bora Ground site is protected and accessible to the Aboriginal community.

The Heritage Council applauds the commitment to continue to engage with Wambo Coal regarding a collaborative management protocol for the Bulga Bora Ground area.

Coal & Allied welcomes the Heritage Council's acknowledgement and support for the proposed WBACHCA. While the intention for the establishment of the WBACHCA is to provide for the long-term protection of places and landscapes of Aboriginal cultural heritage significance, it is also intended to incorporate the management and conservation of historic heritage places within the WBACHCA into the Plan of Management for the area. These places include the Springwood Homestead, portions of the RAAF Bulga complex (including the mess hall ruin), and various relics of previous agricultural and pastoral activity undertaken on these lands.

Importantly, the most intact section of the Great North Road (along Wallaby Scrub Road section) is situated to the north of the proposed disturbance area and Coal & Allied has made the commitment to include this section of the road in the WBACHCA for its long-term protection (refer to Chapters 18 and 22). This will require the consent of Singleton Council which is the owner of the road.

4.10 Roads and Maritime Services

The NSW Roads and Maritime Services (RMS) raised no objections to the proposal, provided the matters discussed below are addressed and included in the development consent. These matters have been presented by RMS as recommended conditions of approval.

4.10.1 Road contributions

The RMS has recommended:

The proponent shall pay Roads and Maritime \$1million as their contribution to the upgrade of the Putty Road/Mitchell Line of Road intersection, or alternatively carry out upgrade works of an equivalent value on the intersection to the satisfaction of Roads and Maritime.

The Putty Road/Mitchell Line of Road intersection is part of the Golden Highway (State Highway 27 – SH27) and is managed and funded by the NSW Government. This intersection was assessed as part of the traffic and transport study (EIS Appendix O) to determine both the proposal's impacts as well as any cumulative effects. A specific assessment scenario was selected, the year 2017, which corresponds to the first year of Wallaby Scrub Road traffic detours and also includes proposed construction traffic movements for Bulga Coal Complex's Bulga Optimisation Project (BOP) (Umwelt 2013).

The results of the intersection traffic assessment are reported in Table 20.8 of the EIS and show minimal change in any of the intersection delay parameters at this intersection. The only detectable changes in the intersection peak hour levels of service at this intersection (which remain at level of service B for all the year 2017 proposal traffic analysis scenarios considered) are primarily due to the assumed +2 per cent per annum locality background traffic growth in the Mount Thorley area, which is independent of existing and proposed mining projects in the area.

It is not evident from the RMS submission that a clear justification for the cost of intersection improvement works to the value of \$1million, at the Putty Road/ Mitchell Line of Road intersection can be clearly attributed to either the existing traffic operations or the future traffic impacts of the proposal.

If future intersection traffic improvements are required at the Putty Road/ Mitchell Line of Road intersection, it is likely these will be primarily required as a result of locality background traffic growth. Existing funding mechanisms for state highways such as the Golden Highway would contribute to any such future upgrade or improvement. As noted in Section 1.1 of this report, the proposal is conservatively estimated to generate \$567million in NPV terms in royalties to the state which would contribute to schools, hospitals and roads and other infrastructure and services.

Further, the RMS submission refers to conditions of approval for the now disapproved Warkworth Extension 2010 when suggesting that previously committed funds be redirected 'in lieu' from contributions to the now upgraded Golden Highway/Broke Road intersection to the intersection of Putty Road/Mitchell Line of Road. As described earlier, the traffic and transport study concluded that the proposal would show minimal change in any of the intersection delay parameters at this intersection. It is considered that this redirection is neither appropriate nor justifiable.

4.10.2 Intersection of Lydes Lane and northbound ramp of Golden Highway

The RMS has recommended:

The existing intersection of Lydes Lane and the northbound on load ramp of the Golden Highway shall be closed to ensure road safety and network efficiency is maintained and not compromised. All access to and from Lydes Road shall be via the existing protected right turn bay on the Putty Road.

Lydes Lane is a north-south road connecting to Putty Road at its southern end and the Golden Highway at its northern end. The Lydes Lane/Golden Highway intersection (a left turn in and left turn out only access, with a concrete median barrier in the centre of the Golden Highway to prevent unauthorised right turns) is an existing access point to the site. However, the primary access is the southern end of Lydes Lane via Putty Road.

Due to the aforementioned physical safety restrictions, the Lydes Lane/Golden Highway access is used by a small proportion of the MTW workforce (approximately 7 percent) travelling north via the Golden Highway when exiting the site.

Whilst closure of this access to ensure road safety and network efficiency is unlikely to significantly adversely affect the accessibility of the mine site, the applicant would welcome the opportunity to discuss alternative traffic safety solutions with the RMS.

4.10.3 Underpass of Putty Road

The RMS has recommended:

The proposed third bridge crossing of the Putty Road shall be designed and constructed in accordance with Austroads Guide to Road Design (2010) and Roads and Maritime supplements to the satisfaction of Roads and Maritime. A Works Authorisation Deed shall be executed prior to the commencement of any such works on the classified (State) road network.

The applicant considers that the recommended condition is appropriate.

The applicant will provide the necessary detail and comply with the requirements of the Austroads Guide to Road Design (2010) and RMS supplements to the satisfaction of RMS for the crossing of Putty Road. It is noted that a Works Authorisation Deed shall be executed prior to the commencement of any such works on the classified (State) road network.

4.11 Singleton Council

Singleton Council raised no objection to the proposal, however, requested clarification of a number of matters.

Each of the matters raised by Council are provided and addressed in the sections below.

4.11.1 Noise

Verification that the exceedances in cumulative noise impacts are attributable to Wambo Mine. If so, to what extent is this operation meeting its noise obligations.

The noise and vibration study concluded that only one assessment location (property 77) was predicted to exceed the cumulative noise criteria. This assessment location is already within Wambo Mine's noise acquisition zone. The noise and vibration study also calculated Warkworth Mine's contribution to cumulative noise at this assessment location and it was less than or equal to 3 per cent of total noise received at that location. The proposal is shown to satisfy its obligation to amenity noise contribution at this location as derived according to the INP amenity criteria irrespective of whether urban/industrial or rural/industrial amenity category is adopted as per the EPA's submission. Refer to Section 4.3.1(i) of this report.

The removal of Saddleback Ridge will expose residences to audible ongoing mining operation noise which they would otherwise not be exposed to. Council would be concerned to ensure noise levels do not incrementally creep up above the average noise peaks.

The removal of Saddleback Ridge (initially assessed in indicative Year 9 mine plan) is accounted for in the modelled and predicted noise levels for the proposal. At this stage of mining, noise generated from Warkworth Mine would be managed through different combinations of equipment attenuation and onsite operational noise controls such as plant relocation and shutdown to achieve relevant noise criteria.

The removal of Saddleback Ridge is not considered to be a material contributor to predicted increased noise levels at assessment locations west of the proposal. For example, assessment location 14 is south-west of the proposed 2014 disturbance area with Saddleback Ridge directly between the mining activity and this assessment location. Assessment location 14 is approximately 5.3km from mining activity in Year 3 before the removal of Saddleback Ridge and approximately 4.3km from mining activity in Year 9 when Saddleback Ridge has been removed. This assessment location has predicted noise levels of 36dB(A) in Year 3 and 38dB(A) in Year 9, a predicted increase of 2dB(A). Further north is assessment location 266, where Saddleback Ridge is not directly between mining activity and the assessment location. This assessment location is north-west of the proposed 2014 disturbance area and approximately 6km from mining activity in Year 3 before the removal of Saddleback Ridge and approximately 5.4km from mining activity in Year 9 (ie when Saddleback Ridge has been removed). This assessment location is predicted to experience noise levels of 35dB(A) in Year 3 and 37dB(A) in Year 9, a predicted increase of 2dB(A), which is the same increase predicted for assessment location 14. Both locations experience a 2dB(A) increase in predicted noise from the proposal, however only one of these locations presently has Saddleback Ridge between the noise source and receptor. Therefore, it is considered that the removal of Saddleback Ridge is not a material contributor to the minor increase in noise predictions. Refer to Figure 4.6 showing the relationship between the mine, Saddleback Ridge and Bulga assessment locations referenced above.

Overall, the change in noise from current and approved operations is expected to be marginal for western assessment locations, while a material reduction is predicted for eastern assessment locations as attenuation of plant progresses. The implementation of proposed noise suppression and fleet management will mean the advancement westward will not result in a material increase to noise levels that otherwise would occur without these measures.

The principal means of managing noise impacts is proposed through different combinations of equipment attenuation and onsite operational noise management. It is unclear whether real time monitoring at sensitive nearby receptors is proposed.

A noise management system is currently implemented at MTW which consists of real-time and attended noise monitoring (including at residential locations in Bulga), administration, substitution and elimination controls, engineering measures, and a commitment to continuous improvement. These management practices, which are described in detail in Section 6.4.6 of this report, would continue under the proposal, ie real time monitoring will be undertaken for the proposal.

The noise assessment undertaken uses different noise modelling techniques which will result in different background noise levels.

Background levels were determined in accordance with the EPA's policy (INP) for establishing background levels. Background levels are discussed further in Section 6.4.3 of this report and are derived from monitoring data rather than by modelling techniques.

Assignment of background noise levels for individual properties located between monitoring positions where 30dB(A) and 33dB(A) is found, was based on predicted changes in noise over distance from the noise model rather than arbitrary assignment, leading to a fairer representation of background noise levels. Refer to Figures 8.1 to 8.3 of the noise and vibration study.

Compared to previous assessments undertaken in the area, this approach results in a relatively smoother transition in RBL values across such areas and assigns corresponding criteria more evenly between adjoining properties, for example Inlet Road in Bulga. This approach minimises the situation often found where one property has a marked step increase in RBL and therefore higher criteria than its immediate neighbour, creating the problematic 'line-in-the-sand' delineation of criteria which often results in different zones of impact (for example, one property is assigned mitigation while its neighbour is not). This approach is considered robust and was adopted given the importance of this matter. Discussion with the EPA confirmed this was a practical approach.

The background noise data should be verified to ensure it is appropriate given the different modelling undertaken. The background noise level in the EIS of 30dB(A) is significantly less than the 33dB(A) background noise level from the previous proposal.

The background noise levels in the EIS vary depending on receptor location. In Bulga they range from 30dB(A) and 33dB(A) depending on the receptor locations. The noise and vibration study was peer reviewed. The EPA also reviewed the NVS and raised no concerns in relation to the assignment of background noise levels.



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4.11.2 Ecology

The mine expansion would traverse through an area which was previously intended to be set aside as a conservation area.

As noted by Council, the mine extension for Warkworth Continuation 2014 traverses through an area previously set aside as an offset area, referred to as the 2002 Green Offsets. The 2002 Green Offsets package was one of the first State Significant projects in NSW to provide an offset package. The green offset strategy is conditioned under Schedule 4, Flora & Fauna of the DA-300-9-2002. It contains Non Disturbance Areas (NDAs) intended for long-term conservation and Habitat Management Areas (HMAs) for temporary conservation of ecological values as economic coal resources were known to occur beneath those areas.

The DP&E acknowledged in its assessment reports for the Warkworth Extension 2010 that the design of the original offset was flawed, and should be replaced as soon as possible with a better offset that would not sterilise coal resources and could be safely protected in perpetuity. In its assessment report for the Warkworth Extension 2010, the PAC noted the 'questionable condition and ecological value of much of the offset area', ie the NDAs.

The EIS reassesses the original 2003 ecological impact and provides an alternative BOS. The assessment of impact and offsetting uses contemporary standards and policies. The primary reason for mining through the existing offset areas, including parts of the NDAs is that the resources underlying these offset areas which were previously uneconomic to mine are now fundamental to the continuation of Warkworth Mine. The economic viability of the mine is based on the available dragline strike length (as outlined below).

Maximising the dragline strike length is critical to the efficient operation of the mine. Under the current development consent, a dragline would not be able to extract the lower overburden pass in West Pit as the area to the west (Saddleback Ridge) could not be incorporated into the pit. This is because the strike length would decrease to the point where draglines can no longer operate due to insufficient working room for the dragline and the spoil. Further, there would be no room for access ramps so haul trucks would not be able to access extracted coal. The reduced strike length and inadequate physical working area would not allow the required 18Mtpa of ROM coal to be produced across the operation.

This matter is discussed further in Section 2.3.2 of this report.

Concern is expressed as to the extent to which the Warkworth Sands Grassland can be re-established in perpetuity which has not been proven at this time.

Council's concerns in relation to the ability to re-establish WSW on WSG is noted. WML is highly confident of its ability to successfully re-establish WSW on WSG.

WML has developed a comprehensive programme to re-establish the WSW community. Although there is evidence anecdotally the WSW community has self-re-established without intervention, the proposal includes science-based research and applied technique to ensure its re-establishment. One of the long-term benefits of the proposal is that the re-establishment will lead to a net increase of 87ha (or 19 per cent) to the current 465ha extant area of WSW.

The flora species that make up the unique assemblage that is WSW are not in themselves unique and are found in various other ecosystems. Propagation of most species such as the keystone eucalyptus in the overstorey and understorey species such as banksia, acacia and native grasses have been successfully germinated by UNE and elsewhere. The re-establishment areas are on in-situ sand deposits that once would have grown WSW. These sand deposits have the same water regimes, micro-organisms, climate, and in many cases component species already present. Re-establishment would provide a large, fully functioning example of the EEC through the enhancement of areas that are currently in reasonable ecological condition, and by re-establishing the community in areas where it is currently degraded.

A review of the WSW in Figure 5.2 of the ecology study (EIS Appendix H) and the historical aerials shown in Figure 4.3 (EIS Appendix H) indicate that WSW was heavily cleared in the early 1960s. This comparison is shown in Figure 2.12. By 1979, the vegetation had undergone significant regeneration and is now considered a good quality example of this community. Modern restoration techniques when applied to similar areas will enhance the natural regeneration of the WSW providing a high likelihood of successfully re-establishing WSG to WSW.

Further, the proposed WSW re-establishment programme in the SBA and NBA builds on comprehensive scientific understanding of the vegetation community compiled with the assistance of the UNE and other regeneration practitioners.

A WSW Restoration Manual has also been prepared (Niche 2013), which summarises the previous work undertaken by UNE, Dr Anne Marie Clements and Associates, and Cumberland Ecology. This Manual provides a sound basis for guiding best management practices to restore WSW. The Manual also sets out a process for tracking the recovery of WSW sites toward a reference state as a result of appropriate applied land management restoration interventions.

A draft LOMP has also been developed. The LOMP establishes conservation objectives, key performance criteria and indicators for the SBA and NBA, as well as outlining conservation management actions and monitoring programmes that have been formulated based on the existing ecological condition of the SBA and NBA to achieve the conservation objectives.

An implementation bond is also proposed as an additional supplementary/conservation measure to provide an incentive for timely delivery of the WSW re-establishment programme, please refer to Section 2.4.5(iv) of this report. For the reasons given above, the applicant is confident of the successful re-establishment of WSW.

The offset package is not on a like for like basis.

As described previously, the OEH has extensively considered and assessed the BOS and provided certification in accordance with clause 14(3) of the Mining SEPP which requires the consent authority to consider any certification by the Chief Executive of the OEH that measures to mitigate or offset the biodiversity impact of the proposal (ie the BOS) will be adequate. The BOS certification from OEH is provided in Appendix L.

One element of the BOS are land-based offset areas, which provide a portion of offset areas which are like for like. Contributions to the UHSA fund will be used by OEH to purchase suitable land-based offset areas, utilising the BBAM. The BBAM uses the broadened requirement of like for like offset areas under Principle 3 of the BOP.

The BCAM credit calculation for proposed impact is 611ha and is equivalent to over 3,000ha of land-based offset areas using BBAM. Additional to this is the 2,100ha of EEC rehabilitation which will be protected in perpetuity which will be like for like.

4.11.3 Rehabilitation of mined lands

The adequacy of progressive rehabilitation to minimise air quality impacts is an ongoing community concern.

Council's comment is noted.

The rate of progressive rehabilitation may not be apparent to some stakeholders. It is noted, however, that it accords with the rehabilitation requirements as presented in the MTW MOP. Photographs 4.1, 4.2 and 4.3 show the progressive rehabilitation currently taking place at the Site. Note the piles of topsoil ready to be spread along the landform.



Photograph 4.1 **Progressive rehabilitation of the Site as viewed from the Golden Highway**



Photograph 4.2 **Progressive rehabilitation at the Site as viewed from within the Site, to the west**



Photograph 4.3 **Topsoil spreading as viewed from within the Site, to the west**

In the 2013 MTW Annual Review, which reported on the activities undertaken during the 2013 calendar year, the area sown for rehabilitation (61.6ha) exceeded the target for that year (54.5ha).

In response to stakeholder feedback, temporary rehabilitation, through the aerial seeding programme of disturbed areas is undertaken at Warkworth Mine. This practice will continue under the proposal and will provide a temporary vegetative cover for active mining areas until the area is available for final rehabilitation. This vegetative buffer will assist to reduce the entrainment of dust during wind events.

Additionally, the proposed mine plan is focused on completion of the final landforms to the east of the site, this will allow a closer alignment with the rehabilitation and mine planning as the mine progresses west (refer to Figures 2.7 to 2.9 of the EIS).

In recognition of the communities' interest in rehabilitation and mine closure, Warkworth Mine will run some rehabilitation and closure information sessions with the community to provide an overview of Coal & Allied's approach to mine closure planning, rehabilitation, future land use and management. These sessions will also provide an opportunity for the community to provide feedback on this aspect of the operation.

A regular and systematic schedule of rehabilitation should be incorporated into any consent conditions which includes a significant per cent of exposed land being rehabilitated on an annual basis.

WML supports a regular and systematic schedule of rehabilitation.

The details of the extent of progressive rehabilitation is outlined in the MTW MOP and reported against in the Annual Review each year. Due to the variability of mining operations the commitments of the extent of areas proposed for rehabilitation are prescribed in a MOP, not an EIS. As reported in the 2013 Annual Review, the area sown for rehabilitation in 2013 exceeded the stated target by 13 per cent.

Table 2 of the MTW MOP (EIS Appendix Q) outlines the Landform Establishment schedule. Additionally, the proposed progression of mining and rehabilitation are shown in Figures 2.7 to 2.9, with the final landform in Figure 2.10 of the EIS.

The final landform will contain a significant void. It will be important that the final landform integrates with surrounding future land uses and the Council would appreciate being involved in future discussion in this regards.

As described in Section 13.5 of the EIS, once it is determined that Warkworth Mine is to move toward closure, detailed planning and preparation for closure of the mine would commence. The Rio Tinto Closure Standard would be followed and was developed with the intent to ensure that Rio Tinto managed activities are left in a condition which minimise adverse impacts on the human and natural environment, and that a legacy remains which makes a positive contribution to sustainable development.

The standard requires the development and implementation of a comprehensive consultation process and communication plan as part of any operations Closure Strategy. The communication and engagement must be executed in a timely, consistent and transparent manner. This must target all internal and external stakeholders, including Councils. Council's input will be important to this process.

4.11.4 Social

Voluntary Planning Agreements provide an opportunity for the proponent to seek to offset some of the potential adverse social and environmental impacts on the community associated with a project in terms of financial initiatives. The Council requests that a suitable consent condition be imposed should consent be recommended.

Coal & Allied is committed to working with Council on developing a mutually agreeable voluntary planning agreement (VPA) and would support a condition of development consent to this effect.

The Bulga village locality comprises a population of approximately 400 people and the Council is concerned to ensure the ongoing sustainability of this community should mining operations continue.

Council's concerns in relation to the sustainability of the Bulga village are acknowledged by the applicant.

Bulga has a number of significant attributes including retail and community facilities (service station, general store, tavern, community hall, sports ground and fire brigade) and it is well located to service the tourist trade being proximal to attractions like wineries and is on the Putty Road tourist route. Bulga experiences low population turnover and residents have relatively positive health, employment, crime rate and property ownership characteristics that are illustrative of a stable and cohesive community.

Coal & Allied is committed to continued co-existence with the local community, and ensuring Bulga village is sustainable in the future.

Predicted impacts from the proposal would not result in any properties in Bulga village being entitled to acquisition upon request in accordance with government policy.

As described in EIS, technical studies for the proposal predicted that all properties surrounding the operation would satisfy relevant criteria with the exception of assessment location 34 and those already within, or inferred to be in, zones of affectation for mining operations (assessment locations 77, 102 and 264). Assessment location 34 is located to the north of Bulga village as can be seen on Figure 6.5 of this report. No other properties in Bulga or elsewhere will be entitled to acquisition upon request, as they are not impacted by the proposal to such a degree as to be entitled to an acquisition right.

WML has taken the initiative to reinstate the acquisition rights of those properties that were entitled to acquisition upon request under the Warkworth Extension 2010 following feedback from a number of residents and subject to approval of the proposal. This is part of Coal & Allied's property acquisition programme and is not related to the impacts assessed for this proposal.

WML recognises that any property acquisition in the area must be thoughtfully managed. While this is part of the current operating approach of the business, Coal & Allied appreciate that any discussions around property purchases locally generate interest, questions and concerns, and has encouraged residents to speak directly with the business to discuss any aspect of the process.

Regardless of the criteria based assessment, MTW publically committed in March 2014 to reinstate acquisition rights of residents who lost the right when the Warkworth Mine 2012 development consent was rescinded.

As part of this process, Coal & Allied utilises the services of local real estate agents to manage its properties. Any properties purchased will be offered for lease on the open market at market rates, and in accordance with Coal & Allied's standards of property management. There are two commercial enterprises located in Bulga that are entitled to voluntary property acquisition under this programme.

Coal & Allied recognises that these businesses are also valued as community facilities and as such any acquisition offer would include the intention of leasing the premises for the continuation of these businesses.

Australian Bureau of Statistics (ABS) data shows that Bulga SSC's population increased by 11.5 per cent from 321 to 358 persons between 2006 and 2011, which is double the NSW rate of 5.6 per cent for the same period. In this period, Singleton's population declined by 4.7 per cent. This is despite community consultation regarding the MTW's intention to seek regulatory approval to continue mining beyond the 2003 consent beginning in August 2009.

It is acknowledged, however, that local stakeholders reflect on gradual population decline in nearby villages such as Warkworth, Camberwell and Ravensworth. Even with the replacement of population that may occur with leasing any acquired properties, or with the new owners living or leasing properties sold by owners on the open market, concern remains regarding the loss of existing community connections, activity and village life.

While the proposal would contribute to maintaining the current and the regional population, individual community members would continue to make decisions based on individual circumstances about whether to stay in the area. ABS data has shown that Bulga has a lower population turnover rate than the NSW average: in 2011, 71 per cent of people in the Bulga SSC were recorded at the same address they were five years earlier (compared to 57 per cent for both Singleton and NSW).

Although it is true that population growth (of 37 individuals) was experienced during the period of 2006-2011, submissions of objection attribute this to the deed that was in place to consider in-migration data and the timing of the population change. To understand population movement, the ABS census asks respondents whether they had a different address 5 years ago and/or 1 year ago. The data for Bulga indicates that of the 82 individuals in Bulga stated that they had a different address five years prior (2006), 33 (40 per cent) had moved to Bulga in the previous year, 2010. This is important because in 2010 the previous Warkworth Extension 2010 had already been publically announced.

This demonstrates that families and individuals were prepared to move to the community with knowledge of the proposal and provides evidence that it is unlikely that the community would experience significant population loss as people will continue to desire to live there. It is considered that similar outcomes are likely for the current proposal.

Although it is acknowledged that some community connections may be lost if existing community members choose to leave the community, new community members will have the opportunity to become part of the community and establish new connections and support the sustainable future of Bulga village.

Existing direct community contributions and investment from MTW operations would continue under the proposal. Employees and suppliers make financial and non financial contributions to the regional community and participate significantly in community activities, which in turn, contribute to community way of life. The proposal would continue to provide employment and economic benefits to suppliers, allowing employees and suppliers to continue to contribute to the community.

A proportion of the MTW Site Donation Committee annual funding would be dedicated for projects which contribute to near neighbour communities, including the Bulga community, and which are in accordance with the funding guidelines of the committee.

It is also noted the VPA (refer to section above) is anticipated to include specific provision for Bulga village.

Further, the applicant recognises community visioning work that has been completed for Bulga, and Singleton Council's proposal for the development of a Village Master Plan for the villages of Broke, Bulga and immediate surrounds. The applicant proposes participating in this process to ensure its contribution toward facilitating the ongoing sustainability of the Bulga-Milbrodale community.

The Social Impact Assessment has focussed on broader LGA wide impacts rather than focussing in on the local community.

Whilst the SIA appropriately considered the broader Singleton LGA, contrary to the assertion, the greatest focus was on near neighbours, including Bulga residents.

For the purposes of the SIA, the following scales were used:

- Assessment area suburbs: this includes those villages (defined as suburbs by the ABS) closest to the Site for which there is a significant resident population and available ABS census data – Bulga State Suburb (SSC), Broke SSC and Singleton SSC. A particular focus on Bulga village is given in accordance with the Secretary's requirements.
- Assessment area LGAs: Singleton LGA is the main area considered as part of the assessment as this is where the proposal is located. Maitland, Cessnock, Muswellbrook, and Upper Hunter Shire LGAs are also included given the socio-economic linkages between MTW and these LGAs.
- NSW is used given the resource is owned by the State and exploitation of the resource is a State decision.

A strong focus of the engagement completed as part of the SIA for the proposal was with near neighbours and residents of local communities such as Bulga, as required by the Secretary's requirements. Approximately 44 per cent of participants were near neighbours. The Bulga community was strongly represented with 20 per cent of Bulga residents participating (the highest proportion of stakeholder participation).

This matter is discussed further in Section 6.7.9 of this report.

Council is concerned to ensure that the Social Impact Assessment report in the EIS accurately reflects the extent of consultation undertaken.

The SIA accurately reflects the extent of consultation undertaken, which had a strong focus on near neighbours.

A total of 151 stakeholders participated in the SIA consultation process. A strong focus of the engagement was with near neighbours and residents of local communities such as Bulga, as required by the Secretary's requirements. Approximately 44 per cent of participants were near neighbours, equating to 66 of the 151 participants. In addition to near neighbours, consultation was also undertaken with MTW employees, local community groups, Singleton Council and other service providers.

As described in Section 2.4.2 of the SIA, interviews were conducted addressing a number of key themes, namely: perceptions of social impacts associated with the proposal; potential for management and mitigation of these impacts; opportunities associated with the proposal and potential enhancement strategies; perceptions of existing operational impacts and management strategies; costs and benefits of mining in the region; needs and aspirations in the community; preferred forms of information and engagement.

Throughout the SIA consultation process all data was coded and analysed to identify significant stakeholder identified themes across key topic areas which were then consolidated and summarised into Figure 21.6 in Chapter 21 of the EIS. The topic areas identified through consultation were used to guide the identification of impacts and opportunities, the analysis of which is presented in Table 21.5 of the EIS and Appendix E of this report. The table provides an overview of community consultation findings in Column B and technical assessment in Column A. This demonstrates that the assessment clearly took into consideration the outcomes of the consultation with all stakeholders who were engaged during the development of the SIA.

The community has expressed a strong sense of being let down in relation to setting aside of the deed which would have preserved Saddleback Ridge.

It is recognised that Saddleback Ridge is of particular interest and concern to local stakeholders. WML acknowledges the concerns raised by the community. The decision to proceed with a process to seek mining access to areas previously set aside was not taken lightly but is critical to ongoing viability of the mine.

Under the current development consent, a dragline would not be able to extract the lower overburden pass in West Pit as the area to the west (Saddleback Ridge) could not be incorporated into the pit. This is because the strike length would decrease to the point where draglines can no longer operate due to insufficient working room for the dragline and the spoil. Further, there would be no room for access ramps so haul trucks would not be able to access extracted coal. The reduced strike length and inadequate physical working area would not allow the required 18Mtpa of ROM coal to be produced across the operation.

As described in the EIS (see Chapter 23) the Deed of Agreement (the Deed) was acknowledged by DP&I (now DP&E) to be an early attempt at offsetting and one that does not reflect current government policy. Further, the Planning Assessment Commission (PAC) noted the 'questionable condition and ecological value of much of the offset area' contained in the area covered by the Deed.

The Deed has since been amended and makes provision for mining of the area subject to a relevant planning approval issued under the EP&A Act. As described in the EIS, offset areas for the mining of this area are provided within the BOS, which has been prepared in accordance with the *Draft NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014) (now final). This matter is discussed further in Section 6.7.3 of this report.

4.11.5 Economics

Council's draft submission was available to the public on its website prior to the Council meeting on 18 August 2014, where concurrence of councillors is required prior to finalisation. Review by Coal & Allied identified an inconsistency in the draft submission, compared to the information provided in the economic study (EIS Appendix E). As a result, the following clarification was issued to Council on 18 August 2014 prior to the Council meeting and is provided here for transparency.

In the draft submission for the Council meeting, it stated that the economic benefit to be derived from the proposals for the LGA is:

- 35 per cent of the operations employees and long-term contractors live in the Singleton local government area and the estimated local flow on effect is \$84million in additional income and the continued employment of 61 full-time equivalent workers.

- The benefits attributable to Warkworth Mine in NPV terms are identified to amount to... for the Singleton LGA, the additional disposable income received by employees of \$75million, and additional annual employment of 57 full time employees. [emphasis added]

The first dot point correctly summarises the economic study's assessment of the combined proposals (ie Warkworth and MTO) 'indirect' or 'flow-on' benefit to the LGA. The benefits refer to the additional economic activity generated locally (for instance, by local businesses) as a result of MTW expenditures on wages and salaries and other purchases in the local economy. These flow-on benefits are estimated at around \$84million in additional income (in NPV terms) and 'additional' annual employment of around 61 full-time equivalent workers over the life of the mine.

Information provided during briefing sessions to Council showed that, separate to the indirect/flow-on benefits, the *direct* benefits largely take the form of the disposable income (wages and salaries net of taxes and other contributions) earned by MTW employees who live in Singleton. In NPV terms, the disposable income earned by MTW employees living in Singleton is estimated at around \$320million over the life of the mine (from 2015 to 2035). This estimate of \$320million does not appear directly in the economic study. As stated in Section 2.5 of the economic study, disposable income paid to Singleton residents (net of taxes, superannuation and Medicare payments) is shown to average almost \$49million per year from 2015 to 2030 and over the life of the proposal, amounts to \$320million, inclusive of a discount rate of 7 per cent and subtracting the final five years of mine life when production begins to decline (correspondingly it would be expected that the number of employees begin to fall).

The following two economic matters were raised in the submission provided by Council. These are indented below with a response following.

Approximately 35 per cent of the work force lives in the Singleton Local Government Area and should the operation close there would be a loss of revenue to local businesses and leakage from the area together with adverse impacts on families. Significant royalties to the State Government would not be realised and returned to the area through infrastructure projects.

The Council submission is correct in highlighting the impacts on the local economy should the proposals not proceed (there would also be negative impacts to the regional and State economies).

The economic study has estimated the 'net' economic benefits of the proposals on the Singleton LGA, that is, the difference between the proposals being approved and not being approved. Therefore, should the proposals not be approved, the impact on the Singleton LGA would be:

- loss of disposable income that would have been earned by MTW employees living in Singleton, which has been estimated at around \$320million over the life of the mine (from 2015 to 2035) in net present value (NPV) terms;
- loss of Shire rates of around \$0.7million per year until 2035; and
- loss of indirect – or flow-on – benefits resulting from the additional economic activity that would have been generated locally. These flow-on benefits have been estimated at around \$84million in additional income (in NPV terms) and additional annual employment of around 61 full-time equivalent workers over the life of the proposal.

Should the projects be granted consent it could result in residents leaving the area, particularly in the Bulga village and because of perceived and real mining impacts it may prove difficult to re-establish the lost community members whilst ever the mining operations are continuing. This would have a negative economic impact on the immediate locality and more broadly the Singleton LGA. The EIS does not appear to address and quantify this issue.

Based on all of the assessments undertaken, through mitigation measures proposed, the proposal is anticipated to remain within government mandated amenity limits throughout its life.

The EIS considers any potential socio-economic impacts such as those identified above in the context of cumulative impacts of multiple developments as well as a range of other social factors which affect regional Australian communities, rather than directly attributable to a single continuing operation.

As described in Section 4.10.4 above, WML is committed to supporting the sustainability of communities in areas surrounding the mine, particularly Bulga village.

Predicted impacts from the proposal would not necessitate property acquisitions in Bulga village. Acquisition rights would be restricted to one property that is not currently within an actual or inferred acquisition zone of another mine (see Section 6.7.4 of this report). This property is located to the north of Bulga village.

ABS data indicates there has been an increase in Bulga's population between 2006 - 2011, which is well above the state average and took place during the period of the previous application. This increase has occurred since the commencement of community consultation in August 2009 regarding WML's intention to seek approval to continue operations beyond the 2003 consent (refer also to Section 6.7.6).

The proposal received a small number of supportive submissions from Bulga residents highlighting the benefits of living with their families in a small village in close proximity to their place of work. This indicates that even if some residents choose to move throughout the life of the mine, that other members of the broader regional community or new members of the community are interested in living in Bulga, maintaining the sustainability of the village. It is also important to note that these submissions came from individuals with families and close connections to the community rather than 'single men' as has been suggested in a number of community and special interest group submissions.

As noted in Section 4.11.4 above, WML recognises the community visioning work that has been completed for Bulga, and Singleton Council's proposal for the development of a Village Master Plan for the villages of Broke, Bulga and immediate surrounds. WML proposes participating in this process to ensure its contribution toward facilitating the ongoing sustainability of the Bulga-Milbrodale community.

WML is committed to industry best practice environmental management and continual improvement over the life of the proposal to manage potential impacts. Extensive ongoing engagement with near neighbours would be implemented with feedback received continuing to be an important consideration in the operational management of the mine. The impacts discussed in the EIS demonstrate that mining and Bulga village can co-exist.

As assessed in the economic study, the proposal is forecast to provide significant economic benefits to the Singleton LGA.

4.11.6 Traffic and transport

The closure of Wallaby Scrub Road has been a long standing issue of concern for Council and the community due to the potential inconvenience to road users should it close. It is also considered by the community to define the outer limit of mining operations.

Council's concerns regarding the closure of the road are acknowledged.

For MTW to secure its future, it needs to continue mining to the west and mine through Wallaby Scrub Road. It should be noted that the existing development consent allows mining to continue up to between 60 and 80m east of Wallaby Scrub Road, with areas west of the road acknowledged in the consent as containing coal resources for mining subject to separate development consent.

WML has always stated that reserves within Warkworth Mine's mining lease may be developed at a later stage. Whilst the 2002 EIS presented mine plans that identified Wallaby Scrub Road as the western limit of mining, it stated that there were other areas that may eventually be developed. Specifically, the Green Offset Strategy that was developed and presented in the 2002 EIS identified two types of land-based offset areas; HMAs and non disturbance areas NDAs.

Three HMAs were proposed in the 2002 EIS; one to the north of the proposed mining area and two to the west of Wallaby Scrub Road. The 2002 EIS stated that development of this land may occur in the future. It also stated that the land would be managed for the duration of the impact of vegetation clearance associated with the project or until the land is required for development. So it has always been a known option that the land west of Wallaby Scrub Road could be developed.

As discussed in Section 20.3.2iii of the EIS, the proposed closure of Wallaby Scrub Road would impact current traffic movements in the area and would divert its existing traffic to alternative routes via either the Golden Highway and Putty Road or the Golden Highway and Broke Road. Existing traffic on Wallaby Scrub Road originates primarily from the Charlton Road direction. This is confirmed by origin-destination (OD) surveys undertaken as part of the Warkworth Extension 2010 (Parsons Brinkerhoff 2010) and traffic and transport study for the proposal, a comparison of which is provided below in Table 4.9.

Table 4.9 Comparison of Wallaby Scrub Road 2010 and 2014 OD traffic survey results

| Direction | Route | 2010 Survey traffic | | 2014 Survey traffic | |
|-----------------------|-----------------------------|---------------------|------|---------------------|-------------------|
| | | vehicles | % | vehicles | % |
| Combined (to/from) | Charlton Road | 425 | 76.3 | 383 | 65.6 |
| | Wallaby Scrub Road | 0 | 0 | 41 | 7 |
| | Putty Road (east) | 14 | 2.5 | 25 ¹ | 4.3 ¹ |
| | Putty Road (Bulga) | 45 | 8.1 | 135 ² | 23.1 ² |
| | Putty Road (south of Bulga) | 73 | 13.1 | | |
| | <i>Total vehicles</i> | 557 | 100 | 584 | 100 |

Notes: 1. Also includes traffic travelling on Charlton Road which does not continue to the southern end.

2. Includes traffic travelling from Bulga village and from other locations further to the south.

The major traffic proportions using Wallaby Scrub Road were approximately 60 to 70 per cent from Charlton Road (south end) and 20 to 25 percent from Putty Road (west, for Bulga village and areas to its south). This suggests that local use of the road is relatively low and that a majority of road users on Wallaby Scrub Road are travelling through the area.

By Year 2 (nominally 2016/17) of the proposal, mining would be within 500m of the road and it would be necessary to close it. There are alternative routes to local areas, including Bulga, already in place (for example, Golden Highway) that add time to journeys; approximately 6 minutes to a trip for Bulga village.

Alternative routes for Wallaby Scrub Road were examined and were found to have unacceptable impacts on ecology and cultural heritage, and would still increase travel times as the relocated road would be longer. It should be noted that Singleton Council did not support the relocation of Wallaby Scrub Road as part of the 2010 Warkworth Extension. Section 23.2.4 of the EIS details considerations for the permanent relocation and temporary relocation of Wallaby Scrub Road.

It is proposed to provide an access track through the expanded operations for the Rural Fire Service in lieu of Wallaby Scrub Road. Consideration should be given to other emergency services and their access arrangements should this route be closed.

The applicant consulted with the nearest emergency service with local access to Wallaby Scrub Road (ie Rural Fire Service (RFS)) during the proposal development phase.

An agreement is in place with the RFS to provide an appropriate emergency access trail between Putty Road and the Golden Highway, west of the proposed mining area. The access trail would be constructed in accordance with the RFS's access standards prescribed in *Planning for Bush Fire Protection* (Rural Fire Service 2006) and NSW Bushfire Coordinating Committee Policy No. 2/2007, in consultation with emergency services. Should other emergency services require access to the fire trail, it will be made available.

Wallaby Scrub Road is 7 kilometres in length and is a significant Singleton Council asset. Should this road be closed this value will be lost to the Singleton community.

Council own the land on which Wallaby Scrub Road is located and would be compensated for the loss of this land asset accordingly.

More generally with regard to its closure and its effects on the community, the traffic and transport study concluded that:

- future traffic proportions travelling from Charlton Road would continue to decline with increasing use of the Hunter Expressway route;
- daily traffic increases which would occur on the alternative traffic detour routes following the closure of Wallaby Scrub Road would be small in comparison to the actual capacity of the affected roads;
- there would be minimal intersection traffic impacts on the alternative traffic detour routes for Wallaby Scrub Road; and
- additional traffic will be directed to State maintained roads, which have excess capacity reducing the maintenance cost to Council and Singleton community, including that of the closed Wallaby Scrub Road.

In addition, Wallaby Scrub Road has a relatively low traffic volume and a high proportion of through traffic, as previously mentioned.

Accordingly, the proposal would result in minimal traffic impacts on the wider local road network with the primary traffic impacts related to the closure of Wallaby Scrub Road. There would generally be minimal traffic impacts on the traffic detour routes for the Wallaby Scrub Road closure as these roads (and the relevant intersections) have sufficient spare capacity to accommodate this traffic with minimal intersection capacity impacts or delays.

If Wallaby Scrub Road were to be closed this would facilitate the continued encroachment of mining operations towards the village of Bulga.

As shown in Figures 2.7 to 2.9 of the EIS, proposed mining will extend beyond Wallaby Scrub Road. As stated in the EIS, the closure of Wallaby Scrub Road is an essential element of this proposal to make the proposal economically viable. Coal resource is present in the intervening area between the proposal and the SBA (shown in Figure 4.7 of this report) and may be subject to future assessment. The SBA represents the western most extent of possible mining for the Site.

4.11.7 Blasting

Best practice blast management should continue to be implemented and be incorporated into any consent conditions.

Council's response is noted. WML is committed to best practice blast management.

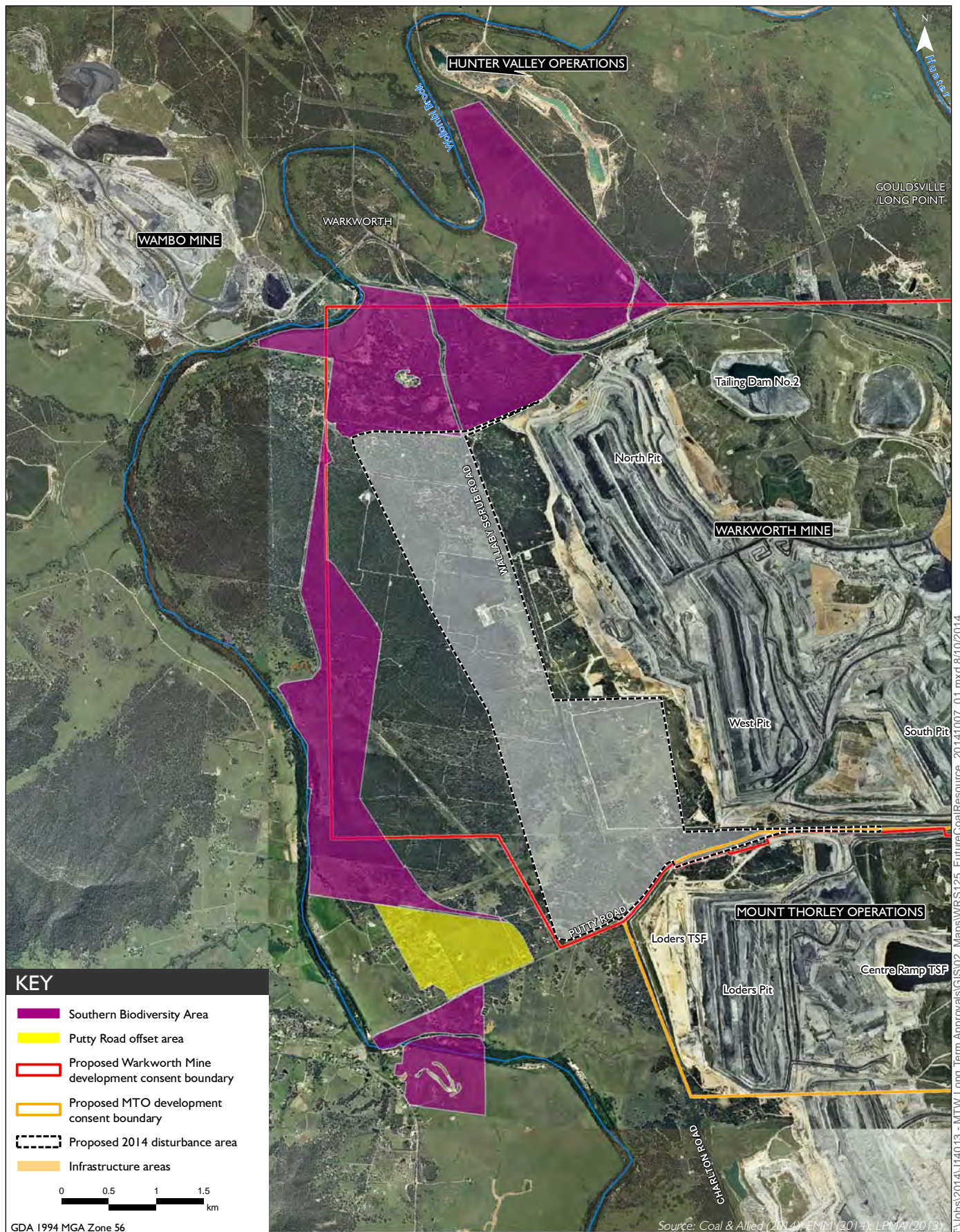
An online blast schedule should be provided and updated regularly.

Council's response is noted. WML is managing blasting at the Site in accordance with the development consent (DA-300-9-2002), Schedule 3, Condition 27c which requires WML to operate a suitable system to enable the public to get up-to-date and accurate information on the proposed blasting schedule on site.

The current blast management plan (September 2014) for MTW provides up-to-date information regarding the proposed blasting schedule via the process outlined below:

- notify neighbouring mining operations;
- advertisement in the Singleton Argus when a public road is to be closed, as well as identifying proposed blasting times on road signage established in the vicinity of MTW;
- providing an overview of the blasting practices on the Rio Tinto Coal Australia website (<http://www.riotinto.com/energy/mount-thorley-warkworth-10427.aspx>) which also includes a contact number for any community enquiries; and
- providing up-to-date information to the blasting hotline 1800 099 669.

This plan would continue to be used for the proposal. WML is committed to ongoing improvements to the system to reflect community feedback, for example the investigation of effective SMS alerts. An example of typical blast notification signage used for Warkworth Mine is shown in Photograph 4.1.



Future coal resource constraints

Warkworth Continuation 2014

Response to Submissions

Figure 4.7



Photograph 4.4 **Blast notification signage**

4.11.8 Aboriginal heritage

The proposed conservation area would appear to present a beneficial outcome. However, the adequacy of this measure should be reviewed and confirmed in consultation with the Aboriginal community.

Council's response recognising the beneficial outcome the WBACHCA provides is noted. The adequacy of the WBACHCA as an Aboriginal cultural heritage offset area has been endorsed by the Registered Aboriginal Parties through the CHWG.

Information on the archaeological and cultural significance and the CHWG endorsement of the adequacy of the WBACHCA as a cultural heritage offset area are detailed in the Aboriginal cultural heritage study (EIS Appendix M).

The CHWG is comprised of Aboriginal community representatives who are Registered Aboriginal Parties for consultation with respect to the proposal. The WBACHCA has been developed as an offset for disturbance to Aboriginal cultural heritage associated with the proposal as a result of discussions with and the endorsement of the CHWG. The WBACHCA concept was originally proposed during the Warkworth Extension 2010 consultation process. Substantial progress towards the implementation of a collaborative co-management regime with the Aboriginal community had been made prior to the disapproval of Warkworth Extension 2010 and Coal & Allied has since 2009 voluntarily co-managed the area with the CHWG for the protection and conservation of significant Aboriginal cultural heritage objects, places and landscapes.

Coal & Allied will continue consultation with the Aboriginal community through the CHWG, as well as DP&E and OEH, during the establishment of both the Wollombi Brook and Loders Creek (Mount Thorley Operations 2014 proposal) Aboriginal Cultural Heritage Conservation Areas and the development of their associated management plans.

4.11.9 Historic heritage

The proponent's commitments in respect of European [historic] heritage should be incorporated into any future consent conditions.

Council's response is noted.

The impacts on the P1 huts are described as moderate due to them becoming rare, however it would be likely the impacts in this circumstance is significant.

The two P1 Huts that are within the proposed 2014 disturbance area have previously been relocated from their original context, substantially altered and renovated by subsequent owners in order to make them habitable as modern dwellings. Table 6.2 of the historic heritage study (EIS Appendix N) states that the P1 huts have a cultural heritage site sensitivity rating of low, resulting in an overall cultural heritage impact rating of moderate.

As stated in Chapters 19 and 22 of the EIS, if these huts are structurally sound and it is feasible for them to be relocated and reused, Coal & Allied commits to ensuring that opportunities for their continued adaptive reuse, especially by community groups, are explored and where possible and practicable will endeavour to facilitate their relocation and reuse.

Council is concerned to ensure there is full understanding of the funding program proposed in relation to European heritage and particularly in relation to any residue of the historic Old North Road.

A total of \$700,000 will be provided across two funds: the MTW – Historic Heritage Conservation Fund and the MTW – Great North Road Conservation Fund.

It is proposed that the MTW Historic Heritage Conservation Fund would be administered by Singleton Council in conjunction with the Coal & Allied Community Heritage Advisory Group. Coal & Allied will provide an initial commitment of \$100,000 within 12 months (c.2016) of the approval of the proposal and then an additional \$20,000 per annum for the life of proposal, with a total expected commitment of \$500,000.

With regards to the Great North Road Conservation Fund, Coal & Allied will provide an initial commitment of \$100,000 within 12 months of the approval of the proposal and then an additional \$100,000 in 2018 or upon commencing development disturbance works that impact the Wallaby Scrub Road section of the Great North Road, with a total expected commitment of \$200,000.

Coal & Allied acknowledges the Singleton Council as a key stakeholder in the establishment and operation of these community funding programmes, and commits to detailed consultation with Council regarding the governance, administration, funding criteria, community participation and ongoing management of these community based heritage conservation funds.

4.11.10 Air quality

A PM₁₀ and PM_{2.5} monitoring and reporting system should be established in respect of the expanded Warkworth Mine and the Minister for Planning be requested to impose a suitable consent condition in this regard should consent be granted.

As outlined in Section 11.5.2 of the EIS, MTW operates an extensive air quality monitoring network that monitors dust deposition, total suspended particulates (TSP), PM₁₀ and meteorological conditions according to relevant Australian Standards. Currently, PM_{2.5} monitoring is not required under NSW legislation. However, it is important to note that two monitors (ie Singleton and Muswellbrook) form part of the Upper Hunter Air Quality Monitoring Network monitor PM_{2.5} for research purposes.

The extensive monitoring network is supported by cameras and physical inspection by appropriately trained mine personnel. The monitoring network currently consists of the following:

- nine dust deposition gauges representative of residences on privately-owned land;
- five HVAS to measure TSP;
- five HVAS to measure PM₁₀;
- five TEOM monitors that transmit live data (real-time PM₁₀) to MTW personnel via the SCADA (supervisory control and data acquisition) system;
- one meteorological monitoring station; and
- three relocatable 'early warning unit' PM₁₀ monitors, positioned nearer to mining operations, which are currently in their testing phase with the intent to use them as supplementary monitors to alert MTW staff of deteriorating air quality conditions should testing prove successful.

Alarms, based on data from the real-time PM₁₀ monitoring units, are used to inform the operation of potentially adverse weather conditions. Following receipt of an alarm the shift coordinator undertakes (or delegates) a site inspection and implements additional controls as required.

The current development consent provides a mechanism for reporting compliance and any incidents. It is anticipated that any new approval would also include a similar condition of consent.

While the EIS seeks to address environmental health impacts in relation to particulate size, it does not consider any broader possible health impacts associated with air quality. Given that the proposal would continue emission of particulate matter it is considered appropriate the proponent make a financial contribution toward a broader health impact study.

Air quality criteria are benchmarks set by government policy to protect the general health and amenity of the community in relation to air quality, including particulate matter. The air quality study (EIS Appendix G) outlines particulate matter health effects and Section 3.2 of the study discusses effects of carbon monoxide (CO), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂) on health. These, and PM_{2.5}, are discussed below:

- The monitoring data for NO₂ recorded are well below the EPA 1-hour average goal of 246µg/m³ during this period at all of the monitors (see Section 4.3.5 of the air quality and greenhouse gas study). The data indicates that levels of NO₂ are relatively low compared to the criterion level and show a seasonal fluctuation.

- Ambient air quality goals for CO are set at higher concentration levels than NO₂ goals. Based on the NO₂ monitoring data which are low compared to the goals, and consideration of the typical mix of ambient pollutant levels, the indication is that ambient levels of CO would similarly also be well below the air quality goals (see Section 4.3.5 of the air quality and greenhouse gas study).
- Emissions of SO₂ generated from diesel powered equipment at mine sites are generally considered to be too low to generate any significant off-site pollutant concentrations.
- Cumulative PM_{2.5} concentrations would be below the National Environment Protection Measure (NEPC 2003) advisory reporting standards at all of the assessment locations where the concentrations of other pollutants are below the relevant air quality goals.
- Dust from mining is generally coarse in fraction (>PM_{2.5}) whereas the fine fraction dust (<PM_{2.5}) of concern to human health typically originates from combustion sources.

Air quality emissions from the proposal are predicted to be well below relevant criteria and, therefore, the potential for broader health impacts associated with air quality resulting from the proposal is minimal.

The timely rehabilitation of exposed mining areas and overburden dumps is an ongoing issue of concern and would contribute to reducing adverse air quality impacts if carried out in a more timely manner. The extent and rate of rehabilitation on an annual basis should be prescribed through suitable conditions should consent be granted.

This matter is considered in Section 4.11.3 of this report.

The DP&E is requested to apply and enforce appropriate rehabilitation conditions which meet best practice and community expectations.

This matter is considered in Section 4.11.3 of this report.

Even though no new cumulative impacts are predicted in relation to Bulga village and its surrounds, should the project proceed, amenity impacts will be experienced over an extended period of time. These impacts, would amongst others, comprise dust in water tanks and cleanliness of domestic buildings.

As described in the EIS, Lucas *et al.* (2009) investigated the potential for health impacts from coal dust deposited on rooftops and washed into water tanks. The incremental dust deposition predicted for the proposal at private and mine-owned residences is less than the 2g/m²/month incremental criterion in all modelling years.

Taking the predicted dust deposition levels, the spatial separation of residences from the mine and the findings of Lucas *et al.* (2009) into account, the potential for adverse impacts on rainwater tanks from the deposition of coal dust, whilst potentially visible, is low, even at the closest residences. Regardless of proximity to mining, water tanks generally require routine maintenance to ensure that water quality is maintained.

While there would be no significant impacts on private residences directly attributable to the proposal, Coal & Allied has committed to contributing to a Near Neighbour Amenity Resource to provide services to residents surrounding the operation (see Section 21.5.2 of the EIS). The intent of this resource would be to provide support in addressing amenity concerns, such as rainwater tank cleaning for near neighbours.

The extent of the proposed strike rate of the open cut would expose a significant amount of material which would have an impact on air quality.

The proposed strike length is required to enable the long-term viability of operations at Warkworth Mine, as discussed in detail in Section 2.3.2 of this report.

The amount of exposed strike length in the proposed Year 14 is 3.8km, which is significantly reduced from the existing strike length which is approximately 5.4km. As the mining operations progress west rehabilitation catches up and potentially exposed areas are reduced. As described earlier, the air quality study concluded that relevant air quality criteria will be satisfied at all residents in Bulga village.

4.11.11 Groundwater

Should consent be granted best practice conditions be imposed in respect of groundwater monitoring.

Council's response is noted.

4.11.12 Surface water

Should consent be granted best practice conditions be imposed in respect of surface water monitoring.

Council's response is noted.

4.11.13 Visual amenity

The EIS generally concludes there would be a low level of visual impact, however there are offers for elevated locations in Bulga to request a site specific visual assessment, possibly resulting in visual screening at impacted residences. A further detailed supplementary visual impact assessment should be carried out for the elevated locations in Bulga to determine the need for mitigation measures.

An additional detailed supplementary visual impact assessment is not considered necessary given the existing commitment to the site-specific visual assessment (SSVA) process.

The commitment to undertake SSVAs, upon request, for properties in Bulga village was previously recommended by Council. The SSVA process would be used to determine mitigation for any viewpoint with high visual sensitivity.

As described in Section 15.3.2 of the EIS, visual sensitivity is a measure of how critically a change to the existing landscape would be viewed by people from different land use areas in the vicinity of the development. For private dwellings, visual sensitivity would be high for visible mine elements less than 2.5km away and high to moderate for elements 2.5 to 7.5km away. Residences with the proposal's primary visual catchment (shown in Figure 4.8 of this report) are within a range of up to 7.5km, and the visual sensitivity of these residences where the proposal is viewed would be high or high/moderate.

The VIMP would outline a process to undertake these assessments. A landowner affected by visual impacts from the proposal would be able to request a SSVA, which may result in the application of appropriate screening treatments at the affected property or between the property and the source for impacts assessed as high.

For the small number of individual residences within the primary visual catchment, which may have high visual impacts at some stage of the proposal, suitable mitigation measures would be implemented, subject to agreement with the landowner. This is likely to constitute vegetation screening; however, property-specific mitigation measures would be guided by an SSVA and associated consultation with the affected property owners.

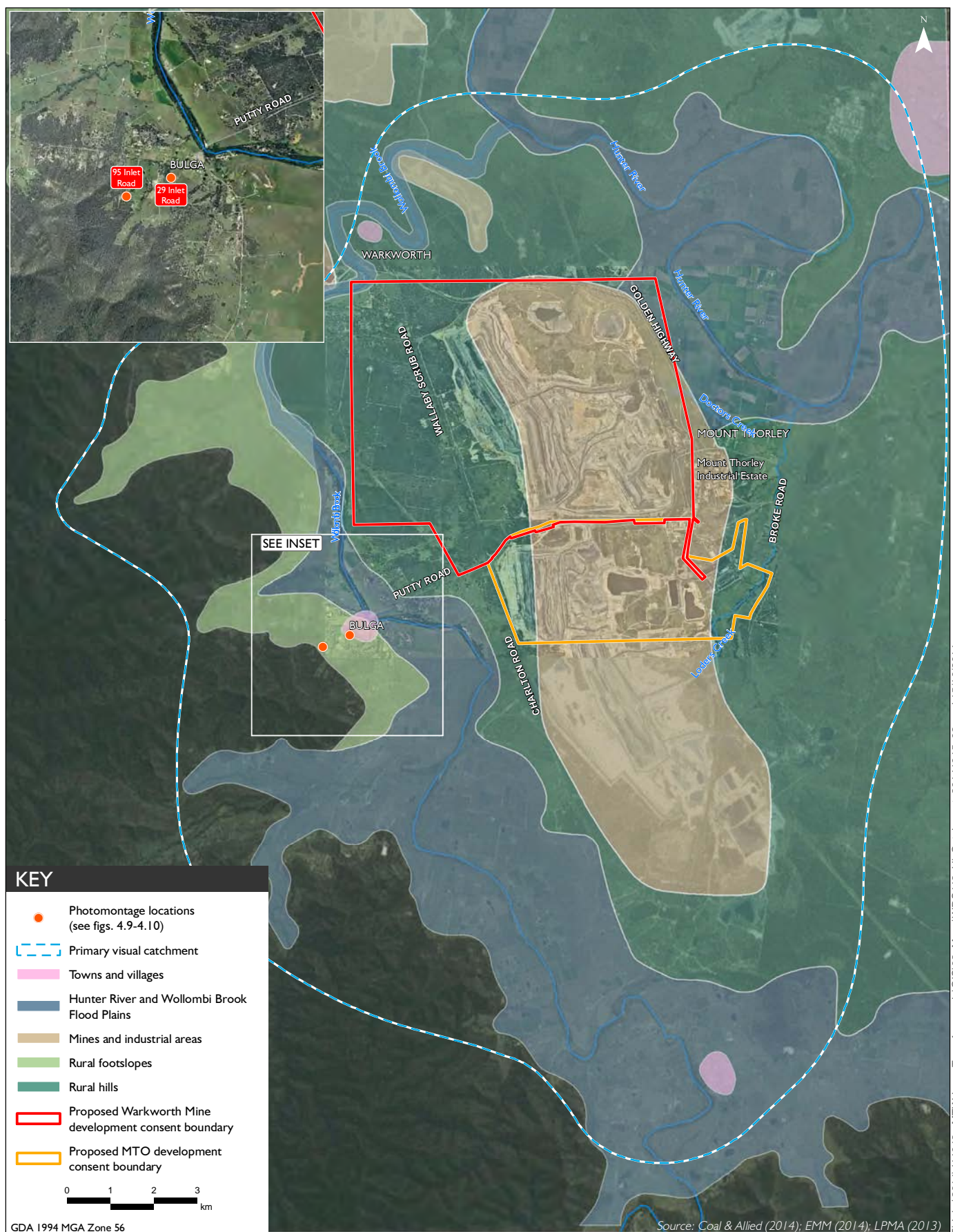
The removal of Saddleback Ridge and progression of mining westward would generally be concealed to most viewers to a varying extent by the intervening vegetation and topography, particularly in lower lying areas where views are mostly of trees along Wollombi Brook. Overburden emplacement at the operation will continue to be visible to some properties in Bulga village for the duration of the existing development consent.

Photomontages were included in Section 15.3.4 of the EIS. These photomontages taken from elevated locations at Inlet Road, Bulga. The unmitigated views of the proposal in these photomontages are considered to represent high and high/moderate visual impacts (as defined in Table 15.1 of the EIS). The photomontages, shown in Figures 4.9 and 4.10, illustrate the existing view (that is, where Warkworth Mine is operating now under its development consent), the view of the proposal without mitigation measures applied, and the view with an example of the mitigation measures proposed as part of the SSVA process.

Onsite mitigation measures currently in place at MTW include:

- structure design to minimise visual impacts, consistent with engineering principles and practice, and any site constraints;
- direction of lighting away from offsite areas to the greatest degree possible, and the use of sensor lighting where permanent lighting unnecessary;
- community response officers who visually check the perimeter of the operation for lighting impacts;
- construction of bunds, vegetated and built screens at appropriate locations along the Site boundary; and
- establishment of planting patterns of trees and grasses in rehabilitation areas to create a high level of visual integration with the surrounding landscape.

This process is considered consistent with the intent of the matter raised by Council.



Primary visual catchment and visual character units

Warkworth Continuation 2014

Response to Submissions

Figure 4.8



Source: IDS (2014)

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Photomontage - 95 Inlet Road, Bulga

Warkworth Mine Continuation 2014
Response to Submissions

Figure 4.9



Source: IDS (2014)

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Chapter 5

Public submissions of support



Chapter 5 — Public submissions of support

- 5.1 Introduction
- 5.2 Employment
- 5.3 Economic contributions
- 5.4 Social impacts
- 5.5 Environmental management
- 5.6 Other matters

5 Public submissions of support

5.1 Introduction

This chapter provides a summary and response to the public submissions supporting the proposal, including those prepared by special interest groups.

Of the 1,967 submissions, 1,638 individual submissions and 32 specialist interest groups supported the proposal, representing 85 per cent of the total submissions.

Matters raised included employment, economic contributions, social impacts, environmental management and several other matters that do not fit within the preceding categories.

5.2 Employment

A total of 693 submissions received in support of the proposal referenced matters related to employment, representing 41 per cent of supporters. These matters included the direct loss of jobs, impacts on suppliers, local businesses and other local industries and a reduction in the local and regional career opportunities should the proposal not proceed. This is shown in Figure 5.1.

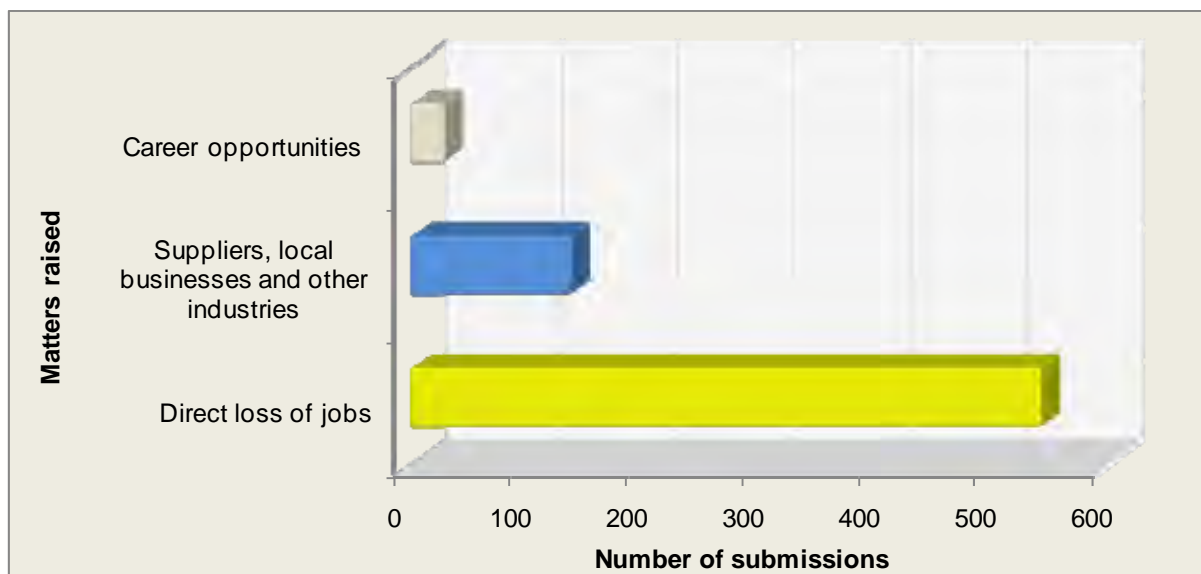


Figure 5.1 Employment matters raised within submissions of support

Of the 693 submissions received in support that referenced matters relating to employment, some 28 per cent were from Singleton LGA (ie 196 submissions) with a further 15 per cent from Cessnock LGA (ie 105 submissions) and 22 per cent from Maitland LGA (ie 153 submissions).

5.2.1 Direct loss of jobs

The most common matter raised was the significant impact the direct loss of jobs at the Warkworth Mine, including full-time contractors, would have on individuals, families and the broader community. This represented over 84 per cent of employment matters raised in submissions of support of the proposal.

The inability to find alternative employment due to the current economic environment, as evidenced by the substantial layoffs at other nearby mines was also commonly referenced (refer to Section 2.3.3 of this report). Numerous submissions not only referenced the lack of mining jobs in the locality and region, but also questioned the availability of mining jobs beyond the region. Other submissions stated that there was no other local or regional industry that could provide jobs for the number of people employed by the mine.

The concerns expressed in submissions relating to direct job losses and the importance of Warkworth Mine continuing is reinforced by the HVRF.

As noted in Section 3.2 of the EIS, the HVRF's measure of employment intentions suggest that further weakness in the Hunter Valley labour market can be anticipated. Employment intentions have declined since December 2011 with HVRF's most recent measures lower than those during the Global Financial Crisis of 2008. Similar trends are also evident in the HVRF's (2013b) Household Survey, which suggests that consumer confidence and purchasing intentions in the Hunter Valley remain negative. Overall, HVRF (2013b) conclude that the economic outlook for the Hunter Valley reflects the end of the previous expansion phase combined with a drive to achieve efficiencies, the effects of which are now being felt by local suppliers, contractors and operational employees.

As described in Section 2.3.3 of this report, HVRF's forecast has proven correct. Australian Bureau of Statistics figures for May show the unemployment rate for the Hunter Valley is 9.2 per cent, up from 5.8 per cent in May the previous year. This equates to a loss of approximately 4,000 jobs. These figures are considered highly conservative given only those 'seeking employment' are included in the statistics.

A number of submissions received from employees of Warkworth Mine had concerns that their age would be a strong impediment to finding alternative employment, particularly given the number of recent redundancies in the industry. It is noted that over 260 Warkworth employees, excluding full-time contractors, were aged over 50 as of June 2014, with over 40 of these aged over 60.

Several respondents also had concern that the skill set they had developed over a long period of time to perform a specific role at Warkworth Mine would not be transferrable to other operations within the sector or other industries.

5.2.2 Suppliers, local businesses and other industries

Impacts on suppliers, local businesses and various other industries should the proposal not proceed were commonly raised. A total of 170 submissions referenced this matter.

A number of individual submissions referenced the importance of MTW to their business, stating that with the closure of the mine they would struggle to remain open or would have to dramatically decrease staff numbers to remain viable. This was mirrored in special interest groups' submissions with a number of smaller suppliers and other local businesses noting that the ongoing operations at Warkworth Mine were critical to maintaining jobs and the viability of their companies.

Table 5.1 shows that MTW expenditure within Hunter Valley LGAs for local businesses in 2013 was a total of \$255million. A breakdown by LGA is provided below.

Table 5.1 MTW expenditure for 2013 within the Hunter Valley for local businesses

| LGA | Number of businesses | Total expenditure (\$M) |
|----------------|----------------------|-------------------------|
| Singleton | 132 | \$76.6M |
| Cessnock | 29 | \$67.7M |
| Maitland | 40 | \$18.6M |
| Muswellbrook | 29 | \$25.2M |
| Upper Hunter | 1 | \$0.02M |
| Newcastle | 141 | \$52.3M |
| Lake Macquarie | 39 | \$9.9M |
| Port Stephens | 14 | \$1.4M |
| Dungog | 2 | \$0.1M |
| Great Lakes | 11 | \$3.3M |
| Total | 438 | \$255.12M |

Note: 1. Upper Hunter region (Singleton, Cessnock, Maitland, Muswellbrook and Upper Hunter) = \$188.1M.

A number of larger companies also noted that disapproval of the proposal would lead to significant job losses within their companies. For example, Orica, which employs more than 750 people in the local Hunter Valley region, stated in its submission that a drop in production would directly lead to regional job losses at Orica. A fourth generation earth moving company, which employs approximately 80 local staff, noted that half its staff work at MTW on a daily basis undertaking mining rehabilitation, water management and general in-pit earthworks. Refusal of the application would result in a dramatic loss of jobs at the company and this in turn would adversely impact its suppliers of goods and services.

Many of these submissions reflect on the impact the mining downturn has already had on Singleton and surrounding communities. Several submissions contended that the substantial flow-on effects were grossly underestimated by some stakeholders.

One special interest group stated that to stay afloat suppliers may push into other NSW mining regions that are already experiencing financial strain due to the drop in coal prices. It was contended that in order to win business, prices would have to be dropped, forcing downward pressure on the market. The end result would be flow-on effect where even more service providers are displaced and the net number of mining service providers in NSW under financial duress increases.

As described in Section 9.5 of the EIS, almost three quarters of MTW employees and contractors live in the Mid and Upper Hunter region. Direct benefits of around \$464million in NPV terms in additional disposable income generated by the mine's ongoing operation would flow to that region over the life of the proposal.

The initial flow-on effects or indirect benefits for the Mid and Upper Hunter region are estimated at:

- around \$227million in additional income (in NPV terms) would flow to the Mid and Upper Hunter region; and
- additional annual employment of around 214 full-time equivalent workers.

Approximately 35 per cent of MTW's employees and long-term contractors live in Singleton. As described in Section 4.11.5 of this report, around \$320million, in NPV terms, in additional disposable income would flow to the Singleton LGA. The estimated flow-on effects for the Singleton LGA from MTW are:

- around \$84million in additional income (in NPV terms); and
- additional annual employment of around 61 full-time equivalent workers.

The analysis indicates that the flow-on effects attributed to Warkworth Mine would be 90 per cent of additional income and 93 per cent of additional employment, respectively.

These estimates were developed from comparing the reference case (or proposal disapproved case) to the proposal approved case. Under the reference case, coal production would decline from 2016 onwards and would end by 2021. As noted in Section 2.3.2 of this report, the reference case is not likely to eventuate as mining under this scenario is not likely to be economically viable due to extraction constraints from a reduced strike length in West Pit.

5.2.3 Career opportunities

Career opportunities provided by the mine for young people were considered significant. A reduction in local or regional work opportunities for people and resultant higher levels of youth unemployment were viewed as highly detrimental to the community.

HunterNet, which is a network of small and medium-sized manufacturing, engineering and consulting companies in the Hunter and Central Coast Regions, which through its membership, represents over 50,000 employees, notes Coal & Allied's commitment to communities in which it works, being a large employer for training and jobs for young people, providing security for families.

WML's commitment to indigenous scholarships for local indigenous people and vacation students was another reason given in support of the proposal.

The loss of employment was closely linked to social impacts such as health and well-being, financial distress, loss of community and reduced viability of services such as local schools. These matters are further discussed in Section 5.4 of this report.

5.3 Economic contributions

A total of 716 submissions in support of the proposal referenced the substantial economic contribution of the mine in various forms, representing 43 per cent of supporters. This is shown in Figure 5.2.

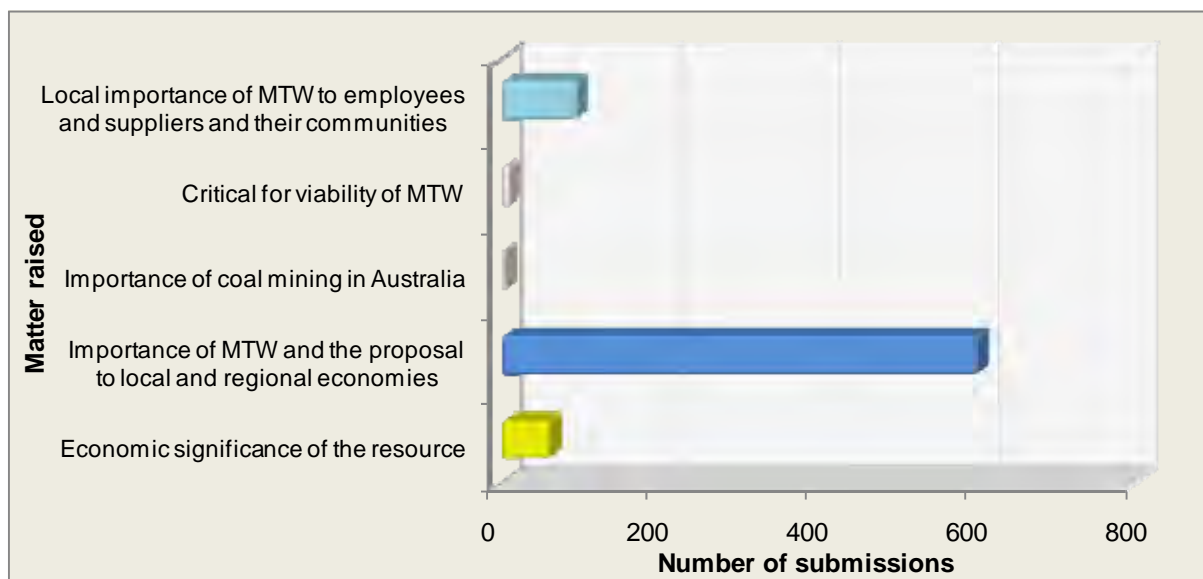


Figure 5.2 Economic contribution matters raised within submissions of support

Of the 716 submissions received in support that referenced matters relating to economic contributions of the proposal, some 30 per cent were from Singleton LGA (ie 215 submissions) with a further 17 per cent from Cessnock LGA (ie 122 submissions) and 20 per cent from Maitland LGA (ie 144 submissions).

Some 62 submissions referenced the economic significance of the resource attributable to Warkworth Mine, being:

- the continuation of approximately 1,187 jobs on average in the long-term;
- the payment of \$567million in royalties in NPV terms to the state; and
- indirectly, the making of approximately \$75million in additional income in NPV terms and additional annual employment of 57 full-time people in the Singleton LGA.

More commonly raised, however, was the important contribution to local and regional economies. The significance of MTW's \$188million expenditure with local businesses in the Upper Hunter in 2013 alone was referenced numerous times.

The CFMEU notes that there is no doubt the proposal, if approved, would provide ongoing socio economic benefits.

More general statements were also made regarding the significance and magnitude of economic benefits the proposal would provide, and the economic disadvantages, should it be refused.

Funding for schools and community organisations by MTW over a long period was recognised as significant, as was the lack of alternative funding sources. A number of respondents were concerned about the viability of charities, clubs and other organisations without the sponsorship, donations and other initiatives provided by MTW and other mines in the region as well as the significant amount of volunteering undertaken by employees.

As identified in Section 21.3.4 of the EIS, WML is fully committed to community support through the continuation of its Community Development Fund, Aboriginal Community Development Fund and Site Donations Committee.

The importance of royalties was referenced as potential for reduced funding for services in NSW such as hospitals, roads, police and education.

It was noted Singleton and surrounding communities have benefited to varying degrees from the mines, even if they have never been employed directly by the mines’, and that impact on local industry and businesses should the proposal not proceed was not understood by the broader community.

As noted in Section 21.3.2 of the EIS, a third of employees estimated that they spend between 70 per cent and 90 per cent of their income in the LGA in which they live. For those living in the Singleton LGA, this equates to between approximately \$229million and \$288million over the life of the proposal, excluding flow-on effects. The remainder estimate that they spend between 30 per cent and 80 per cent of their income in the LGA in which they live. Further, approximately 35 per cent of the MTW workforce lives in Singleton LGA, 56 per cent of the workforce have children who attend educational facilities in their local LGA and approximately 33 per cent participate in volunteering in their local LGA. The flow-on benefits attributable to Warkworth Mine for the Mid and Upper Hunter region and Singleton LGA are listed in Section 5.2.2 of this report.

A number of submissions stated that coal will continue to be an important commodity into the foreseeable future. It was perceived that coal not mined at Warkworth Mine would be replaced with coal mined overseas, to the detriment of the NSW and Australian economies.

Economic contributions, or lack thereof, were often linked to social impacts. These matters are provided in Section 5.4 below.

5.4 Social impacts

A total of 824 submissions in support of the proposal referenced social impacts, representing 49 per cent of supporters. These raised both the positive social impacts of the proposal and the negative social impacts of the proposal not proceeding. Matters have been grouped below into health and well being, financial distress, community and viability of services. This is shown in Figure 5.3.

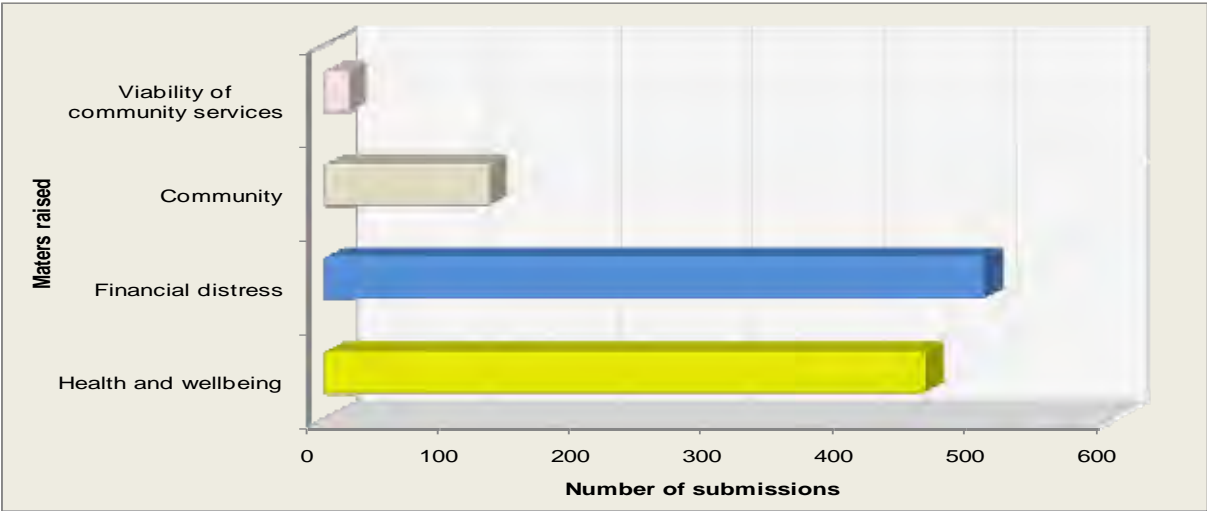


Figure 5.3 Social impact matters raised within submissions of support

Of the 824 submissions received in support that referenced matters relating to social impacts, some 31 per cent were from Singleton LGA (ie 258 submissions) with a further 17 per cent from Cessnock LGA (ie 144 submissions) and 19 per cent from Maitland LGA (ie 161 submissions).

5.4.1 Health and well being

Some 458 submissions referenced health impacts should the proposal not proceed. This included submissions from employees of the mine and supporting businesses who commonly referenced these health impacts, such as stress related illnesses, due to the ongoing uncertainty regarding the mine's future and job security.

Employment vulnerability of the primary or only earner supporting a family working at the mine should the proposal not proceed was commonly raised. Fear and uncertainty associated with potential job loss were expressed in these submissions. As described in Section 5.2.1 of this report, this was often linked to the inability to find alternative employment in the region, necessitating the relocation of families and leaving social support networks. This contention was premised on the dramatic increase in unemployment levels in the Hunter Valley, including substantial job losses at local mines (see Section 5.2.1 of this report).

Stress and fatigue impacting personal and family lives was raised as a chief social concern. A number of submissions stated that this was compounded by the inability to make decisions about the future due to the uncertainty regarding the long-term viability of the operation in relation to the proposal. Several submissions noted frustration with the time taken to assess the development application, given the previous application was lodged close to four years ago.

Health impacts from stress and uncertainty associated with mine closure were identified not only for individuals and their families working at the mine, but also the broader community. It was noted in various submissions that stress can lead to psychological impacts.

The importance of the long-standing mine to the morale of the community, including larger centres such as Singleton, was often referenced. Related matters raised included career opportunities and planning for local youths and increased confidence within the community, particularly given the number of recent job losses.

Several submissions drew on their personal experience of emotional difficulties faced in their own families following their redundancy at other mines in the Hunter Valley.

It is noted that the Singleton Shire Healthy Environment Group (SSHEG), a health focused community-based group looking to address environmental issues affecting Singleton Shire residents, provided a submission of support, subject to conditions.

5.4.2 Financial distress

A total of 513 submissions received from employees, suppliers and local businesses, referenced the financial distress that would be caused by the closure of the mine. Inability to pay mortgages, rent, bills and school fees and support children were referenced.

Submissions received from single people and those with families working at Warkworth Mine referenced the likelihood of the requirement to take on a fly-in, fly-out position (if they exist), or relocating themselves and family interstate. Government assistance through Centrelink was not seen as a desirable or viable alternative.

As noted above, in many families the primary earner works at Warkworth Mine. There was also concern from older individuals that they would be 'unemployable' in comparison to younger people (Section 5.2.1 of this report).

The median house price in Singleton decreased by 8.7 per cent in 2013. The closure of Warkworth Mine was considered to have material impact on already falling property prices, in both Singleton and also the broader community. The adverse economic flow-on effect was often noted.

5.4.3 Community

i Community contributions and participation

Many employees stated that they were heavily involved in the community through participation in sporting clubs, community events, attendance at local schools and volunteering. A range of volunteering activities was referenced including sporting clubs, to pre-school committees, choral activity and local eisteddfods. This is consistent with outcomes of the survey presented in Section 21.3.2 of the EIS that found that more than 30 per cent of employee survey respondents stated that they currently undertake some form of voluntary work in the community. Of these respondents, the majority carried out this work for sporting or community recreation organisations. Respondents also carried out voluntary work for emergency services; children, youth or parenting organisations; education or training organisations; and community or welfare organisations.

In addition to the direct contributions made by MTW to a number of funds, employee contributions and those enabled by the continued financial success of suppliers and local business were referenced. This is consistent with surveys completed for the SIA (Section 21.4.2 of the EIS) that show about 75 per cent of MTW suppliers make direct financial contributions to community organisations (for example, charities, community services and health care) in the Hunter Region.

The point is exemplified in the submission of support received from the Westpac Rescue Helicopter Service, which is a community based emergency service that forms an important part of the NSW health care chain. Its submission states that Coal & Allied is a major contributor to the service. It notes that from long experience the leadership from the mining sector has encouraged many other sections of communities to support the service. Community funding is essential for this free service to continue as it has since its inception 39 years ago.

ii Loss of community

As noted in Sections 5.2.1 and 5.4.2 of this report, submissions noted that with limited, if any, job prospects locally or regionally due to the increase in unemployment, people would have no choice other than to leave the area to find employment, requiring relocation of families and leaving their close community networks.

Many submissions referenced adverse impacts on the community should the proposal not proceed. Matters raised included depopulation, family separation, loss of community and support networks. Many respondents reflected on their affinity with the community in which they have lived for a long period of time, often for generations.

In its submission, the Singleton Branch of the Labor Party noted that the failure of this project to go forward will see a major loss of jobs for local families which will have a devastating flow-on effect which will directly impact on businesses, real estate and family lives locally as well as many businesses further abroad that supply and support the mining communities.

A number of submissions questioned the viability of towns such as Singleton and surrounding communities in their current form should the mine close when combined with the recent job losses in the industry in the region. The large number of properties for sale and lease in Singleton was noted. Young people moving away from the local area were commonly referenced due to perceived lack of future opportunities for children and future generations.

5.4.4 Viability of community services

As noted in Section 5.4.3 of this report, employees and suppliers at MTW make a range of contributions, direct and indirect, to the communities and towns in the local area that would likely be impacted should the mine close. A number of submissions questioned the viability of services and infrastructure associated with these communities and towns, including health services and community facilities such as sporting clubs should operations at Warkworth Mine cease.

The viability of educational facilities in the local area was frequently referenced in submissions. It was reasoned that mine closure and related job loss will likely lead to people leaving the area to seek employment opportunities out of the local area. These people would take their families with them. As described in Section 21.3 of EIS, of the 337 employees who responded to the employee survey, 209 had families. These employees had a total of 184 children currently attending educational facilities in the Hunter Valley.

It was contended that families leaving the local area would lower demand for school places and associated services, which would place stress on future funding for these services, particularly for smaller local community schools such as Milbrodale, Broke and Jerrys Plains public schools. This could further place pressure on the ability to employ or retain teaching staff, and may result in school closures. As noted in Section 21.4.2 of the EIS, Milbrodale, Broke and Jerrys Plains Public Schools had 11, 59 and 21 enrolments in 2013, respectively. An analysis of Warkworth Mine employees with students enrolled at these schools has not been undertaken.

5.5 Environmental management

A total of 74 submissions (ie four per cent) in support of the proposal were frustrated that the efforts undertaken by the mine to achieve environmental compliance were not understood, or misrepresented by some stakeholders. Many considered that the mine goes above and beyond compliance, implementing best practice, to manage risks to the environment and community. This is shown in Figure 5.4.

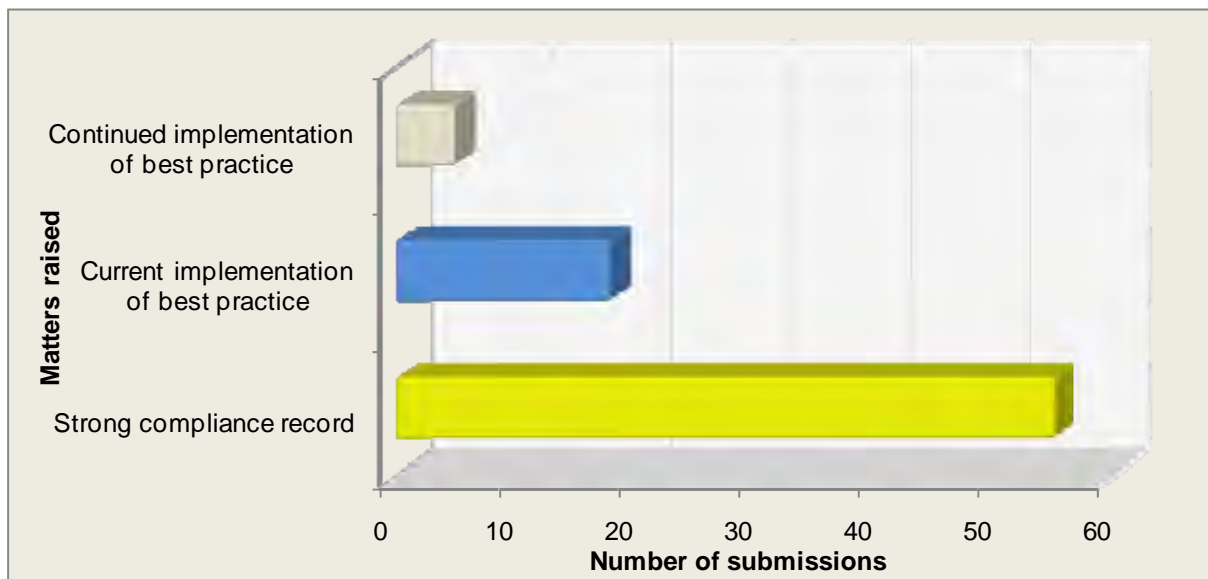


Figure 5.4 Environmental management matters raised within submissions of support

Of the 74 submissions received in support that referenced matters relating to environmental management, some 43 per cent were from Singleton LGA (ie 32 submissions) with a further five per cent from Cessnock LGA (ie four submissions) and 20 per cent from Maitland LGA (ie 15 submissions).

A number of employees noted awareness of all personnel of noise and dust management and the commitments made by MTW to minimise these aspects. Methods noted included community response officers who monitor noise and dust, equipment and production shutdown to ensure noise and dust criteria are met, real time and attended monitoring and state of the art noise emission/suppression controls.

A number of submissions referenced the mine's commitment to progressive rehabilitation and its ability to achieve positive biodiversity outcomes.

Submissions from several employees stated mining is an environmentally sustainable industry that is necessary to support the growing demands of Hunter Valley, NSW and Australia and that MTW was committed to achieving this outcome.

In its submission of support, General Electric (GE) highlight the funding provided by MTW for the Coal21 Fund, the Australian Coal Association Research Programme, and the Cooperative Research Centre for Greenhouse Gas Technologies to support and develop the research of low emission coal technologies. GE contends that the comprehensive EIS and commitments made by the applicant can minimise the project's environmental impacts and maximise its economic benefits during the development, operation and rehabilitation of the proposal.

As described in Section 24.2 of the EIS, environmental management at Warkworth Mine is undertaken in accordance with a range of best practice systems, plans, procedures and licenses. The approach to environmental management is underpinned by the principle of continuous improvement. The applicant has committed to proposal specific management measures where adverse impacts were assessed irrespective of the implementation of existing best practice environmental management safeguards. Residual impacts were identified to noise, dust, Aboriginal cultural heritage and ecology. Compensation measures have been developed in consultation with the relevant stakeholders to ensure residual impacts are fully offset and the proposal provides a net environmental benefit.

5.6 Other matters

A number of other matters were raised in 76 submissions of support. A summary of these is provided below.

- The proposal has limited environmental impacts as the continuation of existing operations is preferable to the development of a greenfield site.
- WML own the land subject to the proposal and, pending compliance with necessary legislation and policy, are entitled to apply to extract the resource within the lease boundary. It is noted that Crown lands owns two parcels of land in the northern and north-eastern section of the existing development consent boundary.
- The Hunter region has a rich, multi-generational history of mining that may be lost should the proposal be refused.
- WML has been an integral part of the community for over 30 years.
- The environmental assessment meets all statutory and policy requirements and the proposal should, therefore, be approved.
- The proposal achieves an appropriate balance between the economy and the environment and should, therefore, be approved.
- Recognition that coal mines and neighbouring communities, whether they be vineyards, farms, horse studs or small community towns, can and will continue to successfully co-exist.

HunterNet also emphasised the need for some balance to be introduced into the current debate focussed on the proposal. This was also raised by a number of individuals that contended the discussion on the proposal presented in public forums had disproportionately focussed on subjective negatives.

The points raised in 'other matters' are noted.

Chapter 6

Public submissions of objection



Chapter 6 — Public submissions of objection

- 6.1 Introduction
- 6.2 Land & Environment Court judgement
- 6.3 Project design and development
- 6.4 Noise and vibration
- 6.5 Air quality and greenhouse gas
- 6.6 Economics
- 6.7 Social
- 6.8 Ecology
- 6.9 Traffic and transport
- 6.10 Historic heritage
- 6.11 Groundwater
- 6.12 Surface water
- 6.13 Rehabilitation
- 6.14 Visual
- 6.15 Aboriginal cultural heritage
- 6.16 Other matters

6 Public submissions of objection

6.1 Introduction

This chapter provides a summary and response to the public submissions objecting to the proposal, including those prepared by special interest groups.

Of the 1,967 submission received as of 5pm on 11 August 2014, 277 individual submissions and 20 specialist interest groups objected to the proposal, representing 15 per cent of the total submissions. Approximately 49 per cent of objections were form letters.

Matters raised include the L&E Court judgment, avoidance and alternatives for project design and development, noise and vibration, air quality, economics, social impacts, ecology, traffic and transport, historic heritage, groundwater, surface water, rehabilitation, visual amenity, Aboriginal heritage and several other matters that do not fit within the preceding categories.

6.2 Land & Environment Court judgment

A total of 212 submissions in objection referenced the L&E Court judgment, representing 71 per cent of objectors.

Matters raised in submissions contended that the proposal is the same project as that disapproved by the L&E Court and the proposal was inconsistent with the judgment.

6.2.1 Background

The Warkworth Extension 2010 was approved by the PAC in February 2012 and received approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) from the Commonwealth Minister for the Environment in mid 2012. Subsequently, the approval was the subject of a merit appeal in the L&E Court. On 15 April 2013, 14 months after the approval was granted by the PAC, the appeal was upheld by the L&E Court and the application was refused.

The L&E Court judgment was appealed on limited administrative law grounds by WML and the Department of Planning and Infrastructure (now DP&E) and in April 2014 the NSW Supreme Court rejected this appeal, effectively upholding the original decision by the L&E Court.

It should be noted that the appeal to the NSW Supreme Court was limited to points of law regarding the L&E Court judgment and, accordingly, while it was found that the process undertaken by the L&E Court was lawful they did not comment on or find anything further in respect of the merits of the L&E Court judgment or the Warkworth Extension 2010. Notwithstanding, Warkworth Mine retains Commonwealth EPBC Act approval for the extension.

While the proposal has similarities to the Warkworth Extension 2010 there are a number of important improvements and differences. An overview of these is given in Section 1.2 of this report.

6.2.2 Consistency with the L&E Court judgment

Chapter 4 of the EIS outlined the key differences between the proposal and the Warkworth Extension 2010 and how the proposal has considered and incorporated the relevant aspects of the L&E Court judgment.

It is important to recognise and acknowledge the context of the proposal with regard to the Warkworth Extension 2010, the L&E Court judgement and whether a precedent had been set.

The L&E Court judgment was a merit appeal under the L&E Court's Class 1 jurisdiction in respect of an application for planning approval for the Warkworth Extension 2010. As stated in the L&E Court judgment, in a merit appeal:

The Court re-exercises the statutory power originally exercised by the Minister to determine Warkworth's project application by either approval or disapproval. The Court stands, metaphorically speaking, in the shoes of the Minister and determines for itself, on the facts and law that exist at the time of determination of the appeal, whether to approve or disapprove the application for the Project.

Given this, merit appeals have no legal precedent value as the function that the L&E Court performs in a merit appeal is that of a consent authority in respect of the determination of a project application. Accordingly, merit appeals are decided specifically on the facts relevant to the specific development they relate to and have no more precedent value than any other decision of a consent authority.

Further, it should be noted that WML is not at law or under the NSW planning system, prevented from lodging a new development application, despite the refusal of the Warkworth Extension 2010.

The above position is further supported by the following points which make it clear that the proposal is not the same as the proposal under the Warkworth Extension 2010:

- there are numerous changes that have been made to the development the subject of the Warkworth Extension 2010 which differentiate the proposal from the previous application. These are described in Section 1.2 of this report. Given this, the proposal is demonstrably a new development different from the development the subject of the previous application;
- the proposal will be determined under a different statutory regime. The Warkworth Extension 2010 was determined under the now repealed Part 3A of the EP&A Act whereas the proposal will be determined under the new SSD provisions in Part 4.1 of the EP&A Act;
- the Mining SEPP has been amended since the Warkworth Extension 2010 was refused providing a different regime for consent authorities within which they make their determination compared to the regime in which the Warkworth Extension 2010 was determined; and
- recent changes to government policies have been released which provide new context for assessments for major projects. In particular the principles and strategies for biodiversity assessment outlined in the *NSW Biodiversity Offsets Policy for Major Projects* (now final), the FBA and the *Upper Hunter Strategic Assessment Interim Policy*.

In summary, given the changed legislative regime, the clear differences between the Warkworth Extension 2010 and the proposal (described in Section 1.2 of this report), and the fact that an applicant may make multiple development applications in respect of the same parcel of land, there is no basis for any submission that the development application for the proposal is unlawful or improper.

6.3 Project design and development

6.3.1 Introduction

Project design and development is described in detail in the EIS, with avoidance and alternatives in Chapters 2 and 23, respectively.

A total of 125 submissions in objection referenced avoidance and project alternative matters, representing 42 per cent of objectors.

Matters raised with respect to avoidance and alternative project designs included impacts to WSW, impacts to Aboriginal cultural heritage, the removal of Saddleback Ridge, mining through previously secured offset areas, closure of Wallaby Scrub Road and disturbance to historic heritage sites. The number of times the project design and development related matters were raised in submissions of objection is shown in Figure 6.1. It is noted that a number of submissions referenced more than one project design and development matter and, therefore, the number of matters raised as shown in Figure 6.1 totals more than 125.

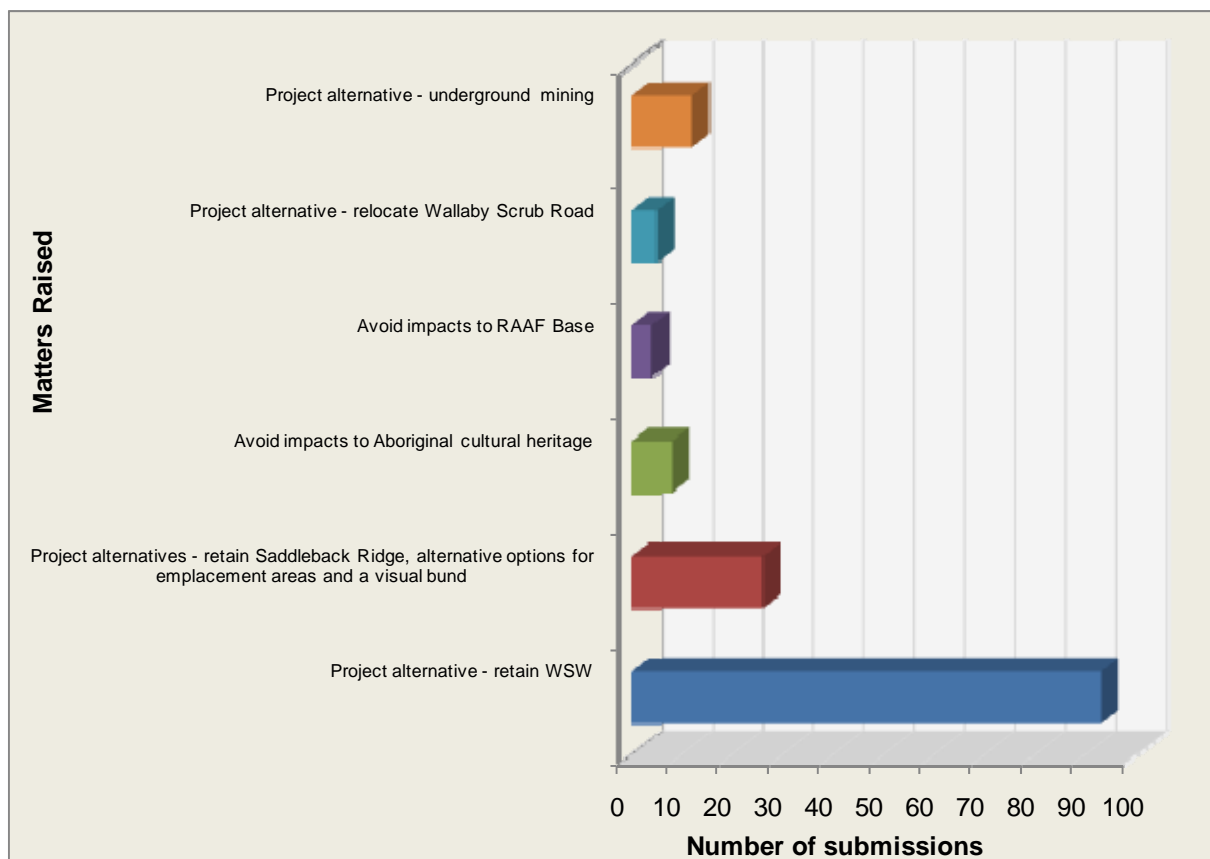


Figure 6.1 Avoidance and project design alternative matters raised within submissions of objection

6.3.2 Avoidance

Of the submissions of objection related to project design and development, six per cent (representing three per cent of the total submissions of objection) stated the proposal should avoid impacts to Aboriginal cultural heritage. Similarly, three per cent (representing one per cent of the total submissions of objection) stated the proposal avoid historic heritage items.

Section 2.2 of this report provides an overview of options and alternatives considered to avoid key environmental and social impacts. Open cut mining projects cannot readily avoid impacts as mineral resources are in fixed locations. Wherever possible and consistent with the L&E Court judgment (par. 69) avoidance was applied as a guiding principle of the proposal design and different options were considered in the development of the proposal and these were described in the EIS. As was the case with the Warkworth Extension 2010, development of the proposal considered different options and alternative plans to avoid or minimise impacts on sensitive features, including those on Aboriginal cultural heritage and historic heritage, whilst needing to satisfy the economic and financial viability requirements of the operation in the longer term.

The level of impact to RAAF Base Bulga has been assessed as minor, as the proposal is anticipated to affect only a very small portion (approximately 1.75 per cent) of the RAAF Base Bulga complex. The anticipated area of disturbance comprises approximately 4.8ha at the very eastern end of the east-west runway (shown in Figure 2.3). This is an area of cleared ground situated beyond the end of the constructed runway. The affected area is largely avoided and is to be incorporated within a 200m wide infrastructure corridor extending eastwards from the western boundary of the proposed 2014 disturbance area. This infrastructure corridor will not be mined and will be used for provision of services such as an access road, water pipelines, power and drainage and, therefore, the anticipated impacts will be minor.

With respect to Aboriginal cultural heritage, it is likely that the all of the 110 extant Aboriginal cultural heritage places within the proposed 2014 disturbance area would be impacted as a result of the proposal. However, extensive consultation with the CHWG has occurred regarding the proposed management measures for managing these impacts. Prior to disturbance, these places would continue to be managed consistent with the provisions of the Aboriginal Cultural Heritage Management Plan (ACHMP) and Cultural Heritage Management System (CHMS).

Examples given include the closure rather than the relocation of Wallaby Scrub Road avoiding 30ha of WSW EEC, sterilisation of economic coal reserves to the north of North Pit to conserve biodiversity in these areas in perpetuity instead as part of the SBA, mining an area from Warkworth Mine rather than currently approved from MTO, and thus avoiding the need to relocate Putty Road, as well as the amelioration measures incorporated into the design through an iterative process with the mine planners. Further, from an operational perspective, avoidance is inherently linked to MTW's noise and dust management regime through a continuous application of procedures including the requirement to modify operations to avoid potential impacts.

6.3.3 Alternatives

Submissions stated that there are a number of alternative options to the proposal that WML should have investigated. These options related to different mining areas (including retaining WSW and/or Saddleback Ridge) and method (ie underground mining), emplacement areas and Wallaby Scrub Road (ie relocation). These matters are addressed below.

i Mining areas and method

Chapter 23 of the EIS documented alternate mining areas considered in the proposal design phase. Options discussed included the retention of NDA1 (and Saddleback Ridge), the retention of WSW and mining underground. Extensive consideration has been given to these issues and the resultant mine plan for the proposal is the only one considered economically viable.

a. The retention of NDA1 (and Saddleback Ridge)

Of the submission of objection related to project design and development, 21 per cent (representing nine per cent of the total submissions of objection) stated the proposal should retain Saddleback Ridge as a project alternative. These submissions also referenced alternatives for visual amenity, which are discussed in sections below.

Near neighbours proposed that Saddleback Ridge should not be mined as it is perceived as important for noise, dust and visual protection from the mining operations. Technical noise and air quality studies prepared for the proposal indicate that the Saddleback Ridge does not provide a 'protective' role in respect of noise and air quality amenity at Bulga village (refer to Sections 6.4 and 6.5 of this report) as perceived and referenced in numerous submissions.

An important aspect of considering the option of retaining NDA1 (and Saddleback Ridge) is the Deed, which applies to this and other areas and provides for various biodiversity protection measures for these areas, including NDA1. In its assessment report for the Warkworth Extension 2010, the PAC noted the 'questionable condition and ecological value of much of the offset area' contained in the area covered by the Deed. This is further discussed in Sections 4.2.1iv and 4.11.2.

As discussed in detail in Section 2.3.2 of this report, MTW currently operates with a total available strike length of 6.65km. The planned closures of South Pit in 2016 and Loders Pit in 2020 (subject to the approval of the Mount Thorley Operations 2014 application) further reduces dragline strike length, to 3.8km; a 43 per cent reduction from the current situation. At this point, MTW would have only two operating pits (ie North and West pits). To provide MTW with its best opportunity to remain a viable operation, MTW requires dragline length to be maximised as they move material at a lower cost compared with load and haul mining systems as well as maintaining a production profile of approximately 18Mtpa of ROM coal across the two mines.

This option would result in a significant loss of strike length and reduction in production levels. Therefore, the retention of NDA1 and Saddleback Ridge would result in a mine plan that is not economically viable in the long-term.

The identification of suitable alternative offset lands for the NDAs and HMAs, removing the Deed as a constraint, was considered a more viable option for the operation to progress mining of the resource in this area, subject to further assessment as part of the development application process. This approach also provides a more beneficial ecological outcome in the long-term (refer to Section 2.4 of this report). In addition, it was also acknowledged in the design process that removal of Saddleback Ridge would require the assessment of potential noise, dust and visual amenity impacts on the surrounding environment which was reflected in the Secretary's requirements for the proposal.

b. Retention of WSW

Of the submissions of objection related to project design and development, 74 per cent (representing 31 per cent of the total submissions of objection) stated the proposal should retain WSW as a project alternative.

An option which retained approximately 72ha of WSW within the proposal's footprint was considered. This mine plan was discounted as it would result in the sterilisation of coal reserves in excess of 30Mt of ROM coal over the proposal life (and, as part of Warkworth Extension 2010, was estimated to result in a \$352million reduction in producer surplus from mining (Gillespie 2011)) and a substantial reduction in annual production levels for the operation.

Avoidance of WSW would also require a reduced strike length at North Pit. At a reduced strike length, production cannot be maintained at 18Mtpa of ROM coal. A mine plan that cannot sustain 18Mtpa of ROM coal does not provide long-term economic viability for the mine.

As discussed in detail in Section 2.3.2 of this report and in the section above, MTW currently operates with a total available strike length of 6.65km. The planned closures of South Pit in 2016 and Lodgers Pit in 2020 (subject to the approval of the Mount Thorley Operations 2014 proposal) further reduces dragline strike length, to 3.8km; a 43 per cent reduction from the current situation. At this point, MTW would have only two operating pits (ie North and West pits).

Furthermore WSW cannot be avoided because the current proposal also allows for haul road access to all seams being mined in the pre-strip whilst maintaining geotechnical stability to the overall wall profile. The proposed endwall benches are wide enough to allow ramp access for haul trucks to the intermediate mining sequences between the benches. If the area is to be avoided, this would result in increases the haul distance along endwalls by up to 600m on each bench, increasing operational costs of pre-strip operations.

Additionally, in order to maximise coal recovery, alternative options to remove or narrow the endwall benches were considered; however, this would result in a lack of truck access and increased haulage costs. The additional haulage costs are due to overburden material being hauled south which is a longer distance than the proposed North Pit waste emplacements, and would also result in increased noise and dust emissions.

To provide MTW with its best opportunity to remain a viable operation, MTW requires dragline length to be maximised as they move material at a lower cost compared with load and haul mining systems as well as maintaining a production profile of approximately 18Mtpa of ROM coal across the two mines.

As previously noted, the Warkworth Continuation 2014 and Mount Thorley Operations 2014 proposals present the best opportunity for MTW to remain viable.

c. Underground mining considerations

Of the submissions of objection related to project design and development, 10 per cent (representing four per cent of the total submissions of objection) raised support for underground mining methods in preference to open cut mining.

A viable, operating underground mine cannot be considered an alternative given the time, effort, and investment that is required, in addition to preparation of requisite studies demonstrating feasibility.

As described in Section 23.2.1 of the EIS, underground resources are known to occur at Warkworth Mine and MTO. However, these seams are deeper than the seams targeted under the proposal. Eight of the seams targeted by the proposal are not suited to underground extraction because they are either too thin, too narrow with high risk of splitting or too close to an adjacent seam sterilising the other should one be extracted. The remaining seams are also constrained due to the footprint and the method of extraction. Subsequently, underground mining of the proposal's targeted seams would result in approximately 20 per cent of the available reserves being extracted, a significant underutilisation of the economic resource.

Consideration was also given to underground mining the seams deeper than those targeted by the proposal. Potential underground mining of these seams is in its early stages of exploration drilling and resource definition with feasibility studies yet to be undertaken. Subsequently, the commencement of a feasibility study, the development of a mine plan and the undertaking of environmental studies to prepare and lodge a development application are all required.

Open cut operations at Warkworth Mine are the most effective and only currently feasible option to enable the continuation of the mine.

ii **Emplacement areas**

As stated earlier, of the submissions of objection related to project design and development, 21 per cent (representing nine per cent of the total submissions of objection) stated the proposal should not emplace overburden at MTO affecting visual amenity.

As discussed in Section 23.2.2i of the EIS, there are limited opportunities across Warkworth Mine to emplace overburden from the proposal within the proposed footprint. The shortfall in available capacity is a result of the need to retain a small void in South Pit as an access point for potential underground mining should it be viable in the future, geographic and transport limitations, and a forecasted increase in overburden material in comparison with its in-situ status.

Overburden material will continue to be emplaced at the Site, however, material additional to current capacity would be transferred to MTO to assist in the development of an improved final landform for MTO. Material would be transferred and emplaced in accordance with methods described in Section 2.4.3iii of the EIS. The ability to transfer overburden to MTO avoids the need for a final void at MTO and allows for the design of a more natural looking final landform which would integrate better with the final landforms of Warkworth Mine and Bulga Coal Complex.

During the PAC assessment of Modification 6, the PAC considered restricting overburden emplacement heights during night time due to noise generation (PAC 2014). Consultation feedback has also queried the potential for emplacement activities to occur during the daytime only. In response to this, different scenarios for overburden emplacement at night time were investigated. The modelling of a range of different design scenarios indicated that current operational controls at the Site were effective in their consideration of prevailing conditions. Restricting night time operations to lower dumps was modelled, as part of the mine plan optimisation process (refer to Section 23.2.2iii of the EIS), but did not translate into measurable noise reductions at Bulga residences. Hence this option was not adopted.

iii **Visual bund**

As stated earlier, of the submissions of objection related to project design and development 21 per cent (representing nine per cent of the total submissions of objection) state the proposal provide alternatives to mitigate visual amenity including construction of a visual bund.

The construction of a large visual bund west of Warkworth Mine for the operations to be concealed and work behind was raised in several submissions. As discussed in Section 23.2.2ii of the EIS, two options were considered, one with the visual bund established at the edge of the mining footprint and occupying some of the services corridor area and the other established further west and outside of the proposal's footprint. Construction of the visual bund in either location would be unlikely to provide noticeable reduction in noise given the distance and topography between active mining and the bund or offer noticeable visual benefit given the topography of the area between active mining or overburden emplacement and the bund. Furthermore, construction of the visual bund to the west of the proposal's footprint closer to Bulga village would require clearance of additional vegetation, predominantly EECs and most likely within currently conserved and protected areas (ie the SBA).

The potential visual bund's benefits and costs were considered and, on balance, it was determined that construction of a visual bund could not be justified for its inclusion as part of the proposal.

iv Wallaby Scrub Road

Of the submissions of objection related to project design and development, four per cent (representing two per cent of the total submissions of objection) contended the proposal relocate Wallaby Scrub Road rather than require its closure.

The relocation of Wallaby Scrub Road was considered in the 2010 EA as a potential measure to mitigate the closure of Wallaby Scrub Road. The proposal to close the road (and not relocate it) is based on a number of technical studies showing that the impacts of road relocation are greater than the impacts associated with closure.

Most significantly, it was found that the relocation of the road would have additional impacts on:

- Aboriginal cultural heritage, including the removal of an additional nine Aboriginal heritage sites and intersection with the WBACHCA; and
- ecology, including clearance of approximately 32.1ha of native forest and woodland (including 3.3ha of Warkworth Sands Woodland) and the loss and fragmentation of habitat for native fauna, including threatened woodland birds and bats.

It was for these reasons that the relocation of Wallaby Scrub Road was not considered as part of the proposal.

6.4 Noise and vibration

6.4.1 Introduction

The assessment of potential noise and vibration impacts resulting from the proposal was summarised in Chapter 10 of the EIS, and presented in full in Appendix F.

A total of 74 submissions in objection referenced noise and vibration, representing 25 per cent of objectors.

Matters raised include the adherence to the L&E Court with reference to the INP, assessment of background noise levels and assigned criteria, the accuracy of the noise model predictions, the scenarios assessed, operational management practices and compliance with current criteria, the results of the assessment including the influence of Saddleback Ridge, cumulative noise, LFN, sleep disturbance and animal health. The number of times the noise and vibration related matters were raised in submissions of objection is shown in Figure 6.2. It is noted that a number of submissions referenced more than one noise and vibration matter and, therefore, the number of matters raised as shown in Figure 6.2 totals more than 74.

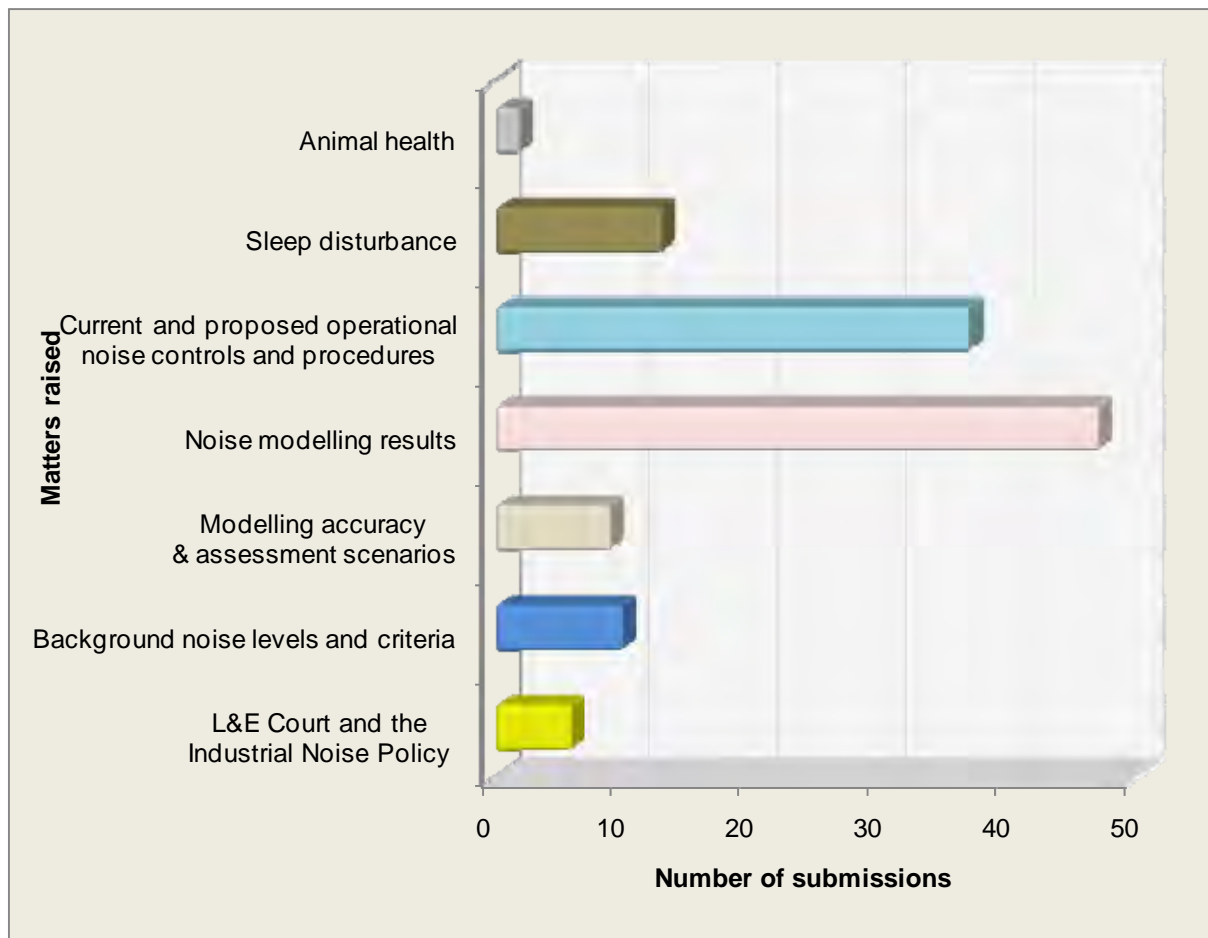


Figure 6.2 Noise and vibration matters raised within submissions of objection

6.4.2 L&E Court and the Industrial Noise Policy

Of the submissions of objection related to noise and vibration matters, eight per cent (representing two per cent of the total submissions of objection) stated that the noise and vibration study did not take into account the L&E Court judgment, including adherence to the methodology requirements of the INP.

Contrary to submissions, full consideration was given to the L&E Court judgment in the EIS. The judgment's fundamental issue with the noise approach related to the combined assessment of Warkworth Mine and MTO, and the legalities around this, rather than the technical merits of the noise and vibration study.

In particular, the following relevant aspects of the L&E Court judgment to the proposal were considered in the noise and vibration study:

- Par. 16 and 64 – existing noise levels:
 - A comprehensive data set of Warkworth Mine’s performance with respect to compliance and the mine’s current and on-going management is provided in the EIS. It should also be noted that the attenuation to plant is currently at 50 per cent of trucks, and partly commenced on other items, and a commitment to have all major plant attenuated by the end of 2016 would mean a reduction in noise levels generated by plant. It is demonstrated that the government policy derived amenity noise level would be satisfied under the proposal.
- Par. 256 – background noise:
 - An extensive background noise analysis was completed for Bulga residences as documented in Section 10.3 of the EIS. Six long-term monitoring sites across Bulga were used capturing, in some cases, several months of data. The data reflects consistency with historic (2002 and 2010) data showing background levels of 30dB(A) to 33dB(A). Further, noise modelling was used to provide much finer allocation of noise background levels for individual residences.
- Par. 261 – low frequency noise:
 - The EIS describes the difficulties in applying the INP methodology for LFN in rural settings such as that of the proposal. However, the INP’s C-A approach is provided in Section 4.3.1 of this report and demonstrates predicted noise levels from the proposal would not attract a penalty according to the INP.
- Par. 338 – residual level of noise impact:
 - The noise and vibration study considered the residual level of impact in accordance with the INP Section 8.2.1. Specifically, the study responded to the INP factors for consideration which included describing the characteristics of the area and receivers likely to be affected, describing the characteristics of the proposal and its noise or vibrations, assessing the feasibility of additional mitigation or management measures and addressing equity issues. Further, the EPA’s submission states: "The EPA’s view of the proposed noise mitigation measures is that they reasonably represent current best practices at similar mines. The EPA considers it unlikely that there are further feasible and reasonable measures that would provide significant additional noise mitigation."
- Par. 346 – cumulative noise:
 - Cumulative noise was addressed with reference to the non-discretionary standards within the Mining SEPP and the INP’s amenity criteria. The results show that the proposal satisfies these levels for Bulga residences and means the area’s amenity is not compromised as it meets the INP’s amenity noise level. Further, the amenity, which relates to cumulative noise from all industry, cannot worsen for this area because no new large scale industry would be able to physically exist in a position that could push amenity levels any higher for Bulga residences.

- For other assessment locations (non-Bulga) the cumulative noise assessment also demonstrates general adherence to the Mining SEPP and INP amenity criteria, notwithstanding the EPA's submission on application of a rural/industrial interface criteria where appropriate. The only exception to this is Warkworth village where an exceedance is presented in the EIS as a consequence of noise generated at Wambo Mine.
- Par. 364 – 367 – combined MTW noise criteria:
 - The noise and vibration study addressed the proposal and the neighbouring MTO development application separately. Further, the approvals do not overlap and it is clear when a noise source is regulated under the Warkworth Mine development consent and EPL and when it is regulated under the MTO development consent and EPL.

The noise and vibration study adopts the requirements of and is consistent with the INP. The study also included a cumulative assessment of Warkworth Mine and surrounding mining operations in the area. Table 10.3 of the EIS describes the INP's steps for noise assessment of development proposals and references where these steps have been addressed in the study. This table has been reproduced below in Table 6.1.

Table 6.1 **INP steps for noise assessments**

| Step | Reference in the EIS |
|---|--|
| 1. Determining the project specific noise levels for intrusiveness and amenity that are relevant to the site or the area (Section 2) | Section 10.2 and Figures 10.3 and 10.4 |
| 2. Measuring and determining existing background and ambient noise levels, using the method relevant to the expected level of impact (as outlined in Section 3) | Section 10.3 |
| 3. Where the proposed development is expected to produce annoying noise characteristics, adjustments are to be applied to the noise levels produced by the development in question (as outlined in Section 4) | Section 10.4.4 |
| 4. Predicting or measuring the noise levels produced by the development in question, having regard to meteorological effects (such as wind, temperature inversions) (see Section 5) | Section 10.4.2 |
| 5. Comparing the predicted or measured noise level with the project-specific noise levels and assessing impacts (Section 6) | Section 10.4.2 |
| 6. Considering feasible and reasonable noise mitigation strategies where the project specific noise levels are exceeded (Section 7) | Section 10.5 |
| 7. Negotiation between the regulatory/consent authority and the proponent and between the community and the proponent to evaluate the economic, social and environmental costs and benefits from the proposed development against the noise impacts (Section 8) | Chapter 8 |
| 8. The regulatory/consent authority sets statutory compliance levels that reflect the achievable and agreed noise limits for the development (Section 9) | To be completed by consent authority at the completion of the approval process |
| 9. Monitoring of environmental noise levels from the development to determine compliance with the consent/licence conditions (Section 11). To be completed post approval for the proposal | Monitoring data for the current operations is considered in Section 10.2.1 |

It is important to note that the INP prescribes noise criteria are not mandatory. The INP states:

The industrial noise source criteria set down in *Section 2* are best regarded as planning tools. They are not mandatory, and an application for a noise producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development. The criteria help to determine consent/licence conditions because they provide information on the likely effect of any environmental noise associated with the development.

The criteria in the INP have been selected to protect at least 90 per cent of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90 per cent of the time (refer Section 1.4.1 of the INP 'Principles underpinning the noise criteria'). The INP states: "Provided the criteria in this document are achieved, then it is unlikely that most people would consider the resultant noise levels excessive". The assessment of the proposal accords with this process.

The INP also acknowledges existing operations and states:

In applying the policy to existing operations it is acknowledged that the scope for applying feasible and reasonable mitigation measures to existing noise sources is usually far more limited than for new developments. Careful consideration of noise impacts and the feasible and reasonable mitigation measures available at these sites may result in less stringent noise limits than would ideally apply. Sometimes the resultant noise limits will be above the criteria. The assessment and management of existing premises is dealt with in *Section 10*.

As referenced above, Section 10 is a chapter of the INP dedicated to existing premises, such as Warkworth Mine. The assessment of the proposal has followed the guidance provided in Section 10 of the INP.

It is important to note that negotiation between the regulator and the applicant can occur as prescribed in the INP (Section 8.2) where PSNLs cannot be achieved following all reasonable and feasible mitigation measures. The negotiation process between the regulator and the applicant must result in the establishment of statutory noise limits that reflect those that are achievable for the proposal. The limits the EPA will license will be within 5dB of the PSNLs, as confirmed for this project in the EPA's submission. As described above, this can be above the INP's PSNLs where all reasonable and feasible mitigation has been adopted, and where the development is demonstrated to provide net benefits. This negotiation process is described in Section 8.2 of the INP. Section 8.2.1 of the INP provides a checklist for residual level of impact, which has been used and responded to in Section 10.6 of the EIS.

As described above, full consideration was given to the L&E Court judgment in assessing noise and vibration as part of the proposal.

6.4.3 Background noise levels and criteria

Of the submissions of objection related to noise and vibration matters, 14 per cent (representing three per cent of the total submissions of objection) queried the data used for establishing background noise levels, particularly for residential areas west of the proposal (ie Bulga village). Submissions also stated that the resultant criteria were not appropriate for the local area (ie they were higher than would reasonably be expected).

The approach to establishing background noise levels, particularly for residential areas west of the proposal was comprehensive, rigorous and has provided for appropriate criteria for the local area.

The study included background noise surveys at six locations throughout the Bulga community to define levels in accordance with the INP, and to better understand changes in levels for residences north, south and west of the centre of Bulga (see Chapter 8 of the noise and vibration study). The data captured at each of the six locations far exceeds the requirements of the INP, which states at least seven days of data is to be collected that is unaffected by rain or wind. The survey captured between three and 11 months of data at each location, ie over 12 to 47 times the minimum survey requirements as prescribed in the INP.

The INP's definition of background noise was applied in deriving the representative rating background levels (RBLs) at each of the six monitoring locations. Three of the six monitoring locations resulted in RBLs of 30dB(A), consistent with the INP's minimum level and hence attracted the minimum or most conservative intrusiveness criteria possible according to the INP, ie 35dB(A) $L_{eq,15minute}$. The other three monitoring locations demonstrate marginally higher background noise levels (ie 33dB(A) attracting intrusiveness criteria of 38dB(A) $L_{eq,15minute}$) and are relatively more exposed to existing mining operations.

Assignment of background noise levels for individual properties located between monitoring positions where 30dB(A) and 33dB(A) is found, was based on predicted changes in noise over distance from the noise model rather than arbitrary assignment, leading to a fairer representation of background noise levels. Figures 8.1 and 8.2 of the noise and vibration study are reproduced for reference as Figures 6.3 and 6.4 in this report.

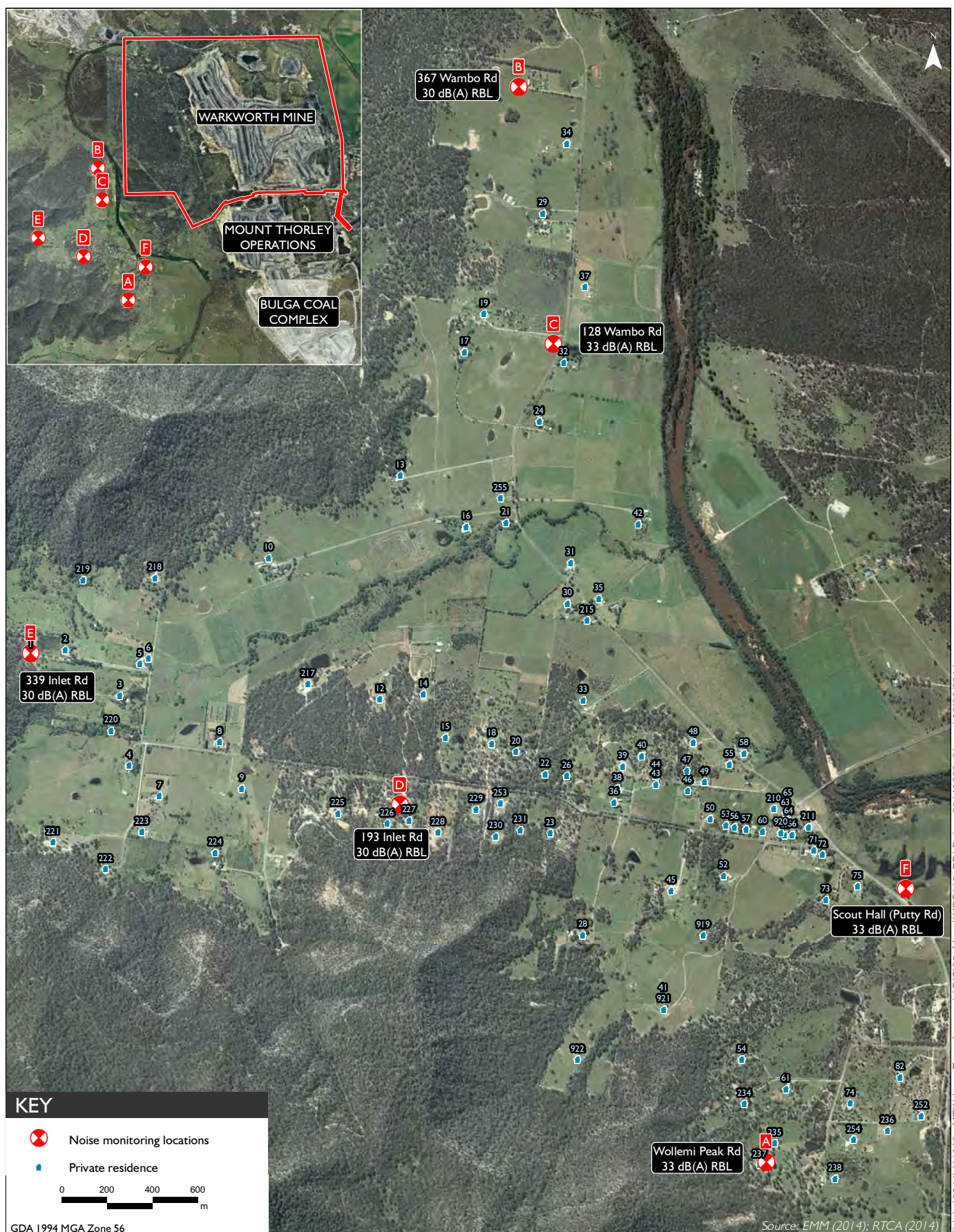
This approach considered noise levels for MTO or Warkworth Mine and Bulga Coal Complex (as published in their most recent assessments).

Compared to previous assessments undertaken in the area, this approach results in a relatively smoother transition in RBL values across this area. It assigns corresponding criteria more evenly between adjoining properties, for example, as occurs at Inlet Road in Bulga. This approach minimises the situation often found where one property has a marked step increase in RBL and therefore higher criteria than its immediate neighbour, creating the problematic 'line-in-the-sand' delineation of criteria which often results in different zones of impact (for example, one property is assigned mitigation while their neighbour is not). This approach is considered robust and was adopted given the importance of this matter. Discussion with the EPA confirmed that this was a practical approach.

It is also acknowledged that background data at one location (Bulga Scout Hall) was higher than assessed in the BOP assessment by Bulga Coal Complex. The adopted 33dB(A) RBL at this location is 3dB higher than the day and night level stated in the BOP assessment (adopting the INP's minimum RBL threshold), and 1 dB higher than the evening value. These differences, albeit marginal, are a consequence of the sampling periods. The BOP assessment included approximately two months of data, whereas the proposal EIS processed 10 months of data, providing a much wider analysis that better represents longer term fluctuations such as those due to seasonal variances.

To ensure that the real-time monitoring network adequately assesses and represents all receivers, validation surveys are undertaken regularly by community response officers at MTW, involving supplementary noise monitoring and comparison with measured levels from the nearest real time monitor. Where a survey indicated a change may be required this is reviewed and actioned as appropriate to ensure monitoring systems and reactive triggers remain representative.

It is not always possible to access the residential property for the purposes of validation, however locations are selected to ensure they are representative of the residence and this is checked by interrogating the noise model. It is also important to note that the distances from the mine to privately-owned residences are large enough that minor positional differences in monitoring (for example, at the residential boundary versus adjacent the dwelling) make little or no differences to captured noise data associated with the mine. Influences such as topography and relative height above ground are also considered during monitoring to again ensure data are representative or worst case.

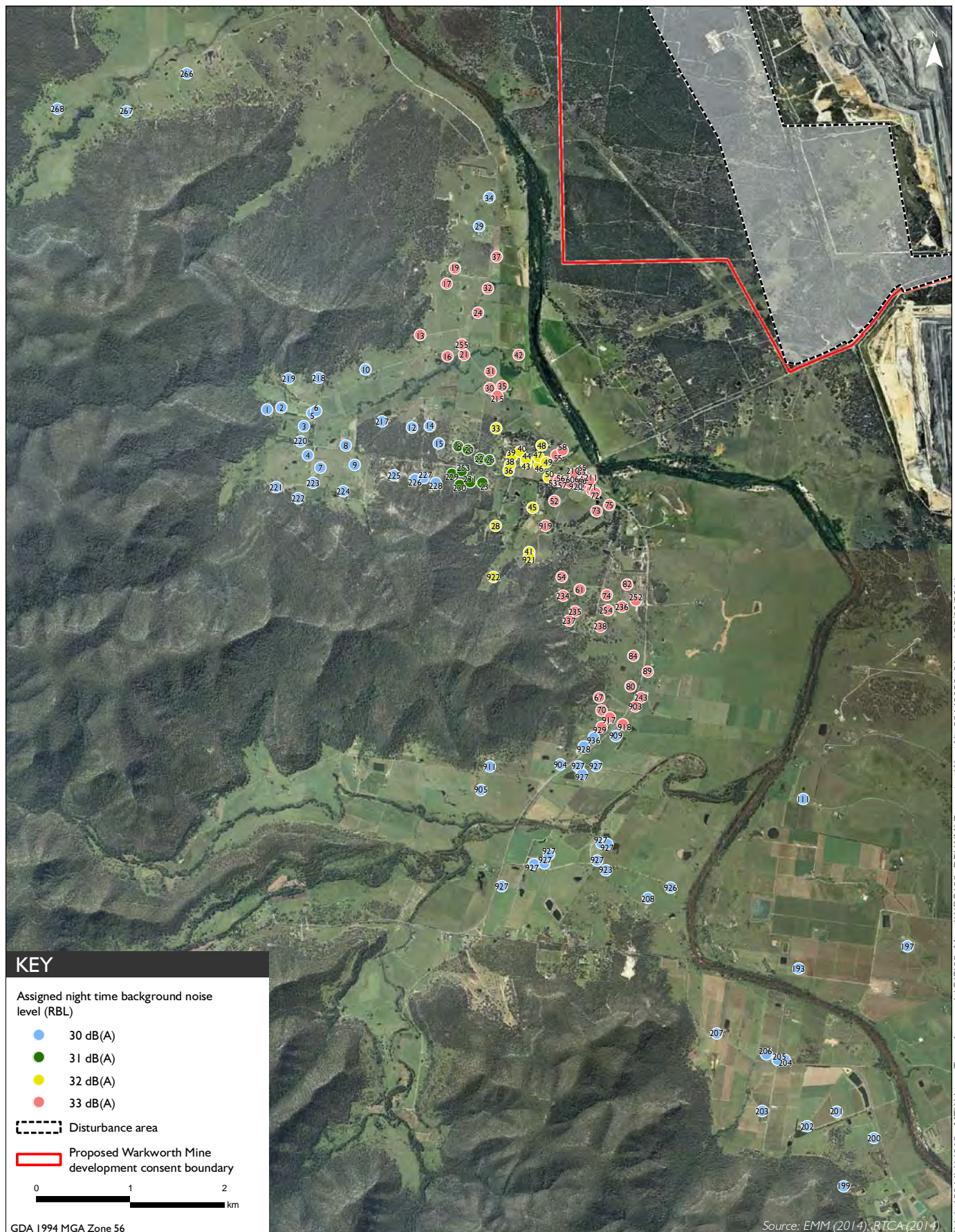


Long-term background noise monitoring locations in Bulga

Warkworth Continuation 2014

Response to Submissions

Figure 6.3



Assigned night time background noise levels
 - Western and southern assessment locations
 Warkworth Continuation 2014
 Response to Submissions
 Figure 6.4

6.4.4 Modelling accuracy and assessment scenarios

Of the submissions of objection related to noise and vibration matters, 12 per cent (representing three per cent of the total submissions of objection) queried the accuracy of the numerical noise model and the lack of site-specific information used for predictions of impacts in the assessment scenarios.

The noise and vibration study prepared as part of the EIS is appropriate for determining properties entitled to acquisition upon request in accordance with government policy.

The noise and vibration study was prepared by industry leading professionals in accordance with government policy and guidelines and included detailing modelling to determine properties entitled to acquisition upon request. The noise study was also peer reviewed at key stages by a leading acoustic firm, with the outcomes reflected in the finalised assessment. The approach to the noise and vibration study is discussed further in Sections 6.4.2 of this report.

Modelling completed as part of the noise and vibration study of the proposal was based on three-dimensional digitised ground contours for the surrounding land, mine pits and overburden emplacement areas. The indicative mine plans represent worst case snapshots with equipment placed at various locations and heights to reflect realistic operating conditions in each of these mining stages.

The noise model was configured to predict the total L_{eq} noise levels from mining operations based on the sound power levels of equipment. These sound power levels are short-term L_{eq} values of generally pass-by events and are therefore conservative representations of the INP's assessment metric, the $L_{eq,15minute}$. The sound power levels are tested regularly on site and models are updated each time if required to ensure input data is current and accurate. It should be noted that the model includes the entire spectral emissions for each individual plant item and therefore uses these spectra to predict received levels. This accounts for the linear characteristics of each source and not just the overall dB(A) level. The results presented assume all plant and equipment to be operating simultaneously and at full power. In practice, such an operating scenario would occur very infrequently. The noise predictions presented are therefore conservative. The model was peer reviewed (refer to Section 4.11.1 of this report and the noise and vibration study (EIS Appendix F)). Further, the EPA in its submission states "... EPA considers that the prediction method and results appear reasonable and proposes to set the predicted values as noise limits, which it will be the responsibility of the proponent to meet."

The EPA encourages site specific validation of noise predictions wherever possible to better represent potential impacts from industrial operations. The results of an extensive field validation exercise, which were also part of the 2002 (ERM) and 2010 (EMM) noise assessments for Warkworth mine, were adopted in the current prediction of noise levels for prevailing winds. Similar studies have been conducted with the results published in peer-reviewed technical journals (for example, *Experimental Outdoor Sound Propagation' 13th International Congress on Sound & Vibration*, 2006 and *Experimental Outdoor Sound Propagation vs ENM* Australian and New Zealand Acoustic Society Conference, 2007). These studies concluded that the prediction of L_{eq} noise is consistently overestimated during weather enhanced conditions, a finding also consistent with a NSW Australian Acoustic Society presentation by Dr Robert Bullen in 2009 about such modelling software algorithms. This further emphasises the conservatism inherent in the modelling software adopted for the proposal.

Other important input factors for noise modelling include consideration of attenuation of the equipment fleet. As described in the EIS this is well under way at MTW. As stated in Section 10.4.1 of the EIS, WML has attenuated 50 per cent of the haul truck fleet, with the commitment to attenuate all trucks by the end of the 2016 calendar year. Further, attenuation packages have been and would continue to be fitted to all mining fleet of dozers, excavators and drills by the end of 2016. The cost of the attenuation programme is in excess of \$50million across MTW.

Several of these submissions stated that the scenarios assessed were unlikely to represent worst case operations.

The mine plans that form the basis of the study were optimised over many iterations of noise modelling for different operating scenarios. In arriving at the mine plans, alternative noise minimisation techniques were identified and applied. This optimisation defined the quantity and location of plant that could operate under adverse weather conditions so that the predicted levels satisfied or were within 1-2dB of the INP's PSNLs at as many properties as possible. This was largely achieved for all Bulga residences as shown in Figure 10.5 of the EIS and reproduced as Figure 6.3 in this report. The result was achieved with the application of all reasonable and feasible mitigation. It is noted that a change in noise levels of 1-2dB is imperceptible.

Indicative Year 14 (nominally 2028) was the final plan modelled and assessed in detail. At this stage mining (at a sustained maximum production rate of 18Mtpa) has extended to its western most point at, some 375m further west than Year 9. Importantly however, by this time the plant is operating mostly below the highwall in relatively shielded areas at the western most parts of the mine. For this reason, noise during this stage is not worst case for Bulga residences. The predicted noise from proposed Year 9 (or nominally 2023) is generally worst case for Bulga residences. Other activities in this stage include establishment of final landform and rehabilitation areas to the east side of the Site. This will provide shielding to assessment locations east of the Site.

Similarly, the footprint of the final year of the proposal operation (Year 21) will not extend any further west than Year 14. Between Year 14 and Year 21, the operation continues and mining deepens. Hence, Year 21 was not modelled as plant is shielded from assessment locations more than in any previous years (Year 2, 9 and 14 that were modelled and assessed in detail).

6.4.5 Noise modelling results

Of the submissions of objection related to noise and vibration matters, 64 per cent (representing 16 per cent of the total submissions of objection) queried the study's results, comprising:

- the influence of Saddleback Ridge (five per cent of noise submissions);
- LFN (14 per cent of noise submissions);
- amenity (69 per cent of noise submissions);
- vibration (12 per cent of noise submissions); and
- cumulative noise (77 per cent of noise submissions).

These matters are addressed in the following sub-sections.

It is noted that noise modelling results reflect a number of conservative assumptions applied to the modelling, which related to the below.

- Plant and equipment operation – the results presented assume all plant and equipment to be operating simultaneously and at full power. In practice, such an operating scenario would occur very infrequently.

- Sound emission levels of plant - the noise model was configured to predict the total Leq noise levels from mining operations based on the sound power levels measured for individual plant. These sound power levels are short term (typically less than one minute) Leq values of generally pass-by events and are therefore conservative representations of the INP's assessment metric, the Leq,15minute. This essentially means that the noisiest 'sample' (one minute readings) is used to represent the whole 15 minute assessment period.
- Equipment locations - equipment positions modelled were selected to be representative of exposed haul routes and emplacement areas.
- Meteorology - the above worst case individual plant emission factor and simultaneous operations at full power is coupled with the occurrence probability of adverse weather conditions, resulting in the predicted levels at assessment locations. The prevalence of the adopted meteorology alone is typically 30 per cent consistent with the INP's threshold for the definition of 'feature' conditions. The probability that all these factors will coincide is therefore lower. Hence, the mine's noise contribution at assessment locations will be lower than presented for the majority of the time. Furthermore, although the presence of temperature inversions in this area does not exceed the INP's minimum 30 per cent threshold value, modelling included inversions. To that end, the upper end of stability class F temperature inversions (3.9degC/100m) was adopted.
- Mine plan scenarios - numerous mine plans were developed and reviewed in detail to select those most representative of worst case years of operations in order to develop the 'outer envelope' of predictions. Hence, during other years the mine's noise contribution at assessment locations is expected to be the same or lower.
- Cumulative noise - a number of assumptions were adopted to simulate worst case meteorological scenarios for the various mines and assessment locations. To estimate Leq,period noise levels from each site, the published Leq,15min predictions were only marginally adjusted by subtracting 3dB to account for changes in operations and weather conditions between a "prevailing" worst case 15-minute and an average nine hour night period. This adjustment is conservative based on our experience in the field for this and other sites. In the very least for example, the coincidence of worst case meteorology in a 15 minute period does not prevail for the whole 9-hour period.
- Modelling algorithm - in EMM's experience on many similar projects the EPA has encouraged site specific validation of noise predictions wherever possible to better represent potential impacts from industrial operations. Studies have been conducted and results of which published in technical journals (for example, Experimental Outdoor Sound Propagation' 13th International Congress on Sound & Vibration, 2006 and Experimental Outdoor Sound Propagation vs ENM Australian and New Zealand Acoustic Society Conference, 2007). These studies concluded that the prediction of Leq noise is consistently overestimated during weather enhanced conditions, a finding also consistent with a NSW Australian Acoustic Society presentation by Dr Robert Bullen in 2009 about such modelling software algorithms, particularly the Environmental Noise Model (ENM) algorithm adopted for the noise and vibration study.

i Influence of Saddleback Ridge

Of the submissions of objection related to noise and vibration matters, five per cent (representing one per cent of the total submissions of objection) stated that Saddleback Ridge played an important role in acoustic mitigation to properties to the west (ie Bulga village) of Warkworth Mine and that its removal would result in unacceptable noise impacts from the proposal. Submissions also questioned whether the removal of Saddleback Ridge was considered in the modelled scenarios of the indicative years.

The influence of Saddleback Ridge on noise levels is addressed in Section 4.11.1 of this report.

A related submission questioned the above in view of dump heights being so high now and hence the reason for the minimal differences in noise pre and post the removal of the ridge. Whilst the dump heights are comparable to the relative height of the ridge, the equipment at that height of the dump are limited and are considerably further away than other equipment on site from Bulga residences. Also, the contributing noise sources at Bulga residences are components from numerous plant across the entire site with predictions being unchanged if for example those sources on the dump are removed. This is because the limited equipment, and hence noise sources, on these dumps (which are at greater distances than other sources) do not contribute to total average noise received at Bulga (during worst case meteorology).

The change in noise from current and approved operations is expected to be marginal for western assessment locations, while a material reduction is predicted for eastern assessment locations as attenuation of plant progresses. The proposed noise suppression and fleet management will mean the advancement westward is not predicted to result in a material increase to noise levels.

ii Establishment of a bund

Noise mitigation, such as a large noise bund, along the transmission path was considered and was found to be ineffective for the assessment locations in Bulga. The slope of the terrain between the mine and Wollemi Brook to the west would require a bund to be considerable in extent (ie kilometres) and height (ie over 20m) and would only provide minimal noise benefit to Bulga residences during adverse weather. Notwithstanding, if line of sight to residences could be obstructed, the benefit would be marginal during adverse weather conditions. The impractical nature of such a bund includes the need for considerable land area to accommodate the bund's base and would need to be adjacent the Wollombi Brook in the proposed offset areas so as not to sterilise coal resources. The bund would also take multiple years to construct. Therefore, this is not a reasonable and feasible noise mitigation option. This matter was discussed in detail in Chapter 23 of the EIS.

It is noted that the EPA's submission states: "The EPA's view of the proposed noise mitigation measures is that they reasonably represent current best practices at similar mines. The EPA considers it unlikely that there are further feasible and reasonable measures that would provide significant additional noise mitigation."

iii Low frequency noise

Of the submissions of objection related to noise and vibration matters, 13 per cent (representing three per cent of the total submissions of objection) stated that LFN emissions from the mine were currently unacceptable and that the proposal would continue to produce unacceptable LFN. It was also contended that the assessment did not follow the INP method of considering LFN and applying the modifying factor of 5dB to predicted levels.

Section 10.4.4 of the EIS specifically addresses LFN and despite the INP standard for LFN not being applied to existing operations, the EPA has advised in its submission that it will apply to the proposal, unless further information is provided. Section 4.3.1 of this report provides an INP LFN assessment of the proposal and demonstrates that the INP penalty would not apply to the project.

The INP defines LFN as noise with major components in the range 20Hz to 250Hz. The majority of the noise energy of mining noise sources is at frequencies up to and including 630Hz based on EMM's experience and available published monitoring data. The amount of noise energy at or below 250Hz needs to be significant in relative terms to other frequencies for LFN to become prominent. Of note, human hearing diminishes with reducing frequency and, therefore, there needs to be more energy at the lower frequencies for it to be perceptible.

The INP definition of LFN does not presently align with the community's perception of LFN. LFN is often perceived as noise energy that is heard or discerned of 'lower' frequency than the surrounding noise climate. For example, comparison may be made between domestic or natural sounds and mining noise, with the latter more 'obvious' and of lower frequency content than the non-mining sounds. This point of view is valid and demonstrated through observations by EMM acoustic specialists at Warkworth Mine and other mining operations. That is, the community's definition of LFN obtained via observation does not necessarily align with the INP's technical definition.

Wind induced LFN is very common in the natural environment and EMM has measured dB(C) minus dB(A) level differences that are greater than the INP's 15dB criteria for example even though mining noise was not audible or present.

Noise generating sources that contain relatively elevated noise energy at frequencies of 250Hz or lower were reviewed to address LFN in a technical sense for the proposal. The primary sources are pumps and centrifuges within the CPP on the eastern side of Warkworth Mine. No changes to the CPP are proposed under the proposal and, therefore, the main source of LFN will remain unchanged. No new plant or equipment will be required to support the proposal. Further, the proposed noise suppression of plant will include reductions in the lower frequencies via 'in-service' target noise level specifications that include dB(A) and dB(L) (or linear) parameters.

Attenuation of noise with distance is greater and far more effective for high frequency noise than it is for LFN due to atmospheric absorption. At significant distance from a noise source (such as private residences near Warkworth Mine) this often results in large differentials between LA_{eq} (or the 'A-weight' energy average noise used for compliance limits - simulating human hearing) and LC_{eq} (or the 'C-weighted' energy average, which is an almost unfiltered metric and hence depicts low frequency content in an almost raw form). The INP requires the modifying factor to be applied in these instances, irrespective of actual low frequency affectation.

As a consequence of the aforementioned effect of noise attenuation due to distance for LFN, the application of the modifying factor as currently described in the INP does not achieve the intended outcome for open cut mines in semi-rural and rural settings. The current threshold for LFN in the INP of dB(C) minus dB(A) of 15dB is one of the more stringent prescribed in jurisdictions worldwide.

The German standard DIN45680 (1997) for instance uses preliminary measurement where the dB(A) and dB(C) difference is found to be greater than 20dB, then further investigation using a nominated reference curve is to be undertaken. This preliminary measurement criterion is less stringent than the 15dB threshold prescribed in the INP.

iv Cumulative noise

Of the submissions of objection related to noise and vibration matters, 77 per cent (representing 19 per cent of the total submissions of objection) contended that cumulative noise levels would increase significantly at residences in the areas surrounding Warkworth Mine should the proposal proceed.

As demonstrated in Section 10.2 of the EIS, the Mining SEPP's non-discretionary standard for cumulative noise is satisfied for Bulga and most other residences and, accordingly, the area's amenity is not compromised as it meets the INP's Acceptable Noise Level (ANL). The only exception is Warkworth village residences where exceedances are due to noise generated from Wambo Mine.

Section 10.4.5 of the EIS provides an assessment of cumulative noise in accordance with the INP. It is important to note that unlike the intrusiveness criteria, cumulative noise is assessed over an entire day, evening or night assessment period, and hence the $L_{eq,period}$ metric is based on an extended duration (11 hours, four hours and nine hours for day, evening and night respectively). The intrusiveness criteria adopts a 15 minute duration, and hence cannot be added to $L_{eq,period}$ nor can $L_{eq,15minute}$ data be combined and directly assessed against $L_{eq,period}$ (amenity) criteria.

The ambient noise at assessment locations in the vicinity of the proposal is also influenced by adjoining industrial premises, for example, Wambo Mine, Hunter Valley Operations, MTO, Bulga Coal Complex, and to some extent Redbank Power Station.

The level of noise at residences from each of these surrounding industries was referenced from the following documents:

- the EIS for the expansion of Wambo Mine (Resource Strategies 2003);
- the Environmental Assessment Report for Hunter Valley Operations South Coal Project (ERM 2008);
- the EIS prepared for Mount Thorley Operations 2014 being exhibited concurrently with this proposal and corresponding noise assessment (EMM 2014); and
- the EIS for the Bulga Coal Complex BOP (Umwelt 2013) and BOP Response to Submissions and Revised and Amended Project Application Assessment Report (Umwelt 2013a).

Most of these assessments predict noise levels at residences under both calm and adverse weather conditions. To assess cumulative impacts, the L_{eq} noise levels predicted by this assessment were combined with the L_{eq} noise levels from relevant mining stages of each of the aforementioned assessments. To estimate $L_{eq,period}$ noise levels from each site, the published $L_{eq,15min}$ predictions were adjusted by subtracting 3dB to account for changes in operations and weather conditions between a 'prevailing' worst case 15-minute and an average nine hour night period. This adjustment is conservative based on EMM's experience in the field for this and other sites. For Redbank Power Station, EMM's attended noise measurements completed during a study in 2010 were adopted and are limited to assessment locations in Gouldsville and Long Point Road.

The cumulative impacts can be predicted for any given mining year, using the conservative approach of combining worst case adverse weather condition noise predictions from each of the mines. In some cases, this is a highly conservative strategy for some assessment locations as meteorological conditions required to produce worst case noise levels from one mine will generally be different and are, in some cases, in opposition. For example, while westerly winds will serve to increase noise to residences in Warkworth village from Wambo Mine, they will also serve to decrease noise from the proposal.

In light of this and as described in the EIS (refer to Section 10.4.5), the assessment of cumulative noise impacts was undertaken on the basis of considering the following:

1. For assessment locations west of the proposal:
 - a) adverse weather predictions from Wambo Mine and Redbank Power Station were combined with calm predictions from all other mines. This simulates north-easterly wind situations; and
 - b) calm predictions from Wambo Mine where combined with adverse weather predictions from all other sites. This simulates easterly or south-easterly winds and therefore worst case for these assessment locations.
2. For assessment locations east and north of the proposal:
 - c) adverse weather predictions from BOP where combined with calm predictions from all other mines. This simulates a southerly wind situation; and
 - d) adverse predictions from all mines where combined with calm predictions from Hunter Valley Operations. This simulates a conservative worst case situation for these assessment locations.

Twenty representative assessment locations were used to assess cumulative noise impacts, including Bulga. Figure 11.1 of the noise and vibration study (reproduced as Figure 6.5 in this report) shows the cumulative noise assessment locations. The results show that the INP's (and Mining SEPP) acceptable night time criteria are satisfied at all but one representative assessment location (77 at Warkworth). Exceedances are predicted at assessment location 77 for indicative Years 3, 9 and 14 of the proposal, being dominated by Wambo Mine operations worst case predictions. This assessment location is already entitled to acquisition by Wambo Mine upon request of the landowner.

Given the magnitude of exceedance at assessment location 77, and being representative of Warkworth village, by extrapolation the amenity criterion is exceeded at neighbouring residential assessment location 264, also due to Wambo Mine.

This outcome is based on noise from the proposal being assessed during indicative worst case operating years and, therefore, the contribution to the cumulative noise environment is not expected to increase beyond indicative Year 14.

Further, noise levels predicted from Bulga Coal Complex referenced in the BOP RTS (Umwelt 2013a) are expected to decrease as mine life progresses. For example, assessment location 266 in Bulga village, representative of the majority of assessment locations (as per BOP numbering system) shows upper predicted noise levels over the day, evening and night periods of 35, 36, 34, 33 and 29dB(A) for mining years 1, 4, 7, 13 and 19, respectively. These BOP RTS predictions are the same or at most 1dB different to those presented in the BOP EIS. The minimal change in predictions does not change predicted total cumulative noise levels presented in the noise and vibration study for Bulga residences. Noise levels in Bulga village from MTO also decrease throughout the mine life, with all active mining and emplacement activity ceasing by Year 14. For example, predicted noise levels from MTO at assessment location 58 in Bulga village are 39, 35 and 27dB(A) for mining years 3, 9 and 14, respectively. Therefore, in consideration of the preceding, it is anticipated that the predicted cumulative noise levels presented in the noise and vibration study represent worst case cumulative noise levels for the life of the proposal with noise levels decreasing during the remainder of the proposed development consent period.

It is also acknowledged that background data at one location (Bulga Scout Hall) was higher than assessed in the BOP assessment by Bulga Coal Complex. These differences, albeit marginal, are a consequence of the sampling periods. The BOP assessment included approximately two months of data, whereas the proposal EIS processed 10 months of data, providing a much wider analysis that better represents longer term fluctuations such as those due to seasonal variances. This matter is discussed further in Section 6.4.3 of this report.



Cumulative noise assessment
Warkworth Continuation 2014
Response to Submissions
Figure 6.5

Of the submissions of objection related to noise and vibration matters, 69 per cent (representing 17 per cent of the total submissions of objection) stated that the amenity of the area was not considered in the noise and vibration study and that the residual noise impacts of the proposal were not considered.

Contrary to the assertion, amenity of the area and residual noise impacts from the proposal were considered in the noise and vibration study. The cumulative noise assessment as described earlier is in effect, an assessment of noise amenity in accordance with the Mining SEPP non-discretionary standard.

It is demonstrated that the non-discretionary Mining SEPP's non-discretionary standard for cumulative noise (refer to Section 10.2 of the EIS) is satisfied for Bulga residences and, therefore, the area's amenity is not compromised as it meets the INP's ANL. Refer to Section 10.4.5 of the EIS for the cumulative noise assessment.

Further, the amenity, which relates to cumulative noise from all industry, cannot worsen for Bulga village because no new large scale industry would be able to physically exist in a position that could push amenity levels any higher for Bulga residences.

With respect to residual noise impacts, the INP, in Section 8.2.1, lists the matters to be considered if predicted noise levels exceed the PSNLs (note that the PSNL is set well below amenity criteria, refer to Figure 6.6 in this report) after reasonable and feasible mitigation has been applied, ie residual noise impact. Section 10.6 of the EIS addresses residual level of impact.

It is noted that in its submission, the EPA states: "The EPA's view of the proposed noise mitigation measures is that they reasonably represent current best practices at similar mines. The EPA considers it unlikely that there are further feasible and reasonable measures that would provide significant additional noise mitigation."

Table 10.14 of the EIS has been reproduced as Table 6.2 below and provides an assessment of the residual noise impacts from the proposal, consistent with the L&E Court judgment (par. 338).

Table 6.2 Residual level of impact

| INP factors for consideration | Justification of the proposal |
|--|--|
| 1. Characteristics of the area and receivers likely to be affected | The majority of the local area surrounding the proposal is characterised by mining and associated infrastructure and agricultural land, mainly pasture, with moderate sized stands of native woodland retained along the steeper hillsides and ridgelines and in patches along creek lines. |
| —the extent of the areas (including existing, developing or proposed residential, health or education sites) and number of receivers (including groups that may be especially sensitive to noise, such as pre-schoolers, students, the aged, hospital and nursing home patients) likely to be affected by noise levels above the project-specific noise levels | The applicant owns a substantial area of land surrounding the Site. Warkworth Mine has been in operation since 1981 and the originally approved mine has been modified several times. Immediately to the south of Warkworth Mine is MTO, which also commenced operations in 1981. The integrated operation of MTW has been ongoing since 2004. The Bulga Coal Complex, which is adjacent to the south of MTW, has been operating since the 1980s. Wambo Mine and Hunter Valley Operation South, to the north of MTW, also commenced operations in 1969 and 1971, respectively. |
| —the daily activities of the community (in particular, effects such as sleep disturbance, speech interference, level of annoyance or effects on physical or physiological health) | The noise and vibration study predicted noise levels at 221 assessment locations surrounding the mine. The predicted noise levels are during worst case INP prevailing meteorological conditions and for the majority of the time actual noise levels are likely to be less than those predicted. Of the 221 assessment locations, a total of 103 assessment locations are |

Table 6.2 Residual level of impact

| INP factors for consideration | Justification of the proposal |
|--|--|
| <ul style="list-style-type: none"> —property values —zoning of land uses affected by noise and the appropriateness of the zoning or land use —the potential change in the ambient noise levels as a result of the proposal; cumulative noise impacts in the area; and whether parts of the area that are already moderately or badly affected by noise will be more or less affected —the extent to which biodiversity (especially native birds and other animals) will be affected —the likely variation between individuals in response to the noise —the amenity of areas used for outdoor recreational activities or conservation, heritage or wilderness areas —other industry in the area (including agriculture) | <p>predicted with noise levels above PSNLs over the life of the mine. Of these, 81 are predicted to have minor noise level exceedances (1-2 dB(A) above PSNL), 18 are predicted to have moderate noise level exceedances (3-5 dB(A) above PSNL) and four are predicted to have significant noise level exceedances (greater than 5 dB(A) above PSNL). Assessment locations with predicted moderate and significant noise level exceedances account for approximately 9% of the total assessment locations considered. Further, one of the three residential assessment locations (77) predicted with a significant noise level exceedance has previously been identified in an acquisition zone of a neighbouring mine (Wambo Mine). Extrapolating Wambo Mine's noise identifies that one other residential location would be impacted (264).</p> <p>A total of 139 assessment locations within Bulga were considered. Of these, 60 are predicted with minor noise level exceedance, five are predicted with a moderate noise level exceedance and one is predicted with a significant noise level exceedance, over the life of the mine. Assessment locations in Bulga with predicted moderate and significant noise level exceedances account for approximately 3% of the total assessment locations considered in Bulga.</p> <p>The change in noise from current and approved operations is expected to be marginal for western assessment locations, while a material reduction is predicted for eastern assessment locations as attenuation of mobile plant progresses. The proposed noise suppression and fleet management would mean the advancement westward would not result in material increases to noise levels. A cumulative noise assessment in accordance with the INP and Mining SEPP demonstrates criteria would be satisfied for all western locations with the exception of those already impacted by other mining operations.</p> <p>There is a very large range of human reaction to noise, including those who are very sensitive to noise. This noise-sensitive sector of the population would react to intruding noises that are barely audible within the overall noise environment, or would have an expectation of very low environmental noise levels. On the other hand, there are those within the community who find living in noisy environments, such as near major industry, on main roads or under aircraft flight paths, an acceptable situation. The bulk of the population lies within these two spectrums, being unaffected by low levels of noise and being prepared to accept levels of noise commensurate with their surroundings.</p> |
| <p>2. Characteristics of the proposal and its noise or vibrations</p> <ul style="list-style-type: none"> —the noise characteristics of the activity —the extent to which any remaining noise impact exceeds the project-specific noise levels —the circumstances and times when the project-specific noise levels are likely to be exceeded —the circumstances and times when the source noise levels are likely to be below the project-specific noise levels (for example, when wind blows source noise away from the receiver) —the accuracy with which impacts can be predicted, and the likelihood that the impacts will occur in the manner predicted | <p>Warkworth Mine is an existing and well established mine in the Hunter Valley. The proposal seeks a continuation of all aspects of Warkworth Mine as it presently operates together with an extension of the approved mining footprint by approximately 698ha to the west of current operations.</p> <p>Warkworth Mine currently invests significantly in the noise management on the mine and would continue to do so under the proposal. For example, attenuation of all major plant would exceed \$50million across MTW and would be completed by the end of 2016.</p> <p>Coal & Allied has committed to managing noise levels to within 1-2 dB above PSNL at approximately 90% of properties. Managing noise to this level is reasonable and feasible for the Site. Managing noise to PSNLs at all locations was tested and found not to be reasonable or feasible for the Site as it would result in the mine not being economically viable. The resultant loss in production from the required quantity of plant being disengaged, for the frequency and duration required due to the presence of adverse meteorological conditions under this scenario, exceeds \$100million (real NPV) over the life of the proposal.</p> <p>The assessment has identified that noise levels predicted above PSNLs would only occur during worst case prevailing metrological conditions. It has been demonstrated that with continued management of the mine, such as by limiting some plant and equipment operation during adverse meteorological conditions,</p> |

Table 6.2 Residual level of impact

| INP factors for consideration | Justification of the proposal |
|---|---|
| <p>—the degree to which the character of the noise is new to an area and differs from existing noise sources</p> <p>—the economic benefit and social worth of the proposal for the local area, the region or the nation.</p> | <p>and implementing equipment fleet with best practice noise suppression, that INP PSNLs can be met for the majority of assessment locations.</p> <p>The noise modelling adopts area specific validation and, therefore, provides added confidence in the accuracy of predictions.</p> <p>Extensive monitoring to measure compliance would be continued under the proposal.</p> <p>The economic assessment for the proposal has identified that the direct economic benefit that can be attributed to Warkworth Mine is around \$1.34billion in NPV terms. The economic flow-on effects from WML amount to:</p> <ul style="list-style-type: none"> • for NSW, around \$346million in additional income (in NPV terms), additional annual employment of 191 full-time equivalent workers, and a contribution to NSW GSP of around \$406million; • for the Mid and Upper Hunter region, around \$204million in additional income in NPV terms, and additional annual employment of 198 full-time equivalent workers; and • for the Singleton LGA, around \$75million in additional income in NPV terms, and additional annual employment of 57 full-time equivalent workers. |
| <p>3. The feasibility of additional mitigation or management measures:</p> <ul style="list-style-type: none"> - Alternative sites or routes for the development - The technical and economic feasibility of alternative noise controls or management procedures | <p>Warkworth Mine is an existing and well established mine in the Hunter Valley and relocation is not reasonable or feasible.</p> <p>The applicant has considered a range of noise management and mitigation measures for the proposal. Those that are considered reasonable and feasible have been included in this assessment. These include a significant investment in providing best practice noise suppression to all equipment fleet (see details in section 10.1.1 of Appendix F) and limiting some plant and equipment operation during worst case meteorological conditions. These measures in combination with the established real-time noise monitoring and management system would assist in keeping noise levels to within or below 1-2dB of PSNL for approximately 90% of the assessment locations considered - this is a reasonable and feasible outcome for the viability of the proposal.</p> |
| <p>4. Equity issues in relation to:</p> <ul style="list-style-type: none"> - The costs borne by a few for the benefit of others - The long-term cumulative increase in noise levels - The opportunity to compensate effectively those affected | <p>The applicant would be investing significantly in noise management and mitigation over the life of the proposal which would be of significant benefit to the surrounding communities.</p> <p>The cumulative noise assessment demonstrates that with reasonable and feasible mitigation and management in place that the INP recommended acceptable amenity noise limits can be achieved for the life of the mine.</p> <p>The applicant would appropriately compensate all assessment locations identified with moderate or significant noise level exceedance as negotiated with DP&E and the landowner.</p> |

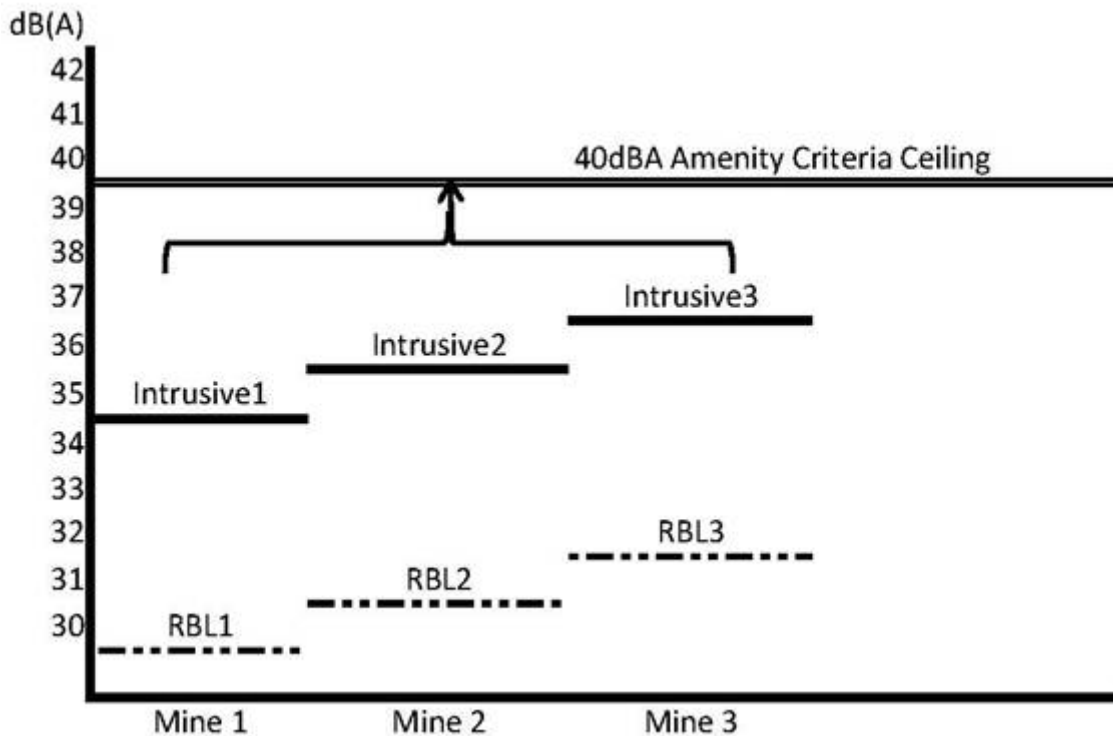


Figure 6.6 Amenity criteria to stop ‘noise creep’

6.4.6 Current and proposed operational noise controls and procedures

Of the submissions of objection related to noise and vibration matters, 50 per cent (representing 12 per cent of the total submissions of objection) contended that current noise emissions and vibration generated at the mine are excessive and do not comply with the existing criteria. A number of these submissions also stated that the existing controls implemented at Warkworth Mine are not working as the operations is still audible and is exceeding criteria, the monitoring system is flawed with monitors in the wrong locations and that the management system triggers are set at the criteria rather than below.

These matters are addressed in the following sub-sections which discuss the Warkworth Mine noise management system, WML’s commitment to continuous improvement and the mine’s compliance history. Additionally, it must be clarified that an operation being audible at residences (as submitted) does not imply exceedance. In fact, in satisfying the INP criteria, it is implied that the industrial source will at times be audible by some degree above the background, depending on the ambient noise at a given time.

i Warkworth Mine noise management system

The MTW noise management plan was developed in accordance with industry best practice with consideration given to the full available range of reasonable and feasible mitigation and their effectiveness in determining the measures to be implemented at the Site. The noise management plan details a range of existing acoustic management and monitoring procedures which are managing the existing operations to comply with the conditions of the development consent. The management measures include those which are implemented on a continuous (standard) basis, as well as both proactive and reactive measures, categorised in accordance with the hierarchy of control for contingency planning to manage residual risks. The hierarchy of control is as follows:

- administrative controls;

- substitution controls;
- engineering measures; and
- elimination controls.

Together, this suite of management measures and processes comprise the MTW noise management system.

The effectiveness of the MTW noise management system has been tested on a number of occasions in recent years, including formal compliance audits, requests for independent review, ad-hoc supplementary monitoring programmes, and departmental requests for information. MTW continues to demonstrate a position of overwhelming compliance with noise criteria, and a high level of adherence to the measures outlined in the noise management plan (see Section 6.4.6iii of this report).

Again, it is noted that in its submission, the EPA states: ‘The EPA's view of the proposed noise mitigation measures is that they reasonably represent current best practices at similar mines. The EPA considers it unlikely that there are further feasible and reasonable measures that would provide significant additional noise mitigation’.

a. Administrative controls

Administrative controls implemented at MTW include:

- Trigger Action Response Process (TARP);
- heavy mining equipment (HME) sound power level (SWL) screening;
- night shift environmental management report; and
- validation surveys of the real-time monitoring network.

Each of these measures is described below.

Trigger Action Response Process

The TARP is the key reactive noise control implemented at MTW, and involves the effective and timely response to elevated noise (trigger), irrespective of meteorological conditions. Triggers levels are set below compliance limits in the vicinity of nearby private residences.

Triggers are enacted in a number of ways, prompting commencement of reactive processes to validate, quantify and appropriately respond to noise conditions, including:

- receipt of a noise alarm from the real-time, directional noise monitoring network;
- identification of elevated noise through routine supplementary surveillance noise monitoring, undertaken by MTW personnel each night;
- notification of elevated noise through the routine (monthly) attended compliance monitoring regime undertaken by experienced and independent experts; and
- receipt of community complaint in relation to noise.

When a trigger is confirmed (noise levels exceed trigger level set below compliance level), an appropriate response is implemented to ensure the noise event is resolved within 75 minutes of identification. The response may include substitution or elimination measures, commensurate with the nature and severity of the noise event. For example, equipment may be relocated, substituted with quieter equipment, or shut down during adverse weather conditions and compliance noise measurements repeated to test the effectiveness of such measures.

HME sound power level screening

Understanding of the sound profile of the mining fleet is critical to effective introduction of both proactive and reactive noise controls. To ensure this information is kept up-to-date and relevant, SWL testing (sound screening) is undertaken on 33 per cent of the attenuated HME fleet annually. In this way, 100 per cent of attenuated equipment would be screened on a rolling three-year cycle. The results of sound screening would be used for the following:

- to inform MTW of equipment which is experiencing degradation in suppression equipment and requiring repair;
- to inform MTW of fleet types and units which can be preferentially deployed into or removed from noise risk areas; and
- to periodically update the PMI to increase model accuracy and usefulness.

When one piece of equipment measures greater than 3dB(L) against operational specifications, MTW maintenance staff inspect and assign the piece of equipment to the appropriate maintenance schedule.

Nightshift environmental management report

The MTW operational personnel prepare and circulate a report following each night shift which describes the noise management activities undertaken including routine controls, minor changes and equipment shutdowns, if any, during the shift. Where noise enhancing weather conditions are predicted for the shift ahead these are described in the report. Along with the description of the conditions, potential management strategies are also detailed.

Validation surveys of the real-time monitoring network

To ensure that the real-time monitoring network adequately assesses and represents all receivers, validation surveys are undertaken on an as-needs basis, involving supplementary noise monitoring in the vicinity of the private residence concerned, and comparison with measured levels from the nearest real-time monitor. Where a survey indicates a change may be required this is reviewed and actioned as appropriate to ensure monitoring systems and reactive triggers remain representative. Such changes have included expanding the real time permanent monitoring. The noise management plan as reviewed by the EPA, includes the monitoring locations, supporting validation via additional attended monitoring and by way of modelling to ensure they are representative.

b. Substitution controls

Substitution controls are implemented in response to one or more triggers (described in 'administrative controls' above), and are utilised both proactively and reactively. Substitution measures involve the repositioning or replacement of equipment or reassignment of tasks when conditions require. For example, assignment of sound attenuated trucks to higher (noise) risk hauls during noise enhancing conditions ahead of shift, or reactively following a trigger.

c. Engineering measures

In conjunction with its suppliers, MTW has progressed with the attenuation of its fleet of haul trucks and other mining equipment. All new trucks purchased for use on the mines would be commissioned as noise suppressed (or attenuated) units. MTW currently operates a mixture of sound attenuated and non-sound attenuated machines and the existing fleet of trucks are being progressively fitted with suitable noise attenuation packages. Baseline testing has been completed and acoustic engineering is being applied to understand what SWLs are achievable across the fleet. The attenuation programme is being undertaken in a targeted manner, addressing the noisier pieces of equipment as a priority for the operations given the remaining development consent life.

Identification and rectification of defects to sound attenuation equipment is undertaken as required through the normal maintenance process where reasonable and feasible. MTW has also completed works to replace all in-pit reverse alarms with 'quacker' style reverse alarms on its mining fleet.

During 2012, engineering works were undertaken to address noise associated with shovel operations. Engineering controls were introduced including hydraulic snubber brakes, and fitting of self-greasing permalubes to the dipper door pins. Where additional reasonable and feasible opportunities for engineering controls are identified in the future, these would continue to be investigated and trialled as appropriate.

d. Elimination controls

Elimination controls are implemented in response to one or more triggers (described in 'administrative controls' above). Elimination controls, equipment or task shutdown, are implemented as a last resort where other controls have been inadequate.

ii Continuous improvement

Coal & Allied takes a pro-active approach to noise management and continues to work with the DP&E to improve the noise management plan, demonstrating commitment to continuous improvement and driving industry best practice noise management. It is expected that the continued implementation and refinement of measures outlined in the noise management plan (as updated from time to time) would enable MTW to effectively manage any noise impacts associated with this proposal, and ensure a high level of compliance is maintained throughout the life of the mine.

Recent initiatives include adopting 'light horns' on most shovels and excavators across MTW. A light horn is a simple system of lights fitted to the loading unit to allow the loading unit operator to signal to the truck driver, and avoids audible horns.

Warkworth Mine is currently working towards implementing a PMI and alternative real-time noise monitoring technology as described below.

a. Predictive modelling interface

The PMI allows for proactive planning of mining operations and weather conditions as a leading measure for managing noise emissions. The PMI utilises predictive meteorological forecast data coupled with detailed mine plans and equipment SWL information to predict noise levels at residences. The PMI is currently being refined and is expected to be fully integrated into day-to-day operations. Introduction of the PMI will be a significant step in the mine's continual improvement in operational noise management.

Coal & Allied is also in the process of investigating alternate noise monitoring technologies to assist with operational control. During 2012 MTW committed capital funding to build and install a first of class directional noise monitor, known as ENC in the Bulga village area. The ENC was installed late December 2013 and is currently collecting data. The ENC aims to accurately pinpoint and identify noise emissions from multiple sources in real-time, to a greater level of accuracy than existing directional noise monitoring technology. This technology is expected to provide additional noise management value to MTW and is considered a first in noise management in NSW.

iii Compliance history

Warkworth Mine has a strong compliance record as evidenced by publicly available compliance monitoring records.

Compliance assessment monitoring for the Warkworth Mine has been undertaken in a number of forms during the period 2004 to 2014, including:

- routine compliance assessment (Global Acoustics) – 2004 to present and in more recent years, monitoring has included LFN assessment;
- Long Point supplementary monitoring programme (EMM) – June to October 2011; and
- independent review of noise impacts – Bulga (Sinclair Knight Merz) – December 2011 and January 2012.

An assessment of monitoring data (publically available via the Rio Tinto Coal Australia website www.riotinto.com/coalaustralia) demonstrates predominant compliance with noise criteria has been achieved throughout the life of the mine. Non-compliant noise measurements account for a small percentage of the monitoring dataset at 0.37 per cent (10 non-compliances measured from 2,689 individual assessments undertaken). The results also demonstrate that there are no sustained exceedances.

When considering the impact of the Warkworth Mine on the area of Bulga village, the level of non-compliant measurements is relatively lower and accounts for 0.12 per cent of the monitoring dataset (two non-compliances measured from 1,643 individual assessments undertaken). The data also demonstrate that there are no sustained exceedances from Warkworth Mine.

In 2013, 410 blast events were initiated at MTW during the reporting period. No non-compliances were recorded for Warkworth Mine blasts. One non-compliance was recorded against the 120dB(L) airblast overpressure criteria on 27 August 2013 in Loders Pit of MTO. Investigation into the blast event determined that the overpressure exceedance was caused by previously unmapped weathered ground in the area. The non-compliance was reported to the EPA and DP&E on the day of occurrence, and to affected landowners in the vicinity of the non-compliant measurement.

MTW complied with all other blasting related consent and licence conditions during the reporting period.

The blast monitoring system achieved a data capture rate of 99.9 per cent during the reporting period (3,271 of a possible 3,280 measurements). There were seven compliance monitors used. For Warkworth Mine, 100 per cent compliance was achieved for blast overpressure noise and ground vibration did not exceed the 0 per cent allowable ground vibration criteria.

6.4.7 Sleep disturbance

Of the submissions of objection related to noise and vibration matters, 18 per cent (representing four per cent of the total submissions of objection) raised concerns regarding sleep disturbance due to activities associated with the proposal.

Section 10.4.3 of the EIS provides a sleep disturbance assessment and demonstrates sleep disturbance criteria are satisfied.

Like with L_{eq} noise, care must be taken to ensure the Site's contribution is defined appropriately and not linked to other sources unrelated to mining. The noise criteria set for the mine applies only to the mine's contribution and without the existing background or ambient noise. As a result, there is always a need to filter measurements to ensure an appropriate comparison against criteria can be made. The minimum guidance criteria used in the assessment of 45dB(A) L_{max} is considered the strictest internationally. It is also only an initial screening level where, if breached, additional analysis should be made and does not infer sleep disturbance upon exceedance. Accordingly, additional analysis was not required as part of the assessment for the proposal.

6.4.8 Animal health

Of the submissions of objection related to noise and vibration matters, three per cent (representing one per cent of the total submissions of objection) raised concerns about the noise impacts of the proposal to the health of animals.

There is limited literature or evidence on the impacts of blasting noise on livestock. Observations of the impact of mining activities, in particular blasting, on cattle were made in a 2011 study (Neil Nelson Agvise 2011). The study included observations of cattle on a feedlot site in the Hunter Valley during a number of blast events. The observations made in the study indicated that blasts did not appear to disturb cattle, which continued to feed, rest or graze apparently undisturbed by blasting. Where blasting is within 1km (arbitrary) of known commercial livestock properties, notification would be provided to such livestock operators prior to blasting. Indirect impacts on ecology from the proposal, including noise are addressed in Section 4.2.1 of this report.

It should be noted that on-site cattle grazing has been part of MTW's land management practices for over 10 years with no adverse effects during this time.

6.5 Air quality and greenhouse gas

6.5.1 Introduction

The assessment of potential air quality and greenhouse gas impacts resulting from the proposal was summarised in Chapter 11 of the EIS, and presented in full in Appendix G of the EIS.

A total of 90 submissions in objection referenced air quality and greenhouse gas matters, representing 30 per cent of objectors.

Matters raised in submissions comprised existing dust levels including Warkworth Mine's contribution, increase in dust impacts – particularly with PM_{10} and $PM_{2.5}$ and cumulatively under the proposal, health impacts, compliance and greenhouse gas impacts. The number of times the air quality and greenhouse gas related matters were raised in submissions of objection is shown in Figure 6.7. It is noted that a number of submissions referenced more than one air quality and greenhouse gas matter and, therefore, the number of matters raised as shown in Figure 6.7 totals more than 90.

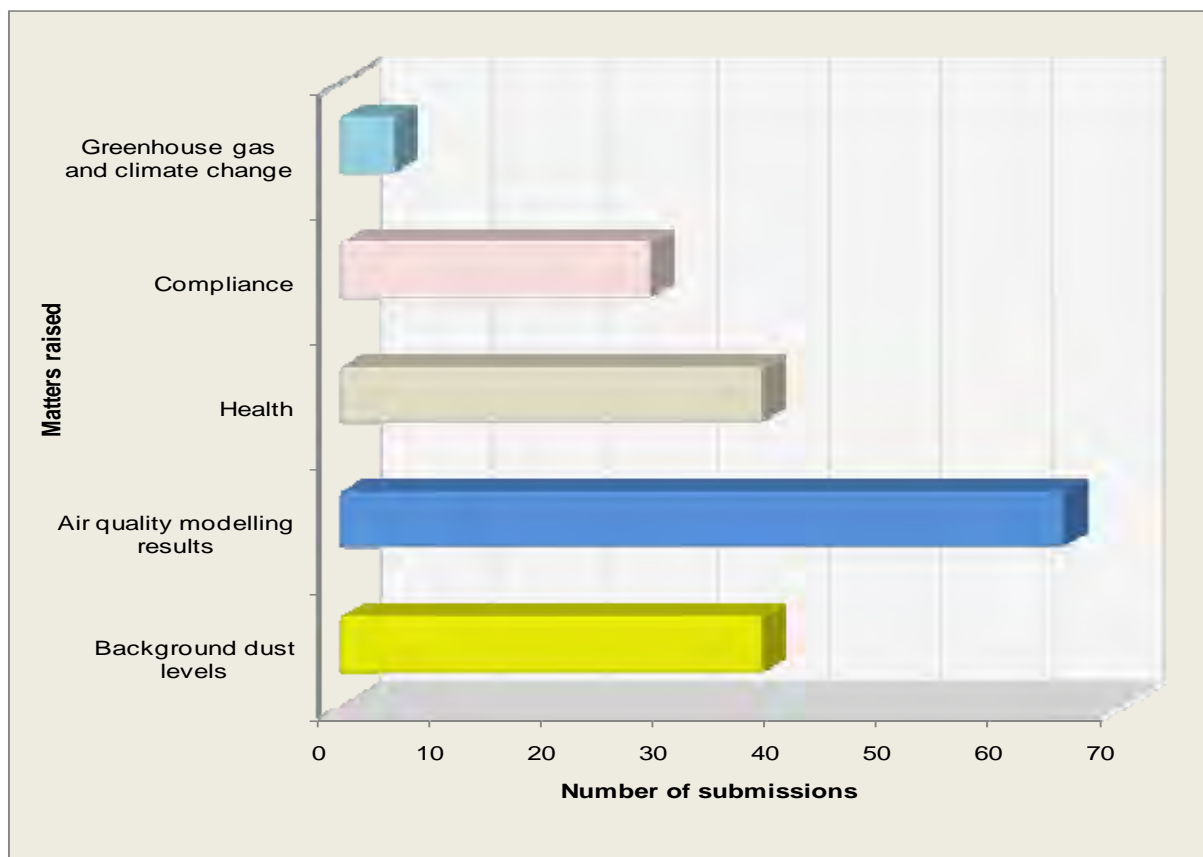


Figure 6.7 Air quality matters raised within submissions of objection

6.5.2 Background dust levels and criteria

Of the submissions of objection related to air quality and greenhouse gas matters, 42 per cent (representing 13 per cent of the total submissions of objection) stated that the air quality (ie dust) levels in the area were high and that this should be reflected by the criteria for the proposal.

Air quality criteria provide benchmarks set to protect general health and amenity of the community in relation to air quality. Criteria are applied for all of NSW, irrespective of industry and location.

Particulate matter consists of dust particles of varying size and composition, which are referred to as deposited dust, total suspended particulate matter (TSP), and TSP particles which have an aerodynamic diameter of 10micrometres (μm) or less (PM_{10}) or 2.5 μm or less ($\text{PM}_{2.5}$).

The air quality assessment was conducted in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (the Approved Methods). The criterion for TSP, PM_{10} and deposited dust has come from the Approved Methods. The criterion for 24-hour average PM_{10} originates from the National Environment Protection Measure (NEPM) goals (NEPC 2007) in the absence of alternative measures (noting that the NSW EPA applies these criteria to assess the potential for impacts for similar projects).

Whilst there are no established criteria for $\text{PM}_{2.5}$, an assessment of the incremental modelling predictions for annual average and 24-hour average $\text{PM}_{2.5}$ with conservative estimates of background $\text{PM}_{2.5}$ for Singleton was completed.

The air quality criteria relate to the total dust burden in the air and not just the dust from the proposal. Consideration of background dust levels (ambient air quality) was made when using these goals to assess potential impacts.

In order to quantify ambient air quality, data was collected from a number of monitoring locations in the vicinity of the Site (see Figure 11.1 of the EIS) including 12 Tapered Element Oscillating Microbalances (TEOMs), 11 High Volume Air Samplers (HVAS) measuring either TSP or PM₁₀, 13 dust deposition gauges and three NO₂ monitors. A summary of the available and reviewed ambient monitoring data relevant to the proposal is provided below:

- Annual average PM₁₀ concentrations are below the relevant criterion of 30µg/m³.
- Maximum 24-hour average PM₁₀ concentrations are on occasion above the relevant criterion 50µg/m³ at some of the monitoring locations.
- The annual trends seen in the TEOM monitoring data indicate that PM₁₀ concentrations are generally highest in the spring and summer months with the warmer weather raising the potential for drier ground to increase the occurrence of windblown dust, bushfires and pollen levels.
- Annual average TSP concentrations are below the relevant criterion of 90µg/m³.
- Annual average dust deposition concentrations are below the relevant criterion of 4g/m²/month.
- Maximum daily 1-hour average NO₂ concentrations are below the relevant criterion of 246µg/m³.

It is also noted that air quality monitoring results in the most recent (2012 and 2013) annual reviews for MTW show that there was 100 per cent compliance during this period: there were no non-compliances. This is despite dust generation recorded in 2012 being generally higher than for previous years, attributed to lower rainfall.

6.5.3 Results

Of the submissions of objection related to air quality and greenhouse gas matters, 72 per cent (representing 22 per cent of the total submissions of objection) raised the results from the air quality study, in regards to:

- the influence of Saddleback Ridge;
- PM_{2.5} predictions;
- PM₁₀ predictions;
- cumulative impacts; and
- amenity, including impacts to rainwater tanks.

i Influence of Saddleback Ridge

Similar to submissions that referenced noise, a number of submissions stated that removal of Saddleback Ridge would result in higher dust impacts to sensitive receptors west of the proposal. Bulga village was noted in the majority of submissions.

The air dispersion modelling included detailed mine specific terrain information for each of the years assessed, including capturing the mine's westward progression and the removal of Saddleback Ridge. Meteorological modelling specific to each mine plan year assessed was prepared to factor in the effects of the changing terrain on wind flows and local conditions specific to the mine terrain. This information was used in the air dispersion modelling to predict the potential air quality impacts.

The modelling predictions do not indicate impacts above the relevant air quality criteria at Bulga village when the mine has progressed through Saddleback. This indicates that the removal of Saddleback Ridge is unlikely to exacerbate the potential for air quality impacts in areas to the west of the mine.

The key reason for this is that the prevailing wind flows are governed more by the overall shape of the Hunter Valley than by the localised influence of Saddleback Ridge. The influence is relatively small, given that Saddleback Ridge happens to be aligned along the direction of the prevailing winds. The general shape of the mine pit and overburden emplacements is such that the localised wind flows will remain similar to the present case.

ii Assessment of PM_{2.5}

Submissions stated that the proposal would result in unacceptable levels of PM_{2.5} at surrounding residences and raised concerns over the assessment of PM_{2.5} in the absence of criteria.

Contrary to the matter raised, the air quality and greenhouse gas study demonstrates that the proposal would not result in unacceptable levels of PM_{2.5} at surrounding residences.

As noted in Section 6.5.2 of this report, whilst there are no established criteria for PM_{2.5}, an assessment of the incremental modelling predictions for annual average and 24-hour average PM_{2.5} with conservative estimates of background PM_{2.5} for Singleton was completed.

PM_{2.5} emissions are usually generated through combustion processes or as secondary particles formed from chemical reactions rather than through mechanical processes that dominate emissions on mine sites.

As discussed in Section 11.3.2.iii of the EIS, the nearest available PM_{2.5} data is collected at the Upper Hunter Air Quality Monitoring Network station at Singleton. This data shows a trend of increasing PM_{2.5} levels in the winter and reduced levels in the summer which is likely due to the influence of urban sources of fine particulate matter. A recent study conducted by the CSIRO to characterise this fine particulate matter found that wood burning activities in winter made up an average of 38 per cent of the PM_{2.5} in Singleton.

A comparison with PM_{2.5} levels measured in Camberwell, which is closer to coal mining activity than Bulga village indicates lower levels of PM_{2.5} compared to Singleton. On this basis, it is considered that background levels of PM_{2.5} at the Site would be significantly lower than the levels in Singleton, given the concentration of wood heaters, people, cars and other urban sources of PM_{2.5} is considerably less in the near vicinity of the Site.

The air quality and greenhouse gas study concluded that PM_{2.5} levels would not exceed the NEPM advisory reporting standards of 25µg/m³ at locations already predicted to comply for other parameters.

iii Assessment of PM₁₀

Submissions stated that the proposal would result in unacceptable impacts from PM₁₀ emissions, particularly at Bulga village.

Contrary to the matter raised, modelling predicts that the proposal would not result in unacceptable impacts from PM₁₀ emissions, particularly at Bulga village.

As described in Section 11.3.2 of the EIS, modelling predicts no exceedances of PM₁₀ criteria at privately-owned residences in Bulga. Modelling does predict, however, that three privately-owned assessment locations (77, 102, and 264) all in Warkworth village may experience concentrations above the relevant criteria for 24-hour average and annual average PM₁₀. Of these: assessment location 77 is within Wambo Mine's current acquisition zone; assessment location 102 is the Warkworth Hall, a non-residential location; and assessment location 264 is newly identified and would have been within Wambo Mine's acquisition zone had it been previously assessed.

Air quality goals/criteria established under government policies are benchmarks set to protect the general health and amenity of the community in relation to air quality. Therefore, the predicted compliance with these would suggest that general health and amenity would be protected under the proposal.

iv Cumulative dust

A number of submissions raised concern regarding cumulative dust, particularly at Bulga, and contended that the proposal would result in significant cumulative dust at surrounding residences. References were also made within these submissions regarding deficient MTW operational practices to adequately monitor and respond to elevated dust levels.

As described in the air quality and greenhouse gas study, cumulative PM₁₀ impacts are not predicted to occur at locations near Bulga under the proposal.

Cumulative impacts have potential to occur to the north and north-west of the Site as the mining activity moves toward the west. This would largely arise due to the prevailing meteorological conditions which favour the transport of material to these areas. Annual and seasonal windroses (see Figure 11.2 of the EIS) for the area show that the most common winds on an annual basis are from the south-southeast and south, generally the direction from the Site toward Warkworth village. Very few winds originating from the north-east, the direction from the Site towards Bulga village.

The Mining SEPP's discretionary standard with respect to cumulative air quality impacts for all but two residential locations (77 and 264), both of which are already significantly affected by a neighbouring mine (Wambo Mine). This, therefore, demonstrates that amenity under the proposal would not be compromised.

Current management practices, operational control strategies and measures to effectively manage air quality impacts, both proactive and reactive, are detailed in the mine's air quality management plan and are considered sufficient to manage dust levels generated under the proposal and contribute to the management of cumulative dust in the region during extreme weather events.

The air quality monitoring network is extensive and involves monitoring dust deposition, TSP, PM₁₀ and meteorological conditions according to relevant Australian Standards. It consists of the following:

- nine dust deposition gauges representative of residences on privately-owned land;
- four HVAS to measure TSP, with three also monitoring PM₁₀; a series of TEOM monitors that transmit live data (PM₁₀) to site personnel via the SCADA system; and

- three 'early warning unit' DusTrak PM₁₀ monitors, located adjacent to existing mining operations, which function as supplementary monitors to alert WML staff of deteriorating air quality conditions. It is important to note that these cameras provide an indicator for operational management based on observed conditions rather than measured data. Visual observations of dust generation do not necessarily equate to non-compliance of criteria.

Alarms, based on data from the real-time PM₁₀ monitoring units, are used to inform the operation of potentially adverse weather conditions. Following receipt of an alarm the shift coordinator will undertake or delegate a site inspection and implement additional controls as required.

During 2012, the EPA established a monitoring site on Coal & Allied land, west of MTO as part of the Upper Hunter Air Quality Monitoring Network. Similar locations were also established in Warkworth village (north-west of Warkworth Mine), in Bulga village and at Mount Thorley on Broke Road.

As discussed in Section 6.5.5 below, Warkworth Mine has a strong compliance record.

v **Amenity**

Submissions related to predicted dust impacts of the proposal raised amenity being adversely impacted through increased dust generation (and resultant domestic rainwater tank cleaning issues) and fume from blasting.

The Mining SEPP's discretionary standard with respect to cumulative air quality impacts for all but two residential locations (77 and 264), both of which are already significantly affected by a neighbouring mine (Wambo Mine), and both of which are located to the north-west of the Site. This, therefore, demonstrates that amenity under the proposal would not be compromised.

It is noted that deposited dust and TSP may cause amenity issues by depositing on surfaces. However, the proposal is predicted to meet the applicable criteria for nuisance dust at all privately-owned residences and, therefore, is anticipated that amenity concerns related to dust would remain within acceptable levels. Notwithstanding, it is acknowledged that beyond compliance or criteria based assessment, amenity may be impacted even when deposited dust and TSP are below criteria.

Over and above compliance obligations, as previously noted, the applicant has committed to contributing to a Near Neighbour Amenity Resource to be available to near neighbours (see section 21.5.2 of the EIS). This resource could be used by residents to provide support for specific amenity concerns identified by individual residents.

As described in Section 11.3 of the EIS, blast fume emissions were modelled for each indicative mine plan year. As the proposal moves west the potential for blast fume impacts to the west increases. The modelling results show that during the middle daytime hours no impacts due to blasting fume emissions are predicted to occur. However, in the early evening, when there is potential for impacts to arise, the results show that application of the blasting restrictions would avert such potential impacts for most assessment locations.

A predictive management system is currently implemented at MTW, which uses forecast weather data, allowing operators to schedule a blast to the time of least impact over the course of the upcoming day. The system deals with the spatially and time varying weather and terrain influences and is generally more reliable than relying on a fixed set of wind speed and wind direction restrictions. With the implementation of this system, amenity issues related to blast fume would remain within acceptable levels.

This matter is addressed further in Section 6.7.

6.5.4 Health

Of the submissions of objection related to air quality and greenhouse gas matters, 42 per cent (representing 13 per cent of the total submissions of objection) contended that the proposal would result in unacceptable health impacts through the generation and airborne transportation of dust (principally, PM_{2.5}) to surrounding sensitive receivers.

As described below, the proposal would not result in unacceptable health impacts through the generation and airborne transportation of dust (principally, PM_{2.5}) to surrounding sensitive receivers. The proposal would continue the existing dust related impacts beyond the current development consent period to approximately 2035.

Whilst there are no established criteria for PM_{2.5}, an assessment of the incremental modelling predictions for annual average and 24-hour average PM_{2.5} with conservative estimates of background PM_{2.5} for Singleton was completed. This indicated that levels would not exceed the NEPM advisory reporting standards of 25µg/m³ at locations already predicted to comply for other parameters.

As discussed in Section 11.2.2i of the EIS the air quality impact assessment criteria are stipulated in the Approved Methods (DECCW 2005). These criteria provide benchmarks, which are intended to protect the community against the adverse effects of air pollutants, and generally reflect current Australian community standards for the protection of health and against nuisance effects. Therefore, compliance with these would suggest that general health and amenity are being protected.

Health effects related to air quality vary depending on the length of exposure and whether those exposed are within a susceptible group (for example the elderly, infants, and persons with chronic cardiopulmonary disease, pneumonia, influenza or asthma). Appendix G of the air quality and greenhouse gas study includes a detailed review of studies that relate to the health effects associated with exposure to particles.

As discussed in Section 11.3.2iv of the EIS the majority of particulate emissions from mining are dust particles, which originate from the soil. Due to the extreme forces required at the micro level to break down a particle of dust into smaller particles in the fine fraction, mining techniques used at coal mines generally cannot breakdown rock, coal or soil material into these very fine fractions. As a result emissions from mines are predominantly in the coarse size fraction, which would not penetrate as deeply into the lung, or carry additional toxic combustion substances.

In many rural areas domestic wood smoke is a key issue of health impact. Wood heaters operate inside living rooms and their chimneys are closer to residents than coal mines, which means the air that the population breathes, will usually be affected by wood heater emissions to a much greater degree than more distant particle sources. Recent studies by the CSIRO (CSIRO 2013) into the composition of particulate matter in the Hunter Valley found that a key source of fine particulate is wood smoke. An initiative to target particulates in the Hunter Valley has recently been launched by the EPA, and a key action relates to management of wood smoke in the urban areas (EPA 2013).

Further information on air quality from coal mining can be found in the *Upper Hunter Valley Particle Characterisation Study* (September, 2013) developed and funded jointly by NSW Health and the Office of Environment and Heritage, and undertaken by CSIRO and Australian Nuclear Research and Development Organisation (ANTSO). The report identified that to measure the contribution of coal dust to particle loadings would require looking at PM₁₀ samples, rather than PM_{2.5}. The study however focused on the finer PM_{2.5} particles (as opposed to PM₁₀) ‘...because they are of greatest concern owing to their impact on health’.

Diesel combustion particulate is classified as carcinogenic by the WHO's International Agency for Research on Cancer (IARC), http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf, and exposure should be minimised where practical.

It is important to note that the IARC findings are based on workers exposure to diesel exhaust in mining, including underground mining and that the exposure levels in these studies are higher than the typical levels of diesel exhaust which the general population may be exposed to. Nevertheless, there is no clear threshold below which no effect can be shown.

The majority of the particulate from diesel exhaust is in the PM₁ and PM_{2.5} size fraction, which is respirable deep into the lung. However, these emissions form a small part of the total dust emissions from mining. The limited data that are available in the Hunter Valley show that the PM_{2.5} levels, (which are generally most closely associated with combustion particulate including diesel emissions and woodsmoke) are highest in the densely populated areas and are lower in the less populated areas. The PM_{2.5} monitors that are near to coal mines in the Hunter Valley (and generally near the receptors that are most affected by coal mine emissions), are shown in Figure 6.8, and show the lowest readings recorded in the Hunter Valley.

A good example of this can be seen by examination of the PM₁₀ and PM_{2.5} levels in Singleton, Camberwell and Muswellbrook (measured when the Ashton open cut coal mine operated in close proximity to Camberwell and upwind of the prevailing winds). The data show that the PM₁₀ levels are high in Camberwell, but that the PM_{2.5} levels are significantly lower in Camberwell (and comfortably below the NEPM advisory reporting standards), whilst the PM_{2.5} levels in Muswellbrook exceed the NEPM standards, and at Singleton are at the maximum standard level.

The data show that the fine particulate levels near mining are low and are below the NEPM advisory reporting standards, and are below the levels that the majority of the population in NSW is exposed to. The data however indicate that fine particulate levels in Muswellbrook and Singleton are respectively above or very near the NEPM standard level, something that occurs in the rural towns and cities in which woodheater use is common.

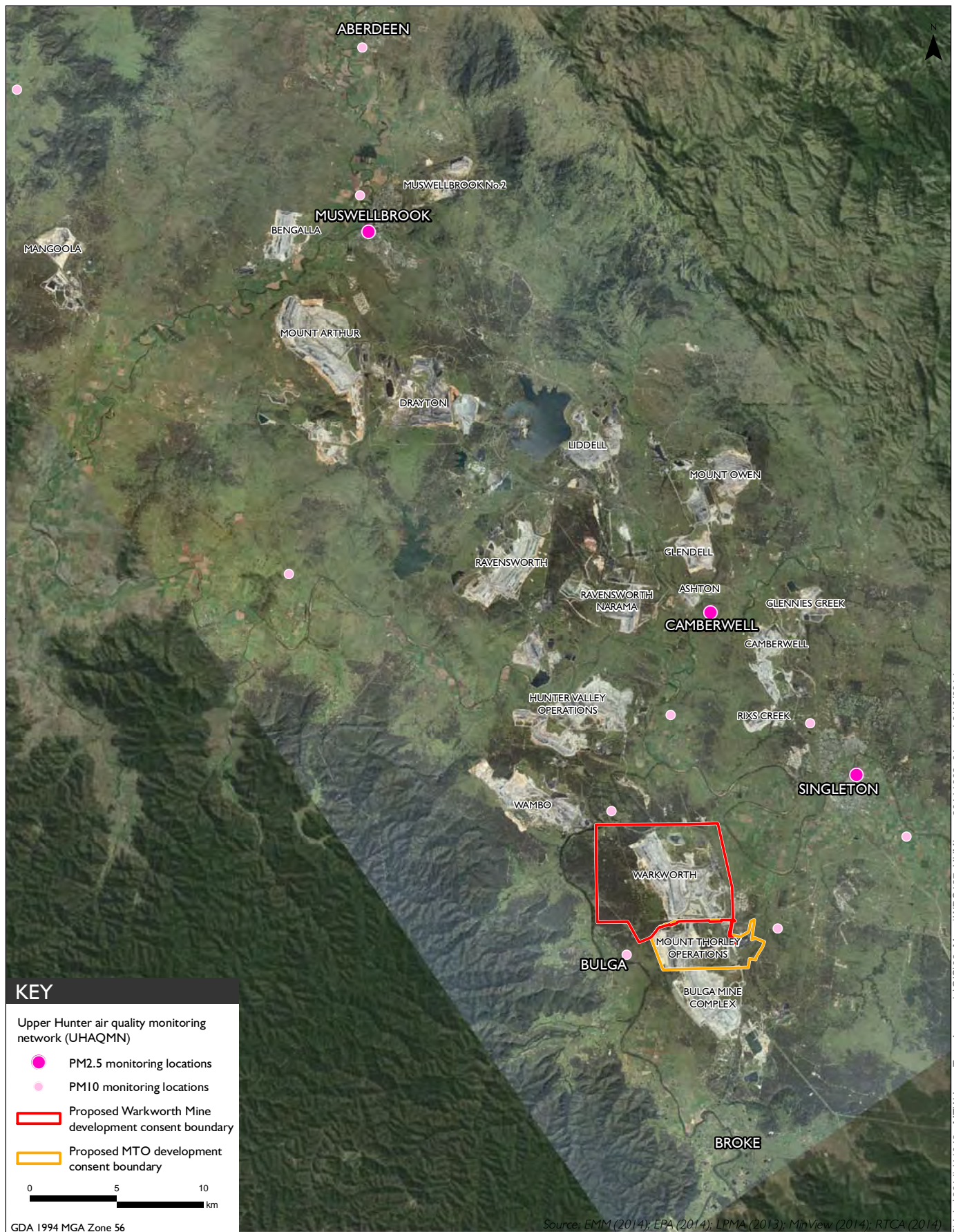
6.5.5 Compliance

Of the submissions of objection related to air quality and greenhouse gas matters, 31 per cent (representing nine per cent of the total submissions of objection) stated that the current operations do not comply with dust criteria.

Contrary to assertions regarding compliance, as discussed in Section 11.2.3 of the EIS, the recent compliance history at MTW as reported in the 2012 and 2013 annual reviews for the Site indicates monitoring results during this period for dust generation meet relevant criteria.

Current management practices, operational control strategies and measures to effectively manage air quality impacts, both proactive and reactive, are detailed in the mine's air quality management plan and are considered sufficient to manage dust levels generated under the proposal and contribute to the management of cumulative dust in the region during extreme weather events.

The air quality monitoring network used to determine compliance is described in Section 6.5.3iv.



Proximity of UHAQMN PM10 and PM2.5 monitors to populated areas

Warkworth Continuation 2014

Response to Submissions

Figure 6.8

6.5.6 Greenhouse gas and climate change

Of the submissions of objection related to air quality and greenhouse gas matters, six per cent (representing two per cent of the total submissions of objection) related to air quality and greenhouse gas contended that the proposal's contribution to greenhouse gas emissions and climate change is unacceptable.

The air quality and greenhouse gas study included an analysis of expected greenhouse emissions associated with the proposal. The conservative estimated annual average greenhouse emissions over the 21 year life of the proposal are 1.038Mt CO₂-e (Scope 1 and 2) which represents approximately 0.18 per cent and 0.65 per cent of Australia's and NSW's emissions, respectively.

Existing energy saving and greenhouse gas emission reduction measures and projects will continue to be implemented at MTW under the proposal. These include a detailed energy monitoring programme, monitoring electricity and diesel usage on-site to identify the main sources of greenhouse gas emissions and initiate appropriate reduction mechanisms. It is noted that MTW contributes funding to the Coal21 Fund, the Australian Coal Association Research Programme, and the Cooperative Research Centre for Greenhouse Gas Technologies to support and develop the research of low emission coal technologies.

6.6 Economics

6.6.1 Introduction

The economic study of the proposal was summarised in Chapter 9 of the EIS, and presented in full in Appendix E of the EIS.

A total of 83 submissions in objection referenced economic matters, representing 28 per cent of objectors.

Matters raised included the methodology and assessment assumptions, the cost benefit analysis (CBA) - inclusive of consideration of environmental and social costs and external effects - and the regional economic impact analysis. These responses raised economics matters in relation to both Warkworth Mine and the integrated MTW. These are addressed in this section.

The number of submissions received on matters relating to economic matters is shown in Figure 6.9. It is noted that a number of submissions referenced more than one economic matter and, therefore, the number of matters raised as shown in Figure 6.9 totals more than 83.

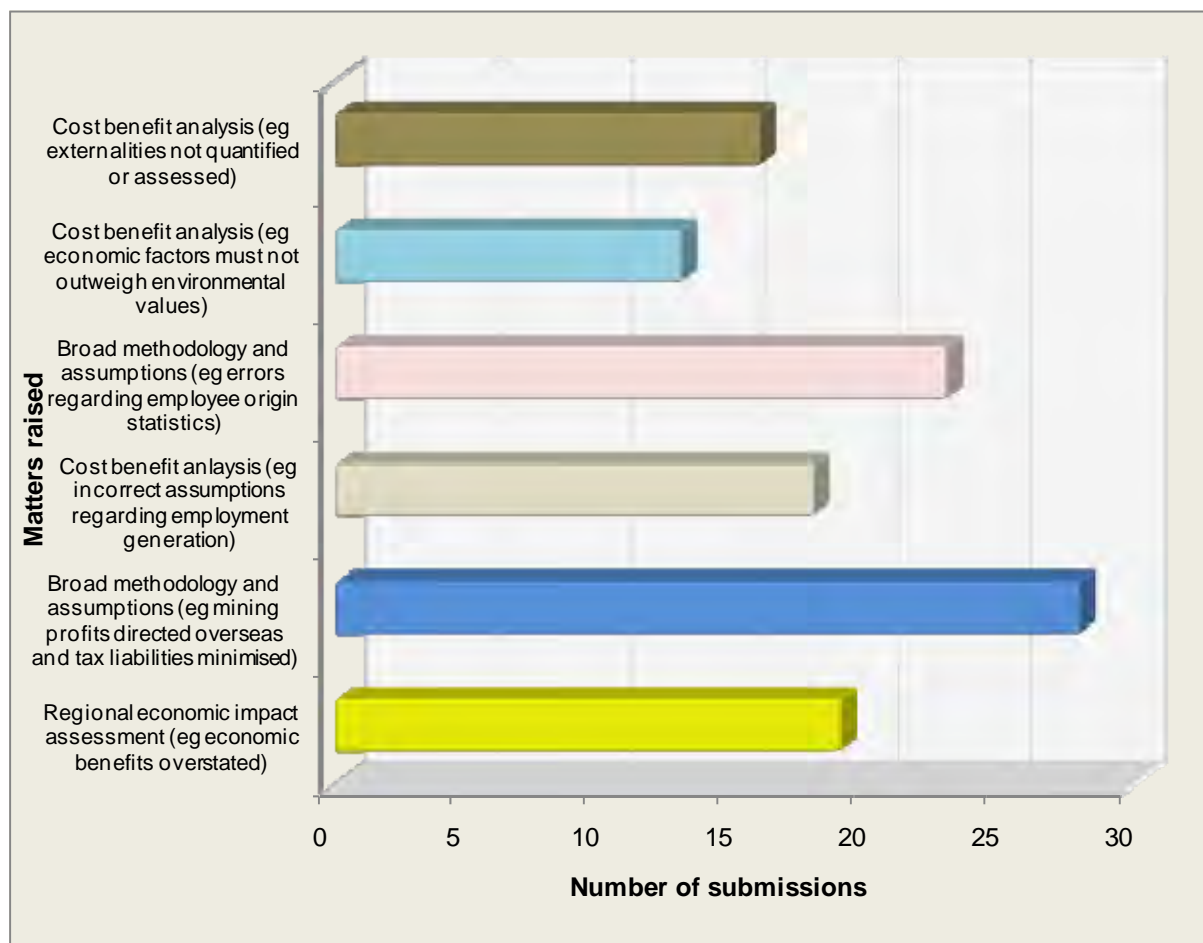


Figure 6.9 Economic matters raised within submissions of objection

6.6.2 Broad methodology and assumptions

i Criticism that the benefits have been overstated

Of the submissions of objection related to economic matters, 23 per cent (representing six per cent of the total submissions of objection) contended that the economic benefits of the proposal had been overstated in the economic study.

The methodologies used to prepare the economic study are consistent with the L&E Court judgment (par. 456) and applied a highly conservative approach to ensure that the benefits of the proposal are not overstated. For example:

- the CBA has been careful to consider only those costs and benefits to the residents of NSW (and, therefore, excludes those to Rio Tinto / Coal & Allied). This is because the extent to which a project contributes to the welfare of a country or state differs from a private benefit calculation, which focuses on profits derived by the applicant; and
- it is common practice for regional economic impact analyses (REIA) to use total multipliers (Type IIA), however, they can lead to an overstatement of the impacts of the proposal. The REIA has, therefore, been conservative by only relying on multipliers that capture first round flow-on effects (Type IA multipliers).

In addition, the underlying assumptions to the assessment have been clearly stated throughout, and are addressed in more detail in the sections below. A number of sensitivity analyses were undertaken to test the extent to which the results would change if the assumptions were also changed.

ii Comparison to outcomes of economic study for Warkworth Extension 2010

Submissions raised the matter that the economic study for the Warkworth Extension 2010 was criticised in the L&E Court judgment.

To address the criticisms raised regarding the economic study for the Warkworth Extension 2010, the current assessment used different methodologies and assumptions than those used for the Warkworth Extension 2010. It also was undertaken by a different economics consultant, BAEconomics, led by Dr Brian Fisher, a former Executive Director of the Australian Bureau of Agricultural and Resource Economics (ABARE).

The CBA concludes that in NPV terms, the continuation of operations at MTW would deliver direct net benefits to NSW of almost \$1.5billion. This is different to the conclusion of the CBA for the Warkworth Extension 2010 and, for a range of reasons the two numbers are not comparable, including:

- differences in methodology and assumptions, as discussed above;
- different proposals - the previous application considered different production scenarios and extraction rates;
- different levels of assessment - the previous assessment was for Australia, whereas the focus of the current assessment is NSW. NSW is considered the appropriate area for which to carry out the assessment because the NSW Government is the consent authority and the majority of benefits and costs occur in NSW. However, as discussed, where possible the assessments have considered other areas;
 - the cost benefit analysis has been done for NSW and Australia;
 - the REIA considers three areas: 1) NSW; 2) the Mid and Upper Hunter Region (defined as the LGA's of Upper Hunter, Muswellbrook, Singleton, Cessnock, Maitland); and 3) Singleton LGA; and
- different timeframe – the previous assessment was done in 2009 and market conditions have changed substantially since then.

iii Clarification of certain assumptions

Of the submissions of objection related to economic matters, 22 per cent (representing six per cent of the total submissions of objection) stated that there have been a number of criticisms regarding the assumptions used for recent economic impact assessments for coal mining proposals in NSW.

The following points of clarification on the assumptions used in this current assessment are provided to address these criticisms and were applied to ensure the economic assessment is robust and appropriate:

- the costs and benefits to the residents of NSW have been clearly separated from other costs and benefits, such as those to Rio Tinto / Coal & Allied or the Federal Government. The CBA only includes the public benefits that flow to NSW;

- royalty calculations in both the proposal and reference cases include allowable deductions for beneficiation and levies; and
- the assessment splits shire rates (paid to local government) and land taxes (paid to NSW Government) where relevant.

iv Clarification of employment numbers (including with and without the proposals)

Submissions stated that there are inconsistencies in the employment numbers provided in the EISs. There is also a question about employment should the applications be refused.

All of the employment numbers provided in the EISs are correct. Different employment numbers are used depending on the context, for example whether reference is being made to Warkworth Mine, MTO or both operations (the combined MTW complex) and allowing for rounding. Table 6.3 below (extracted from Table E.1 in the EIS) shows the employment numbers for clarification, including both with and without the proposals being approved.

Table 6.3 Summary of incremental benefits of the combined proposals

| | Employment generation (annual average FTEs) | |
|-------------------------------|---|----------------------|
| | Without approvals (reference case) | With approvals |
| MTW | 987 over 7 years | 1,307* over 21 years |
| Warkworth Continuation 2014 | 835 over 7 years | 1,187 over 21 years |
| Mount Thorley Operations 2014 | 152 over 7 years | 121 over 21 years |

Notes: * rounded down to 1,300 throughout the EISs.

v Clarification of employee residential location data

Of the submissions of objection related to economic matters, 28 per cent (representing eight per cent of the total submissions of objection) stated that there are errors in the data relating to residential location of employees.

The data is provided by the RTCA Human Resources department and based on the postcode provided by employees for their payroll address. These postcodes are assigned to the local government areas where the majority of the postcode boundary is located (given that postcode and LGA boundaries mostly do not align).

A more detailed analysis of the data based on suburbs rather than postcodes has provided a greater level of accuracy. The latest data from MTW, using suburbs is provided in Table 6.4 below:

Table 6.4 **MTW workforce origins**

| LGA | Percentage of workforce |
|-------------------------------|--------------------------------|
| Singleton | 33.4% |
| Maitland | 27.1% |
| Upper Hunter and Muswellbrook | 3.4% |
| Cessnock | 18.1% |
| Newcastle | 5.2% |
| Lake Macquarie | 6.0% |
| Other | 6.8% |
| Total | 100% |

These updated data do not significantly change the findings of the economic (or social) impact assessment, and if anything lead to a greater benefit to the Singleton LGA and Mid and Upper Hunter region than originally assessed, with 82 per cent of the workforce residing in the five LGAs of the Mid and Upper Hunter (compared to 74 per cent in the economic assessment).

It is noted that references to 35 per cent of MTW employees (455 people) residing in the Singleton LGA have been continued in the RTS to maintain consistency with the percentages stated and results presented in the EIS.

vi **Clarification of direct and indirect benefits to the Singleton LGA**

Submissions questioned the extent of the direct and indirect benefits that will flow to the Singleton LGA. This matter is also discussed in Section 4.11.5 of this report.

If approved, MTW would be a source of direct and indirect benefits to Singleton LGA:

- The direct benefits take the form of the disposable income (wages and salaries net of taxes and other contributions) earned by MTW employees who live in Singleton (approximately 35 per cent). In net present value (NPV) terms, the disposable income earned by MTW employees living in Singleton is estimated at around \$320million over the life of the mine (from 2015 to 2035).
 - This estimate of \$320million does not appear directly in the economic study. However on page 14 of the assessment (EIS Appendix E), disposable income paid to Singleton residents (net of taxes, superannuation and Medicare payments) is shown to average almost \$49million per year from 2015 to 2030.
 - This total of \$320million is roughly equal to the average per year (\$49million) over the 20 years (2015 to 2030), inclusive of a discount rate of 7 per cent applied and subtracting the final 5 years of mine life when production begins to decline.
- Direct benefits also flow to the Singleton LGA in the form of Shire rates. These are estimated at around \$0.7million per year until 2035.
- The indirect – or flow-on – benefits refer to the additional economic activity generated locally (for instance, by local businesses) as a result of MTW expenditures on wages and salaries and other purchases in the local economy. These flow-on benefits are estimated at around \$84million in additional income (in NPV terms) and additional annual employment of around 61 full-time equivalent workers over the life of the mine.

6.6.3 Cost benefit analysis

i Consideration of environmental and social costs against economic benefits of the proposal

Of the submissions of objection related to economic matters, 16 per cent (representing four per cent of the total submissions of objection) stated that the economic benefits of the proposal could not be compared to, or weighed up against, the costs.

A CBA is a tool to assist decision makers to consider the relative environmental, social and economic costs (ie impacts) and benefits of a proposal. Put simply, if a CBA shows that the benefits of a proposal outweigh the costs, then it may be concluded that the community as a whole is better off as a result.

The CBA of the proposal has found that the benefits of continuation of mining operations at Warkworth Mine and MTO outweigh the costs. In NPV terms, the continuation of operations would deliver direct net benefits to NSW of almost \$1.5billion.

The methodology and assumptions used in the CBA are considered to be robust, transparent, credible and conservative.

ii Limitations of cost benefit analysis

Of the submissions of objection related to economic matters, 19 per cent (representing five per cent of the total submissions of objection) stated that the CBA contained several incorrect assumptions, data inaccuracies, uncertainty, and did not appropriately consider the matter of equity or distributive justice and, the valuation of unpriced assets (or external impacts) was also criticised.

The NSW Government *Guideline for the use of Cost Benefit Analysis in mining and coal seam gas proposals* states that: “one of the strengths of CBA over other approaches is its systematic approach to quantifying and valuing impacts”. It also recognises that there are limitations to any evaluation approach:

The commonly argued limitations of CBA are data availability, uncertainty, valuing unpriced assets, timing and the value of waiting, and distribution and social equity.

Each of these is discussed below.

a. Data availability

Data availability has been sufficient to prepare a robust CBA. Data regarding the proposals was provided by WML. This included information on annual production, employment and operating and capital expenditure for both the reference case and proposals scenarios. Information and data on the potential social and environmental impacts was sourced from the experts’ findings in the technical studies, which accompany the EIS. The EIS identifies all of the potential impacts, based on State government requirements and extensive community consultation. A full list of references is provided at the end of the economic study.

b. Uncertainty

A number of assumptions have a material effect on the results of the CBA. To deal with any uncertainty regarding these assumptions, a number of sensitivities have been conducted as follows:

- a discount rate of 7 per cent per annum was used for the analysis – the sensitivity of the results have also been tested using discount rates of 4 per cent and 10 per cent;
- the CBA uses a long-term price for thermal export coal of US\$85/t and a US\$/A\$ exchange rate of 0.85 – different combinations of thermal export coal prices (ranging from US\$75/t to US\$95/t) and US\$/A\$ exchange rates (ranging from 0.75 to 0.95) have also been tested; and
- the CBA has assumed that should the proposals not be approved (the reference case scenario), 30 per cent of employees and long-term contractors who would be made redundant would find employment elsewhere in NSW in the same year, and 40 per cent would find employment in NSW in the year after being made redundant. It is assumed that the remaining 30 per cent of the workforce would leave employment in NSW but this does not mean that those workers would necessarily leave the workforce in Australia. It has also been assumed that 70 per cent of any additional employees and long-term contractors would move to MTW from other industries / employers in NSW. Variations in these re-employment and redeployment assumptions have also been tested.

The results of these sensitivity analyses conclude that, across the range of assumptions tested, significant net benefits still accrue to NSW from the proposal.

c. Valuing unpriced assets (or external effects)

The EIS includes a comprehensive description of the external effects that can be expected, based on the results of the technical expert reports. As much as possible, these effects have been valued with reference to the cost of mitigating these effects for residents (for example, for noise, air impacts) or providing an 'equivalent' outcome (for example, for environmental, Aboriginal heritage impacts). As is acknowledged in the report, it can be argued in some cases that these valuations do not 'exactly' offset the identified harm. However, alternative approaches, such as choice modelling and other valuation approaches run the risk of being viewed as entirely arbitrary.

The CBA has relied on 'market-based' and 'revealed preference' techniques. The unifying characteristic of these techniques is that they aim to value non-market impacts by observing actual behaviour, and are therefore considered to be a more reliable indicator of people's preferences.

d. Timing and the value of waiting

In circumstances where there is significant uncertainty about the future, there is sometimes an 'option' value attached to waiting. This option value arises because new information might come to light that may affect the value or timing of the investment. In the case of the proposal, a key source of uncertainty relates to future coal prices and exchange rates. However, and although these variables have been forecast as best as possible, future coal prices and exchange rates over the 21 year life of the proposal will always be uncertain. Nothing is gained by delaying the proposal, in terms of the additional information that may be acquired.

Instead, waiting or otherwise postponing the proposal risks that existing mining operations cannot be maintained as approved spatial limits of extraction are reached. Mining at Warkworth is forecast to reach spatial limits in 2015 that will, in the absence of the proposal, cause a substantial shortening of the West Pit strike length. Mining beyond 2015 will step down from current rates and staffing levels, and the speed with which it does this will depend on short-term industry conditions. There would therefore be a (material) cost associated with waiting.

e. Equity and distributive justice considerations

Information about the distributional impacts of proposed projects – the gains and losses for affected individuals and groups – is of interest to decision makers. The CBA has focused on the costs and benefits of the proposals to NSW. Where possible, it also identifies whether the identified impacts may occur at a local or State-wide level. For example, although some residents in the vicinity of MTW may experience limited impacts, Singleton LGA would benefit from the increased economic activity as a result of the additional disposable income earned by MTW employees living in Singleton (around 35 per cent, being 455 people), as well as Shire rates.

In addition, for completeness, the analysis has been extended to consider the costs and benefits for Australia.

iii Assessment of employment generation (direct) / continuation of employment

The combined proposals of Warkworth Mine and MTO, if approved, would provide, on average, 1,300 full-time equivalent positions between 2015 and 2035. If current trends continue, around three quarters of these would reside in the Mid and Upper Hunter region, and more than a third would reside in Singleton.

This opportunity of continued employment for approximately 1,300 people is against the backdrop of weakness in the Hunter region labour market. The Hunter Valley Research Foundation's latest economic indicators for the Hunter (July 2014) note that, 'employment has continued to decline since year start, if at a slower rate in recent months, and consumer and business sentiment remain sombre'.

6.6.4 Regional economic impact analysis

i Methodology

Of the submissions of objection related to economic matters, 23 per cent (representing six per cent of the total submissions of objection) stated concern regarding the methodology used in the REIA, principally the use of an input-output model.

The (indirect) flow-on effects of a proposal occur when the additional demand for labour, goods and services from a proposal, sets the economy in motion as businesses buy and sell goods and services from one another and households earn and spend additional income. These linkages between businesses and households cause the total effects on the economy to exceed the initial change in demand (ie direct effects).

Input-output analysis is one method for identifying the likely flow-on effects of a proposal in an economy, but has recently been criticised as being unreliable by the L&E Court. The L&E Court judgment (par. 19) contended that these analyses comprise restrictive assumptions that do not adequately substitute the consideration of environmental and social factors for the decision-maker. As such, the economic study in the EIS readily and transparently described the key assumptions used in the study and importantly, acknowledged that economic models are tools only to assist the consent authority in respect of determining the application for the proposal.

The REIA for the proposals relies on input-output analysis. The primary reasons for selecting this methodology are the simplicity and clarity with which the underlying assumptions can be set out and appropriate caveats made.

Key assumptions for the input-output analysis are clearly outlined in the assessment, and relate to fixed capital stocks, supply constraints, homogenous and fixed production patterns and fixed prices. However, many of these assumptions can lead to an overstatement of the impacts of a project. Therefore, the analysis has been conservative by only relying on multipliers that capture first round flow-on effects (Type IA multipliers). In contrast, the suggested alternative model, a general computable equilibrium (GCE) model, is complex. GCE models additionally require information that is not generally available at a regional or state level in Australia, namely:

- detailed regional input and output, and trade data; and
- information about price induced substitution of inputs and outputs within and between regions, for which there are few, if any, empirical foundations.

The (highly conservative) multipliers in the input-output model have been used to estimate the flow-on effects of the proposals at the State-wide, regional (Mid and Upper Hunter region) and local (Singleton LGA) levels. The State-wide flow-on effects are estimated at:

- \$385million in additional income (in NPV terms) for NSW (\$33million annually);
- additional annual employment of around 206 full-time equivalent workers in NSW; and
- an increase in the GSP of NSW of around \$450million in NPV terms (\$39million annually).

It is important to note that the flow-on effects for the Mid and Upper Hunter region are not directly comparable with those for NSW, and are higher than for NSW. This is because, put simply, the larger the geographical area, the smaller the net employment benefits tend to be.

ii [Assessment of flow-on \(indirect\) effects](#)

Submissions queried the assessment of indirect impacts resulting from the proposal.

The flow-on (indirect) effects of a project are real. Intuitively, if MTW spends almost \$6million a year on services it purchases in Singleton (as it did in 2013), businesses based in Singleton would employ the staff to provide these services. Similarly, if MTW continues to employ around 1,300 people, a share of these would live and shop in Singleton. Some of the disposable income of these Singleton employees would, therefore, also flow into the local economy. This is an example of how the additional employment and income effects would arise in practice.

As stated above, in studies of this kind it is common practice to use total multipliers (Type IIA), however, they can lead to an overstatement of the impacts of a proposal. The REIA has, therefore, been conservative by only relying on multipliers that capture first round flow-on effects (Type IA multipliers).

6.7 Social

6.7.1 Introduction

The assessment of potential social impacts resulting from the proposal was summarised in Chapter 21 of the EIS, and presented in full in Appendix P.

A total of 236 submissions in objection referenced social matters, representing 79 per cent of objectors.

Matters raised in submissions comprised community engagement, reduced quality of life, impacts to the future of Bulga village, property acquisition, the mining of NDA1 and removal of Saddleback Ridge, property devaluation, health impacts, solastalgia, social impact assessment, a lack of trust in the assessment and determination process of the proposal and various other matters. The number of times the social related matters were raised in submissions of objection is shown in Figure 6.10. It is noted that a number of submissions referenced more than one social matter and, therefore, the number of matters raised as shown in Figure 6.10 totals more than 236.

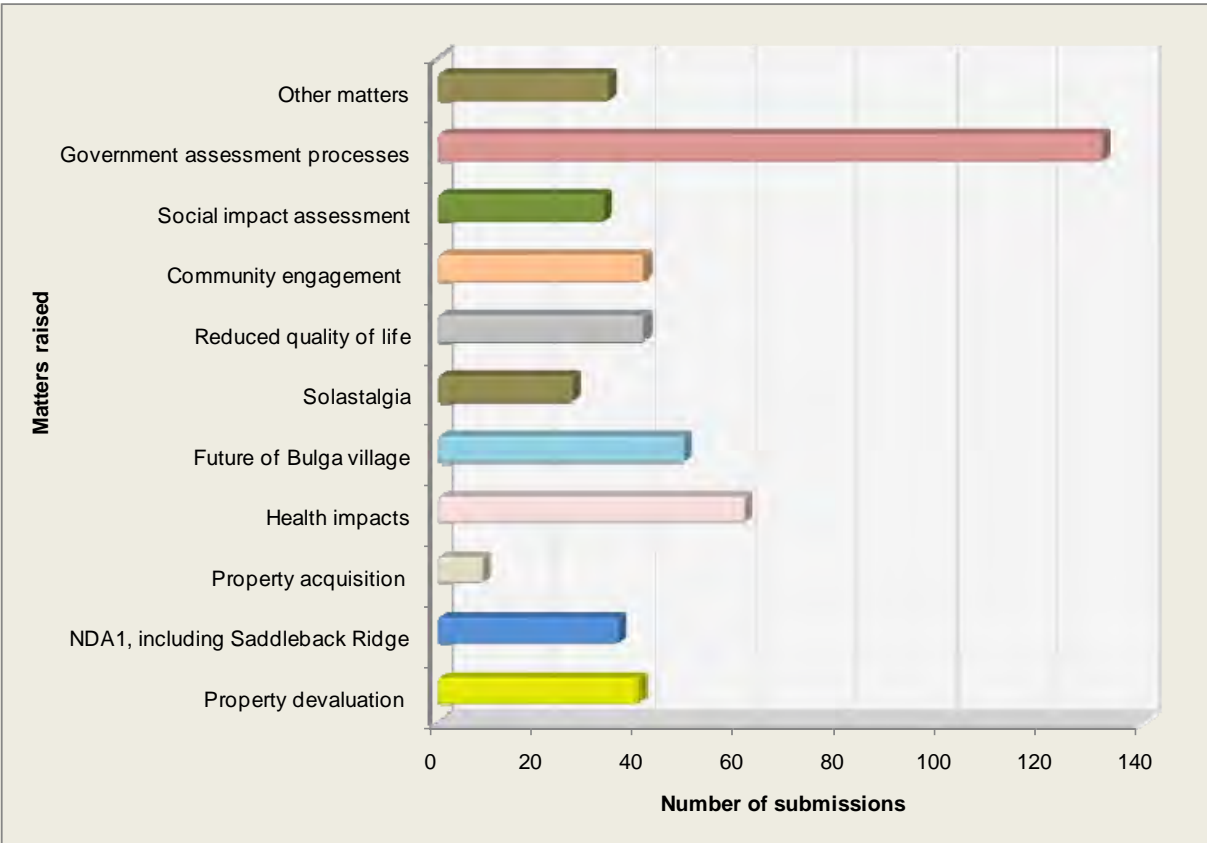


Figure 6.10 Social matters raised within submissions of objection

6.7.2 Property devaluation

Of the submissions of objection related to social matters, 17 per cent (representing 13 per cent of the total submissions of objection) referenced property devaluation in Bulga village and the broader community. Related matters included acquisition rights and financial support from Coal & Allied. Property acquisition and financial support in a social context are addressed in Section 6.7.4 of this report.

Submissions of objection raised as an issue the concern that all properties in Bulga have been devalued by the proposal and that this was reflected by the inability to sell properties or recent sales being at low prices. Further, it was contended in some submissions of objection that if the proposal was approved, properties in Bulga would be unsaleable. On occasion, reference was also given to this trend commencing since the Warkworth Extension 2010 was made public.

Based on publically available data, there is no evidence of substantial decline in property prices due to the previous application for the Warkworth Extensions 2010 or the current proposal (NSW Government Land and Property Information Division, 2014).

There are a number of factors which determine the value of properties, including supply and demand, interest rates, the state of the economy, demographics and the property's location (Investopedia 2014). While an individual property's value is influenced by its location, it is also influenced by these other factors.

Intuitively, the strength of the mining sector, which provides the highest levels of employment in the region, would be an influencing factor in property sale and rental markets in the Singleton LGA. Therefore, it is not surprising that this matter was commonly raised in submissions in support of the proposal. It would be a reasonable assumption to make that when the mining sector is robust in the Singleton LGA and surrounding regions, property values and rental returns increase in response to increased demand.

Concurrent with the recent mining slowdown and increased rate of unemployment across the Singleton LGA described in Section 2.3.3 of this report, house prices have decreased.

Median house prices in regional areas other than Singleton LGA increased by 6.2 per cent from June 2012 to June 2013. Median house prices in NSW and Sydney also increased, by 5 per cent and 15.6 per cent respectively, from December 2012 to December 2013 (ABS 2014a).

In stark contrast, house prices and rental returns have fallen sharply in the Singleton LGA where median house prices fell by 9 per cent and rental returns by approximately 25 per cent in 2013. A major factor for this downturn may have been unemployment rates, which increased significantly over this time in the Hunter region from 2 per cent to 5.5 per cent (see Figure 6.11). This was against the general trend across other regional centres, the Sydney metropolitan region and NSW (Montoya 2013). The downturn in both employment and housing prices in the Hunter region is likely to have been influenced by the decrease in coal investment and the mining slowdown that was experienced during this period.

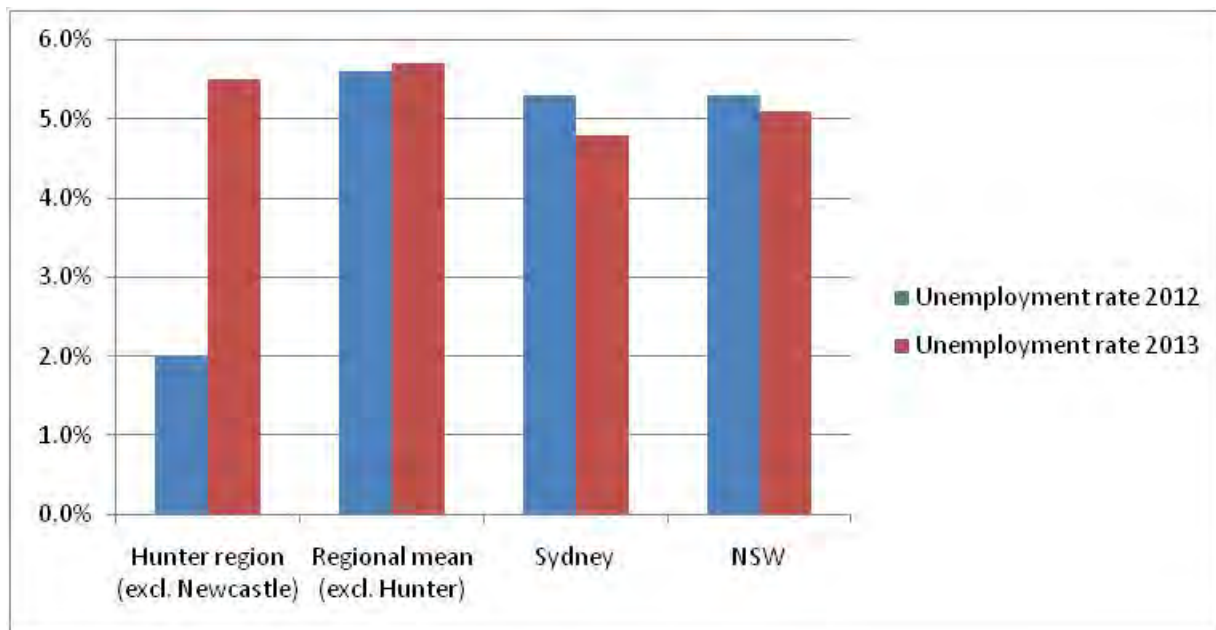


Figure 6.11 Comparison of unemployment rates between 2012 and 2013

The proposal would aim to maintain current workforce levels across MTW operations, which would also enable the substantial flow-on effects for suppliers and local businesses and the community more broadly, should contribute to maintain the current population levels in the Singleton LGA (with over 35 per cent of MTW employees residing in Singleton LGA).

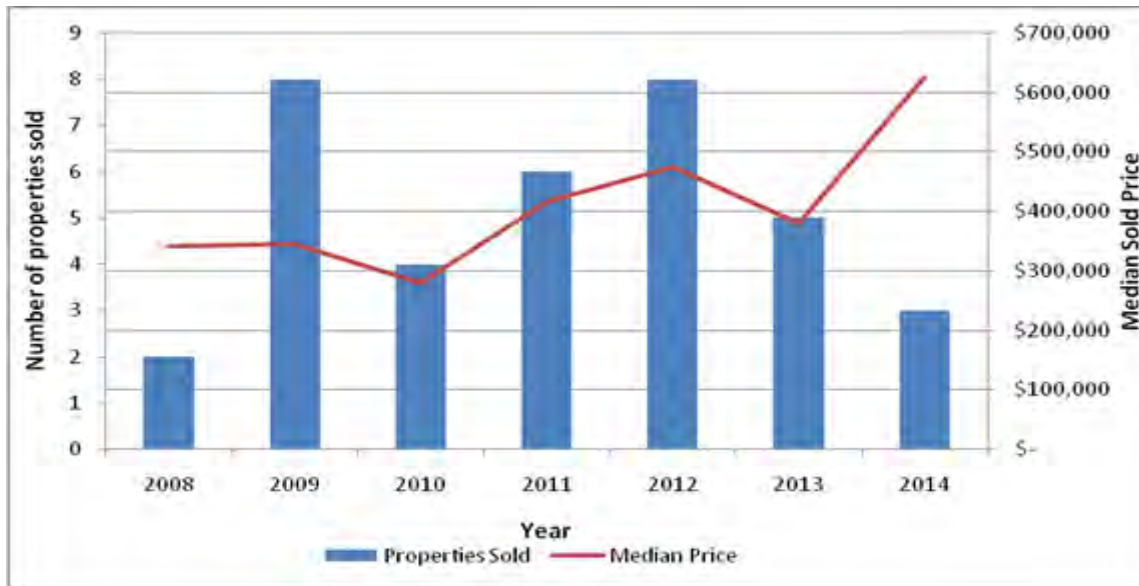
Specifically related to Bulga, the issue of devaluation of properties was considered by Stubbs (2012) who examined the purchase price of properties within Bulga during the lodgement and determination of the application for the Warkworth Extension Project in 2010, 2011 and early 2012. Stakeholder engagement regarding the Warkworth Extension 2010 commenced in August 2009. The application was lodged on 1 March 2010 and the EA was placed on exhibition from 30 April to 15 June 2010. The matter was considered by the PAC and an approval granted on 3 February 2012. The approval was subsequently appealed in the L&E Court with the appeal upheld on 15 April 2013.

Stubbs (2012) examined the sale price of all properties sold in Bulga between 1 April 2008 and 23 May 2012. She noted that the purchase price of properties in Bulga did not appear to have been affected by the lodgement and assessment of Warkworth Extension 2010. An extract of this material is provided in Appendix F.

Recent analysis undertaken for the Bulga Optimisation Project, identified that capital growth for houses in Bulga was at least 97 per cent above other similar NSW regional areas analysed for the 2012 and 2013 period (Umwelt 2013). The growth in the area, despite the downward trend of house prices and increase of unemployment in the Hunter region during this time, may represent the importance of coal mining activities in the region on property values generally.

Further analysis of property sales in Bulga since the Stubbs analysis and Umwelt (2013) assessment, sourced from the NSW Government Land and Property Information Division, shows there has not been a marked decrease in median sales prices, nor the average number of sales from January 2008 and August 2014, shown in Figure 6.12.

With respect to sales, over this period the average annual number of property sales was five, demonstrating that since the announcement of the proposal in August 2009 sales have been at or above average. The median sales price has also remained consistently above pre Warkworth Extension 2010 application levels. It is noted that to calculate median sales price, large property holdings and land only sales have been excluded based upon concern raised in some submissions regarding skewing of the data. There are currently 16 properties for sale in Bulga (www.domain.com.au), however of these, only four have existing dwellings, with the rest being potential development sites.



Source: NSW Government Land and Property Information Division data request 2014.

Figure 6.12 Median sales price and number of properties sold - January 2008 to August 2014

WML acknowledges the importance of retaining value in property in areas surrounding the Warkworth Mine. In this regard, Coal & Allied will continue to manage residential properties it owns via the open market. Coal & Allied utilises the services of local real estate agents to manage its properties to a high standard of maintenance and management.

6.7.3 Non-disturbance Area 1, including Saddleback Ridge

Of the submissions of objection related to social matters, 15 per cent (representing 12 per cent of the total submissions of objection) were critical of the proposal to mine through NDA1 (including Saddleback Ridge) and claimed that community financial decisions were made on the basis of the NDA. These matters are addressed in the sub-sections below.

i Mining of Non-disturbance Area 1

WML acknowledges the concerns raised in submissions regarding mining through NDA1 (including Saddleback Ridge). The decision to proceed with a process to seek mining access to NDA1 was not taken lightly but is critical to ongoing viability of the mine.

As described in Section 4.11.4 of this report, under the current development consent, a dragline would not be able to extract the lower overburden pass in West Pit as the area to the west (Saddleback Ridge) could not be incorporated into the pit. This is because the strike length would decrease to the point where draglines can no longer operate due to insufficient working room for the dragline and the spoil. Further, there would be no room for access ramps so haul trucks would not be able to access extracted coal. The reduced strike length and inadequate physical working area would not allow the required 18Mtpa of ROM coal to be produced across the operation.

The Deed of Agreement (the Deed), which created, amongst other things, NDA1, was acknowledged by DP&I (now DP&E) to be an early attempt at offsetting and one that does not reflect current government policy. Further, the PAC noted the 'questionable condition and ecological value of much of the offset area' contained in the area covered by the Deed.

The Director-General's Report for the Warkworth Extension 2010 also states that in the DP&I's view the potential trade-offs between conservation and resource use warrant proper consideration in this instance, and should not be avoided in order to satisfy a principle that offset areas should never be amended.

The Deed has since been amended and makes provision for mining of the area subject to a relevant planning approval issued under the EP&A Act. As described in the EIS, offset areas for the mining of this area are provided within the BOS, which has been prepared in accordance with the *Draft NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014) (now final).

ii Financial decisions being made on the basis of NDA1

WML acknowledges the concern raised that financial decisions had been made on the basis of NDA1. It is important to note, however, that analysis of data demonstrates that families and individuals were prepared to move to the community with knowledge of the likely continuation of mining at Warkworth Mine (and the mining of NDA1) and provides evidence that it is unlikely that the community would experience significant population loss from the proposal as people will continue to desire to live there.

A number of submissions noted that the population of Bulga has grown by almost twice the National average between the 2006 and 2011 Census. It was stated that this demonstrates that people did consider this a good place to live, and raise a family. It was contended that the growth was in no small part due to a sense of security felt by locals after the 2003 approval, when the Commonwealth government required Rio Tinto to sign a deed of agreement which created, amongst other things, NDA1. It is true that population growth (of 37 individuals) was experienced during the period of 2006-2011, but it is important in the context of the contention to consider in-migration data and the timing of the population change.

To understand population movement, the ABS census asks respondents whether they had a different address 5 years ago and then asks whether they had a different address 1 year ago. The 2011 Census data for Bulga indicates that of the 82 individuals in Bulga that stated that they had a different address in the five years prior (ie they had a different address in 2006), and 33 (40 per cent) had moved to Bulga in the previous year, 2010. This is important because in 2010 the previous Warkworth Extension 2010 had already been publically announced.

As described in Section 6.7.2 of this report above, it is considered that approval of the proposal would contribute to stabilising property values in the communities surrounding Warkworth Mine, including Bulga in addition to the broader Singleton LGA.

6.7.4 Property acquisition

Of the submissions of objection related to social matters, four per cent (representing three per cent of the total submissions of objection) related to property acquisition, including the assessments for determining those entitled to acquisition upon request under the proposal; and compensation or voluntary acquisition for residents either wanting to remain or leave Bulga. These matters are addressed in the sub-sections below.

i Assessments for determining properties entitled to acquisition upon request

The noise and air quality studies prepared as part of the EIS are appropriate for determining properties entitled to acquisition upon request in accordance with government policy.

Both the noise and air quality studies were prepared by industry leading professionals in accordance with government policy and guidelines and included detailing modelling to determine properties entitled to acquisition upon request. The noise study was also peer reviewed at key stages by a leading acoustic firm, with the outcomes reflected in the finalised assessment. Approaches to the noise and air quality studies are discussed further in Sections 6.4.2 and 6.5.2 of this report, respectively.

ii Compensation

It is anticipated that any new development consent for the Warkworth Mine would include a mechanism for an independent review which would be available to all property owners. If an owner of privately-owned land considers the development to be exceeding the relevant noise or air quality criteria then he/she may ask the Director-General in writing for an independent review of the impacts of the development on his/her land.

In addition, should the proposal be approved, Section 265 of the *Mining Act 1992* provides that landholders are entitled to compensation for any 'compensable loss' suffered, or likely to be suffered, by the landholder as a result of the exercise of the rights conferred by the lease. 'Compensable loss' is defined as the:

... loss caused, or likely to be caused, by:

- (a) damage to the surface of land, to crops, trees, grasses or other vegetation (including fruit and vegetables) or to buildings, structures or works, being damage which has been caused by or which may arise from prospecting or mining operations, or
- (b) deprivation of the possession or of the use of the surface of land or any part of the surface, or
- (c) severance of land from other land of the landholder, or
- (d) surface rights of way and easements, or
- (e) destruction or loss of, or injury to, disturbance of or interference with, stock, or
- (f) damage consequential on any matter referred to in paragraph (a)-(e), but does not include loss that is compensable under the Mine Subsidence Compensation Act 1961.

Therefore, it is considered that mechanisms are in place to compensate for mine-related impacts.

iii Voluntary acquisition

Coal & Allied committed to a number of upfront measures prior to lodging planning applications in March 2014. These measures included honouring the voluntary acquisition rights granted to some residents under the now rescinded planning approval for the Warkworth Extension 2010 determined by the PAC. These rights were lost when the L&E Court overturned the approval in 2013.

In undertaking individual discussions with respective property owners, Coal & Allied's intention is to reinstate residents' voluntary acquisition rights, subject to approval of the proposal, to put these residents in a comparable position to that which they held prior to the L&E Court judgment refusal of the Warkworth Extension 2010 and removing their acquisition rights. Coal & Allied is making this offer to respective residents who may or may not choose to approach Coal & Allied to discuss further. While this is part of the current operating approach of the business, Coal & Allied appreciate that any discussions around property purchases locally generate interest, questions and concerns. Coal & Allied has encouraged residents to speak directly with the business to discuss any aspect of the process.

Further, the approval for the Warkworth Extension 2010, before it was refused by the L&E Court, extended voluntary acquisition rights to two commercial interests in the village of Bulga. Coal & Allied recognises that these local businesses are valued as community facilities and, as such, would aim to ensure that any offer of voluntary acquisition for the properties from which those businesses operate does not hinder the ability of independent commercial enterprises to continue to operate.

One submission more broadly raised the acquisition rights in the context of all coal mining developments. It provides a suggestion of an alternative approach as follows.

Before granting a mining licence to a company, rights of the villages neighbouring the future mine should be considered and a protective buffer zone, say 10km, around the mine established. The properties of the land owners in the zone would be evaluated by an independent valuer to determine their real estate values before any mining activity commences. Next the mining company would lodge the combined value of all the properties into an independent Community Trust Fund. If during the life of the mine anyone within the buffer zone cannot sell their property, the Trust would buy it then rent it or possibly sell it. At the end of the life of the mine the Trust would be liquidated, all trust properties sold and the balance of the money returned to the mining company. The same could be done for mines already existing. There is even a partial precedent. We already have 2km protective zone that prevents CSG developments close to the local towns and villages.

WML appreciates the respondent's efforts in proposing an alternative mechanism.

6.7.5 Health impacts

Of the submissions of objection related to social matters, 26 per cent (representing 21 per cent of the total submissions of objection) contended that the health of Bulga residents would be adversely impacted under the proposal. Perceived health impacts related to dust emissions and associated respiratory disease, and mental health issues such as depression from stress and uncertainty. Dust and health related matters are discussed further in Section 6.5.4 of this report.

As reported in Table 21.5 of the EIS, health and well-being impacts need to be considered at a community level. In a study of the health of Hunter Valley communities in proximity to coal mining and power generation, Merritt et al. (2013) found that:

There were no significant differences in management rates of mental health conditions in the Hunter Valley region compared with the rest of rural NSW. Management rates of depression and anxiety were not higher, nor were prescription rates of antidepressants.

This indicates that similar levels of anxiety are experienced in Hunter Valley region compared to rural NSW as a whole although the causes of anxiety may vary between regions.

It is also worth noting that applications of any scale and nature related to any industry have the potential to cause stress and uncertainty for near neighbours. These could range from a next door neighbour's renovation to the proposed establishment of a wind farm.

As discussed in Section 4.11.10 of this report, Merritt *et al.* (2013) conducted an analysis of general practice data for rural communities in close proximity to coal mining and coal-fired power generation in the Hunter Valley to identify unusual patterns of illness. The study in the NSW Public Health Bulletin concluded that:

There was no evidence of a significant difference in problems managed or medications prescribed by [general practitioners] GPs for residents of communities potentially affected by heavy industrial activity (coal mining and power generation) in the Hunter Valley region of NSW compared with residents in the remainder of rural NSW during the period 1998–2010. The diverging trend for respiratory problem management over time is worthy of further exploration.

The 'diverging trend' refers to a comparison of the management rates of respiratory problems (as a group) during the period 2005–2010 with those for 1998–2004. This indicated that there was no significant change in the Hunter Valley region despite a significant decrease for the remainder of rural NSW over this period. However, the statistical significance of this difference could not be determined due to the sample size.

Notwithstanding this, it is recognised that near neighbours of Warkworth Mine perceive dust impacts from the operation. In recognition of this concern, Coal & Allied propose to contribute to a Near Neighbour Amenity Resource which would provide services such as property maintenance to residents surrounding the operation. The resource is subject to VPA discussions with Singleton Council.

6.7.6 Future of Bulga village

Of the submissions of objection related to social matters, 21 per cent (representing 16 per cent of the total submissions of objection) questioned the viability of Bulga village should the proposal be approved. Submissions raised concerns over property acquisition and also noted the historic nature of the village, the sense of community, aspirations of quiet and relaxed rural lifestyle and fragmentation. These matters are addressed in the sub-sections below.

i Property acquisition

Predicted impacts from the proposal would not result in any properties in Bulga village being entitled to acquisition upon request in accordance with government policy.

As described in EIS, technical studies for the proposal predicted that all properties surrounding the operation would satisfy relevant criteria with the exception of assessment location 34 and those already within, or inferred to be in, zones of affectation for mining operations (assessment locations 77, 102 and 264). Assessment location 34 is located to the north of Bulga village as can be seen on Figure 6.5 of this report. No other properties in Bulga or elsewhere will be entitled to acquisition upon request, as they are not impacted by the proposal to such a degree as to be entitled to an acquisition right.

It is important to note that in contrast to perceptions, any property acquisition rights included in an approval are upon the request of the landowner and are not compulsory. If a landowner does not wish to take up their acquisition rights they do not have to. Any landowner with acquisition rights under an approval can also choose when they might like to have their property acquired, if at all, during the life of the development. For example, if the landowner determines at the start of the project to stay but 10 years later choose to take up their acquisition rights, the rights would still exist and can be validly processed under the approval.

Subject to approval of the proposal, Coal & Allied's intention is to reinstate voluntary acquisition to those properties extended rights by WML under the Warkworth Extension 2010. As noted in Section 6.7.4 of this report, Coal & Allied is making this offer to respective residents who may or may not choose to approach Coal & Allied to discuss further. While this is part of the current operating approach of the business, Coal & Allied appreciate that any discussions around property purchases locally generate interest, questions and concerns. Coal & Allied has encouraged residents to speak directly with the business to discuss any aspect of the process.

As noted in Section 6.7.4 above, Coal & Allied would continue to manage residential properties it acquires via the open market. Coal & Allied utilises the services of local real estate agents to manage its properties to a high standard of maintenance and management.

ii Sustainability of Bulga

The applicant acknowledges and respects the historic nature of the village, the sense of community, aspirations of quiet and relaxed rural lifestyle and concerns regarding fragmentation. Coal & Allied is committed to co-existence with the local community, and ensuring Bulga village is sustainable in the future.

As reported in Table 21.5 of the EIS, the decline of smaller rural communities is a broad concern across Australia including in parts of the middle and upper Hunter region that are experiencing decline. A wide range of factors are contributing to this such as improved communications which is encouraging migration to cities and centralisation of services, restructuring of rural industries, reduced employment opportunities, and population aging and non-replacement leading to towns falling below the critical threshold needed to maintain essential services (Productivity Commission 2009). In contrast, Bulga has a number of significant attributes including retail and community facilities (service station, general store, tavern, community hall, sports ground and fire brigade) and it is well located to service the tourist trade being proximal to attractions like wineries and is on the Putty Road tourist route. Consequently, Bulga has experienced both a growth in population and housing prices (prior to recent decrease – see Section 6.7.2 of this report), has a relatively robust age structure and relatively low rates of population turnover.

ABS data shows that Bulga SSC's population increased by 11.5 per cent from 321 to 358 persons between 2006 and 2011, which is double the NSW rate of 5.6 per cent for the same period. In this period, Singleton's population declined by 4.7 per cent. Importantly, it is noted that community consultation regarding MTW's intention to seek approval to continue mining across Wallaby Scrub Road began in August 2009. It is acknowledged, however, that local stakeholders reflect on gradual population decline in nearby villages such as Warkworth, Camberwell and Ravensworth. Even with the replacement of population that is likely to occur with leasing any acquired properties, or with the new owners living in or leasing properties sold by owners on the open market, concern remains regarding the loss of existing community connections, activity and village life.

While the proposal would contribute to maintaining the current and the regional population, individual community members would continue to make decisions based on individual circumstances about whether to stay in the area. ABS data has shown that Bulga has a lower population turnover rate than the NSW average: in 2011, 71 per cent of people in the Bulga SSC were recorded at the same address they were five years earlier (compared to 57 per cent for both Singleton and NSW).

Although it is true that population growth (of 37 individuals) was experienced during the period of 2006-2011, submissions of objection attribute this to the deed that was in place to consider in-migration data and the timing of the population change. To understand population movement, the ABS census asks respondents whether they had a different address 5 years ago and/or 1 year ago. The data for Bulga indicates that of the 82 individuals in Bulga stated that they had a different address five years prior (2006), 33 (40 per cent) had moved to Bulga in the previous year, 2010. This is important because in 2010 the previous Warkworth Extension 2010 had already been publically announced.

This demonstrates that families and individuals were prepared to move to the community with knowledge of the proposal and provides evidence that it is unlikely that the community would experience significant population loss as people will continue to desire to live there. It is considered that similar outcomes are likely for the current proposal.

It is acknowledged that some community connections may be lost if existing community members choose to leave the community.

WML is committed to industry best practice environmental management and continual improvement over the life of the proposal to manage potential impacts. Extensive ongoing engagement with near neighbours will be implemented with feedback received continuing to be an important consideration in the operational management of the mine.

6.7.7 Solastalgia

Of the submissions of objection related to social matters, 11 per cent (representing nine per cent of the total submissions of objection) raised the loss of places of community value and uncertainty regarding the future of the Bulga.

Loss of sense of place has been associated with 'solastalgia', which is defined as the distress that is produced by environmental change impacting on people while they are directly connected to their home environment. Solastalgia is considered in Appendix J of this report which responds to Professor Albrecht's submission on the SIA prepared on behalf of the BMPA.

Some stakeholders had a sense of distress, loss, depression and abandonment when discussing their connections to home, community, family and the rural environment, and that these connections may be lost as a result of the proposal.

A 'loss of sense of place' is a concern of some Bulga residents. As stated in Table 21.5 of the EIS, Bulga experiences low population turnover and residents have relatively positive health, employment, crime rate and property ownership characteristics that are illustrative of a stable and cohesive community. WML acknowledges that some community members may experience changes to their way of life and their community, if they or others choose to leave Bulga. As outlined above, analysis of in-migration indicates that families and individuals have moved to Bulga since the previous Warkworth Extension 2010 was announced which indicates that the community will continue to evolve with new people moving into the community as others leave. WML is sensitive to this concern and this matter will be a consideration in the social impact management plan to be developed in consultation with key stakeholders, including near neighbour representatives.

The reference case (if the proposals were not to proceed) also has the potential to have a subsequent 'loss of sense of place' for a different set of stakeholders if viable mining could not be maintained. These would include employees, particularly those that reside in the Singleton LGA (approximately 35 per cent of the workforce, being 455 people) and others including contractors and suppliers who would lose business and potentially have to leave the region if the proposal was not approved. This loss could be felt through reduction in volunteers available for local organisations, involvement in communities and potentially a reduction in community facilities and services if sufficient population numbers were unable to be retained.

The 'loss of sense of place' for members of the Singleton LGA (and elsewhere) was also raised in 30 submissions of support which note that with limited, if any, job prospects locally or regionally people would have no choice other than to leave the area to find employment, requiring relocation of families and leaving their close community networks. This contention was premised on the dramatic increase in unemployment levels in the Hunter Valley, including substantial job losses at local mines (see Section 5.2.1 of this report).

Of note, matters raised relating to 'a sense of place' in submissions of support were similar to matters raised by objectors. Many of the submissions in support referenced adverse impacts on the community should the proposal not proceed. Matters raised included breakdown of family and support networks, family separation, community and depopulation. Many respondents reflected on their affinity with the community in which they have lived for a long period of time, often for generations.

6.7.8 Reduced quality of life

Of the submissions of objection related to social matters, 17 per cent (representing 14 per cent of the total submissions of objection) contended that implementation of the proposal would reduce the quality of life of people living in Bulga and other surrounding communities; namely Warkworth, Long Point, Gouldsville, Broke, Fordwich and Milbrodale. Noise, blasting, dust and visual amenity were commonly referenced. Impacts were considered unacceptable under currently approved operations and were expected to worsen under the proposal.

All of the Mining SEPP's non-discretionary standards are met with the exception of air quality where the cumulative annual average criteria is exceeded for two properties already afforded acquisition rights by neighbouring mines, although this standard is met for all privately owned properties. Compliance is accepted as providing significant protection against impacts associated with noise, blasting and dust.

Impacts on amenity from noise, blasting, dust and visual amenity are addressed in Sections 6.4.5v, 6.4.6iii, 6.5.3.v and 6.13 of this report, respectively. As described in EIS, technical studies for the proposal predicted that all properties surrounding the operation would satisfy relevant criteria with the exception of assessment location 34 and those already within, or inferred to be in, zones of affectation for mining operations (assessment locations 77, 102 and 264). Notwithstanding, it is recognised that near neighbours of Warkworth Mine perceive impacts from the operation. In recognition of this concern, over and above compliance obligations, as previously noted, the applicant has committed to contributing to a Near Neighbour Amenity Resource to be available to near neighbours (see Section 21.5.2 of the EIS). This resource could be used by residents to provide support for specific amenity concerns identified by individual residents.

As described, WML is committed to industry best practice measures to manage potential noise, blasting and dust impacts. Beyond these measures, it is anticipated that the predictive noise and dust forecasting tools currently being developed will assist in proactively controlling noise and dust emissions.

The dust management tool will utilise predictive meteorological forecast data coupled with detailed mine activity (mine plan) data to determine the most likely times during the upcoming day that dust lift off and air dispersion conditions may be unfavourable. Similarly, the noise management tool will utilise predictive meteorological forecast data coupled with detailed mine plans and equipment sound power level information to predict noise levels at residences.

These advance warning systems will allow mine staff time to be better prepared in the event that such conditions occur. The tool is currently being developed, and would be integrated into day-to-day operations during 2014. This would further assist in avoiding potential dust impacts.

An assessment of blasting impacts on sensitive structures in the vicinity (Bulga Bridge and St Phillips Church in Warkworth) indicated that it is highly unlikely that these structures would be impacted by blasting. As noted above in Section 6.4.6 of this report, a predictive modelling system is currently and would continue to be implemented at MTW. It will continue to use spatially and time varying weather and terrain data to predict the most appropriate time of day to complete blasting activities. Subject to the implementation of the protocols outlined in the MTW blast management plan no impacts are predicted to result from blast fume emissions.

On this basis, and subject to the implementation of all reasonable and feasible mitigation, potential amenity impacts on Bulga and surrounding communities from blasting or vibration are considered acceptable and meet government guidelines.

It is noted that the proposal will result in some negative visual impacts for residences to the west, including those in more elevated parts of Bulga village: the mine and rehabilitated landform will move closer and active mining will occur over an extended period of time. Conversely, the proposal will also result in some positive visual impacts: the final landform at Warkworth Mine will be more undulating supporting a more natural looking landscape and improved at MTO by the removal of a final void when compared to the final landforms approved under the respective mines' approvals.

Given the proposed extension area is on the western side of the mine, visual impacts from the north, east and south are negligible. Potential visual impacts will generally be limited to areas to the west of the mine, specifically, some areas within Bulga village. Visual impacts experienced will range from moderate to low, where existing topography and vegetation would continue to provide screening to the mine, to high, such as at the more elevated residences around Bulga village.

Where high or high/moderate visual impacts occur, site-specific mitigation measures (for example, SSVAs) would be available to individual landowners and WML would engage with property owners who request mitigation. In addition, visual impact mitigation measures would be put in place to mitigate the potential impacts on the overall surrounding landscape including vegetation and bund screening to the boundaries of the Site.

As a brownfield extension and subject to the implementation of management measures committed to under the proposal, it is concluded that visual amenity impacts under the proposal are acceptable as the viewshed is already dominated by mining developments. The increased impact from the proposal is not considered to significantly alter the viewshed from what it is at present.

In conclusion, it is considered that subject to the implementation of all reasonable and feasible mitigation, the proposal would not significantly reduce the quality of life of people living in Bulga village and other surrounding communities.

6.7.9 Community engagement

Of the submissions of objection related to social matters, 17 per cent (representing 14 per cent of the total submissions of objection) contended that there were opportunities to improve historic community relations and engagement on the mine's current impacts. Several submissions noted mistrust, which has stemmed from the proposal to mine through NDA1 (including Saddleback Ridge). One submission contended that the development application was made prior to consultation with the people of Bulga. The example of a MTW CCC meeting being held during the assessment process with no reference to the proposal being made was the example given.

Contrary to the assertions raised in submissions, a comprehensive engagement strategy was implemented for the proposal and SIA process. A key focus of the engagement was with near neighbours and residents of local communities such as Bulga. The proposal specific strategy was supported by Coal & Allied's suite of ongoing engagement activities.

A stakeholder engagement strategy is in place for MTW and is implemented by Rio Tinto Coal Australia's Community Relations team. The key goals of the stakeholder engagement strategy are to ensure the timely provision of relevant and clear information and to create a process that provides opportunities for stakeholders to express their views and allows timely feedback on any matters raised.

As described in Chapter 8 of the EIS, a number of engagement tools have been implemented and are continuing, including shopfronts in Singleton and Muswellbrook, freecall information line, Rio Tinto Coal Australia website, quarterly newsletters and MTW CCC.

A consultation programme was implemented specifically for the proposal and was undertaken with consideration of the then Department of Planning's (now DP&E) Guidelines for Major Project Community Consultation (2007). The Secretary's requirements for the proposal also required consultation with relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. The EIS was publically exhibited from 25 June to 6 August.

Stakeholder engagement was undertaken as part of the SIA for a three-month period during March-May 2014. A total of 151 stakeholders participated in the SIA consultation process.

The consultation programme was implemented throughout the assessment process. The programme involved consultation with key stakeholders to identify social opportunities and impacts that are directly and indirectly related to the proposal. Methods adopted for the consultation are provided in Chapter 8 of the EIS.

As required by the Secretary's requirement, a focus of the engagement was with near neighbours and residents of local communities such as Bulga. Approximately 20 per cent of Bulga's population was involved in the engagement programme, the highest participation of any stakeholder group.

As part of the engagement programme, consultation was also undertaken with MTW employees and suppliers, the majority of whom reside or have a business in the Hunter region, local community groups, Singleton Council and other service providers. The views of the broader Singleton community were sought through information sessions held in the Coal & Allied Singleton shopfront however attendee numbers were limited. It is noted that Singleton residents provided the most submissions on the proposal with 550 submissions originating from the Singleton LGA. As detailed in Section 3.3.1 of this report, approximately 86 per cent of submissions originating from the Singleton LGA being in support of the proposal.

As described in Section 8.5.7 of the EIS, members of the MTW CCC were personally contacted by Coal & Allied on 19 March 2014 prior to Coal & Allied's media release announcing its intention to lodge a development application for the proposal. The MTW CCC members were advised of the forthcoming consultation programme including the community information sessions and were encouraged to attend the sessions for further information. The proposals were also discussed at a meeting of the CCC on 12 May 2014. Minutes of this meeting are available on the Rio Tinto Coal Australia website.

As noted in Table 21.5 of the EIS, since the Warkworth Extension 2010 proposal, based on feedback received from a range of stakeholders, a suite of ongoing and proposal specific strategies have been developed by Coal & Allied to improve communications generally and to manage/ mitigate or enhance proposal-related impacts and opportunities.

In particular, a social impact management plan would be developed for the proposal detailing these management and mitigation measures and a plan for implementation including responsibilities, timing, performance indicators/targets and monitoring measures. The social impact management plan would be prepared in consultation with key stakeholders.

The management plan would include a protocol for periodic review to ensure its effective implementation.

The concerns raised in the submissions in relation to NDA1 are discussed in Section 6.7.3 of this report.

Coal & Allied is committed to continuous improvement across all aspects of its business, including stakeholder engagement. An example of this commitment is the contribution to the establishment of a Near Neighbour Amenity Resource to provide support to residents surrounding the operation. Coal & Allied/WML propose continuing to work closely with the residents of Bulga, the broader community and other stakeholders, to promote effective environmental management and maximise proposal-related opportunities.

6.7.10 Social impact assessment

Of the submissions of objection related to social matters, 14 per cent (representing 11 per cent of the total submissions of objection) raised in submissions related to the social impact assessment and EIS. These are addressed below.

i Workforce numbers

The documents make a conscious distinction with three numbers related to workforce referenced: one for MTW as a whole, being on 'average 1,300 employees including full-time contractors'; one more exact number when referring to the economic significance of the resource as per clause 12AA(A) of the Mining SEPP being '1,307 annual average FTEs'; and one for those attributed to Warkworth Mine only, being 'approximately 1,187 jobs on average in the long-term'. This matter is addressed in Section 6.6.2iv of this report.

Employee numbers at the mine inherently fluctuate depending on a number of factors such as the number of full time contractors, changes to equipment numbers and major maintenance being undertaken. Accordingly, the terms 'on average' or 'approximately' are applied before each reference to employee numbers. For example and as referenced in several submissions, the most recent MTW Annual Review states that there were 1,033 at MTW. This number, however, excludes full-time contractors.

ii Unoccupied Bulga residences

Submissions noted that Table 4.4 of the SIA incorrectly states that 23.8 per cent of privately-owned properties in Bulga are unoccupied. Several submissions contended that only three of the 156 homes in the district are unoccupied.

Table 4.4 shows the socio-demographic data including housing indicators for the 'community' categories assessed in SIA, comprising local community, assessment area LGAs and NSW. Geographical classifications align with those used in the ABS census. The data presented in the table is verbatim from the ABS Census, Community Profiles 2011. The data was accessed in March 2014 and was not changed for the purposes of the SIA.

iii MTW employees' residing LGAs

Several submissions contend that the number of MTW employees residing in the Singleton LGA is overstated in the SIA (and EIS) and provide alternative percentages of 25 per cent and 32 per cent residing in the Singleton and Maitland LGAs, respectively. No alternative is provided for Cessnock.

The workforce data reported in the EIS are provided by the RTCA Human Resources department and are based on the postcode provided by employees for their payroll address. These postcodes are assigned to the local government areas where the majority of the postcode boundary is located (given that postcode and LGA boundaries mostly do not align). This found that almost three quarters of MTW employees and long-term contractors live in the Mid and Upper Hunter region: Singleton LGA (35 per cent, 455 people), Cessnock (19 per cent, 247 people) and Maitland LGA (17 per cent, 221 people) and are shown in Table 6.5.

A more detailed analysis of the data based on suburbs rather than postcodes has provided a slightly greater alignment with LGA boundaries; this is also more closely aligned with the findings of the employee survey undertaken for the SIA.

Table 6.5 MTW employees' residing LGAs

| Local government area | Percentage of workforce reported in EIS | Percentage of workforce |
|-------------------------------|---|-------------------------|
| Singleton | 35% | 33.4% |
| Maitland | 17% | 27.1% |
| Upper Hunter and Muswellbrook | - | 3.4% |
| Cessnock | 19% | 18.1% |
| Newcastle | - | 5.2% |
| Lake Macquarie | - | 6.0% |
| Other | 29% (location not specified) | 6.8% |
| Total | 100% | 100% |

This updated data does not significantly change the findings of the social or economic studies, and if anything leads to a greater benefit to the Mid-Upper Hunter than originally assessed, with 82 per cent of the workforce residing in the five LGAs of the Mid-Upper Hunter. Furthermore, of the 390 people hired at MTW between January 2011 and June 2014, 137, or 35 per cent were from the Singleton LGA which is consistent with the operations preference to hire locally.

iv Secretary's requirements

A number of submissions contended that the SIA does not meet the Secretary's requirements for 'an assessment of the likely social impacts (including perceived impacts), paying particular attention to any impacts on Bulga village'.

The SIA defines near neighbours as stakeholders who reside in the neighbouring villages of Bulga, Warkworth, Long Point and Gouldsville and those stakeholders who reside on properties in close proximity to the MTW operation, as stated in Section 2.4.1 of the SIA.

Appendix E of this report provides a summary of perceived impacts and opportunities and the technical assessment of the impacts and opportunities. It provides particular attention to the views of near neighbours, including Bulga, as near neighbours represented 44 per cent of those who participated in the survey. Approximately 20 per cent of Bulga's population was involved in the engagement programme. The related outcomes of technical assessments are also focussed on near neighbours. Therefore, it is considered that the SIA meets the Secretary's requirements in paying particular attention to any impacts on Bulga village.

v Interviews with local residents

It was contended in several submissions that considerable work was done by EMM in interviewing local residents; however, it was felt that none of this material is included in the SIA.

A total of 151 stakeholders participated in the SIA consultation process. A strong focus of the engagement was with near neighbours and residents of local communities such as Bulga, as required by the Secretary's requirements. Approximately 44 per cent of participants were near neighbours, equating to 66 of the 151 participants. In addition to near neighbours, consultation was also undertaken with MTW employees, local community groups, Singleton Council and other service providers.

As described in Section 2.4.2 of the SIA, interviews were conducted addressing a number of key themes, namely: perceptions of social impacts associated with the proposal; potential for management and mitigation of these impacts; opportunities associated with the proposal and potential enhancement strategies; perceptions of existing operational impacts and management strategies; costs and benefits of mining in the region; needs and aspirations in the community; preferred forms of information and engagement.

Throughout the SIA consultation process all data was coded and analysed to identify significant stakeholder identified themes across key topic areas which were then consolidated and summarised into Figure 21.6 in Chapter 21 of the EIS. The topic areas identified through consultation were used to guide the identification of impacts and opportunities, the analysis of which is presented in Table 21.5 of the EIS and Appendix E of this report. The table provides an overview of community consultation findings in Column B and technical assessment in Column A. This demonstrates that the assessment clearly took into consideration the outcomes of the consultation with all stakeholders who were engaged during the development of the SIA.

6.7.11 Government assessment process

Of the submissions of objection related to social matters, 56 per cent (representing 44 per cent of the total submissions of objection) stated that they had lost confidence in government assessment process due to the nature of the amendments to the Mining SEPP and allegations before Independent Commission Against Corruption (ICAC).

As described in Table 21.5 of the EIS, Coal & Allied conduct its operations in accordance with NSW and Commonwealth legislation and internal high standards of conduct, including The Way We Work, its statement of business practice.

The proposal will be considered by the NSW Government under the EP&A Act and a range of other legislation, regulations, policies and guidelines. These documents are frequently updated to ensure their ongoing relevancy.

The EIS was prepared in accordance with current legislation and government policy and used the most recent and accurate scientific data relevant to the proposal. Feedback received from community and government stakeholder engagement together with the Secretary's requirements and the L&E Court judgment, provided guidance to the assessment approach, ensuring that all potential matters of relevance associated with the proposal were assessed.

On this basis, and subject to the implementation of all reasonable and feasible mitigation, the social impact of the proposal on the government major project assessment process is considered to be limited and meets government laws and guidelines.

Like the Warkworth Extension 2010, this proposal will be determined by the PAC, not the Minister for Planning. The PAC is a statutory body established under the EP&A Act and is independent of the NSW Government, the Minister for Planning and DP&E.

Section 23D of the EP&A Act sets out the functions of the PAC, and these include:

- to determine applications for major developments under delegation from the Minister;
- to review any major development including conducting of public hearings; and
- to provide independent expert advice on planning and development matters.

The delegation to determine certain major development applications and modification applies to:

- applications made by private proponents where a reportable political donation has been declared;
- applications objected to by the relevant council; and
- applications where more than 25 objection submissions received by DP&E.

Given that more than 25 objection submissions have been received by DP&E, the PAC will be the consent authority for the proposal.

There has been no reference to or, mention of, Rio Tinto in any ICAC investigation.

6.7.12 Other matters

Of the submissions of objection related to social matters, 14 per cent raised social matters that were beyond those categorised in the preceding sections were raised (representing 11 per cent of the total submissions of objection). The remaining matters include:

- support for the continuation of the mine; however, disapproval of the spatial extension;
- lodgement of the application being in direct contravention of the judgments handed down by the L&E Court and Supreme court of NSW;
- importance of agriculture and food security;
- automation of services including driverless trucks which contradicts one of the proposal's main objectives, being job security; and
- transparency in noise and dust monitoring results.

i Disapproval of spatial extension

As described in Section 1.1 of this report, mining in West Pit at Warkworth Mine is forecast to reach consent limits in 2015. At this time a critical threshold is reached, whereby the mine will not be economically viable due to a significant increase in mining efficiencies, increase in production costs and decrease in revenue from a reduced rate of coal produced. Under this scenario mining below the required production rates would be reached well before the 2021 expiry of the current development consent. As described in Section 1.1 of this report, the spatial limits of the proposed extension area are necessary to enable the long-term viability of operations at Warkworth Mine.

ii Contravention of court rulings

As detailed in Section 6.2 of this report, given the changed legislative regime, differences between the proposal and the Warkworth Extension 2010, and that the NSW planning system supports the making of multiple development applications in respect of the same parcel of land, there is no basis for any submission that the development application for the proposal is unlawful or improper.

It should also be noted that the appeal to the NSW Supreme Court was limited to points of law and, accordingly, while it was found that the process undertaken by the L&E Court was lawful they did not comment on or find anything further in respect of the merits of the L&E Court judgment or the Warkworth Extension 2010.

iii Agriculture and food security

The proposal will not adversely impact agriculture and food security. Agriculture NSW has confirmed that an agricultural impact assessment is not required (refer also to Section 4.7 of this report).

Following the completion of mining and rehabilitation, the final landform would support final land uses including for the conservation of native vegetation and for sustainable agriculture practices for existing and future generations.

iv Automation of services

Several submissions contend that WML is actively looking to reduce its workforce through automation of services and that this initiative is inconsistent with the promotion of job security.

Automation of services does not form part of the proposal. However, technological advances to reduce cost of production, like those advances to better manage potential impacts, may be considered in the future like any business looking to improve operational efficiencies.

v Noise and dust monitoring results

Several submissions contended that there was a lack of transparency in noise and dust monitoring results.

Noise and dust monitoring results are reviewed against criteria and reported publically in monthly and quarterly reports and Annual Reviews on the Rio Tinto Coal Australia website. Results from supplementary monitoring programmes are also publically reported on the Rio Tinto Coal Australia website.

Noise and dust monitoring results are publically available and, therefore, considered transparent.

6.8 Ecology

6.8.1 Introduction

Chapter 12 of the EIS contains a summary assessment of biodiversity impacts according to government policies for major projects and prescribed mitigation for the proposal. A detailed ecology study is provided at Appendix H of the EIS.

A total of 116 submissions in objection referenced ecology matters, representing 39 per cent of objectors.

Matters raised on ecology related to the adequacy of the BOS, impacts to WSW, re-establishment of WSW from WSG, cumulative impacts to EECs in the Hunter Valley and the mining of previously secured offset areas. The number of submissions received on matters related to ecology is shown in Figure 6.13. It is noted that a number of submissions referenced more than one ecology matter and, therefore, the number of matters raised as shown in Figure 6.13 totals more than 116.

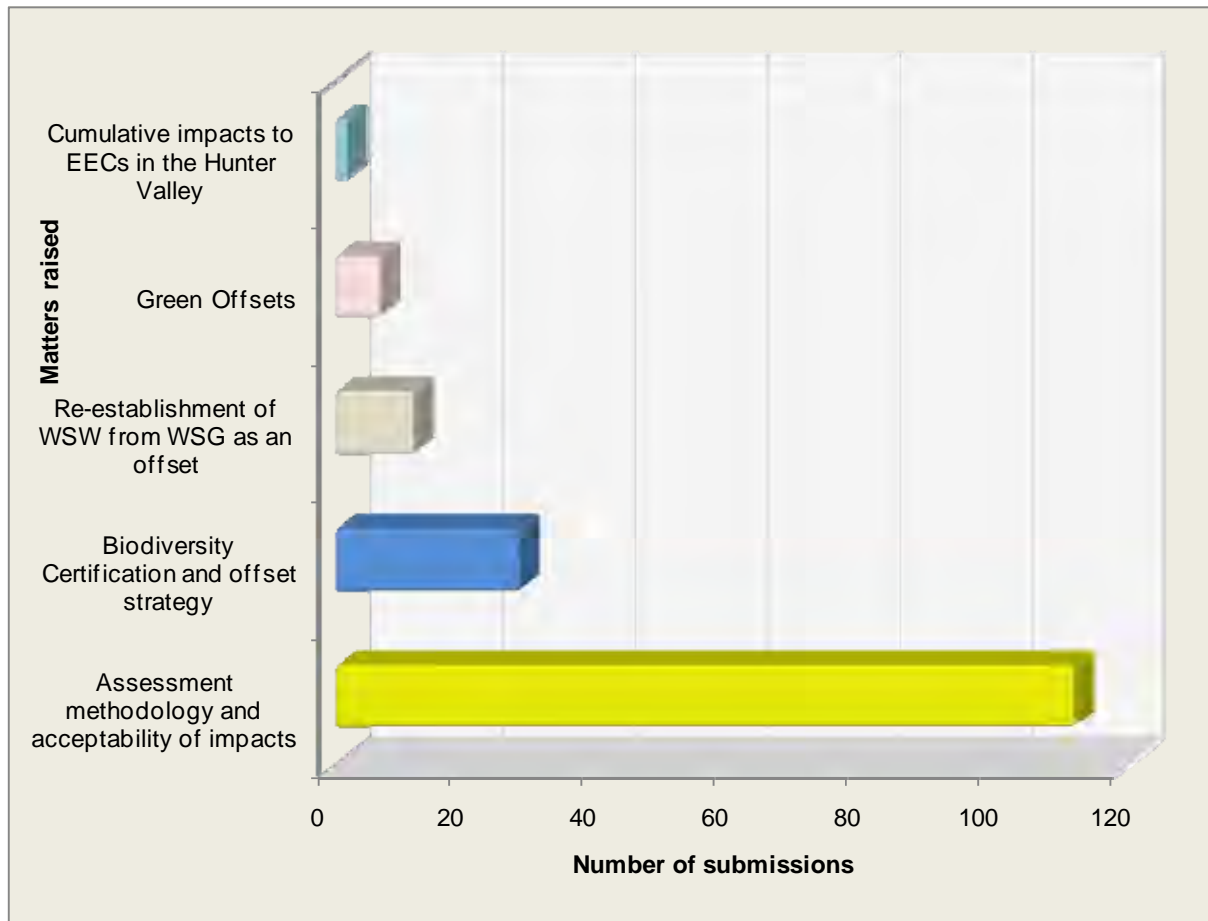


Figure 6.13 Ecology matters raised within submissions of objection

6.8.2 Assessment methodology and acceptability of impacts

Of the submissions of objection related to ecology 97 per cent (representing 38 per cent of the total submissions of objection) stated the assessment and offset methodology and impacts, particularly for WSW, was not acceptable given it had been previously been rejected by the L&E Court. The majority of these submissions (86 per cent) regarded the impacts on WSW as unacceptable.

The ecology study was completed in accordance with the draft *NSW Biodiversity Offsets Policy for Major Projects* (now final) and the *Upper Hunter Strategic Assessment Interim Policy* and considered the relevant aspects of the L&E Court judgment.

Since the L&E Court judgment a number of important changes to legislation and government policy have been made. The proposal has considered and is consistent with the changed legislative framework.

The Secretary's requirements for the EIS required:

- an assessment of the likely biodiversity impacts of the new development, having regard to the principles and strategies in the draft *NSW Biodiversity Offsets Policy for Major Projects* (now final) and the *Upper Hunter Strategic Assessment Interim Policy*, using the Biodiversity Certification Assessment Methodology as amended by the UHSA for credit calculation, and the Biobanking Assessment Methodology as amended by the UHSA for calculating the credits of any offsets;
- specific assessment of the likely impacts of the new development on the WSW EEC; and
- the provision of alternative offsets for the disturbance area approved under the 2003 development consent, using the Biodiversity Certification Assessment Methodology as amended by the UHSA for credit calculation, and the Biobanking Assessment Methodology as amended by the UHSA for calculating the credits of any offsets.

The proposed 2014 disturbance area for the proposal is encompassed within the BAA (Mount Thorley Warkworth, Upper Hunter Strategic Assessment Biodiversity Assessment Report, June 2014 submitted to OEH 30 June 2014) for the Warkworth Mine, which would be included as part of the UHSA. The UHSA is a joint initiative between the NSW and Commonwealth Governments to implement a coordinated assessment of the current biodiversity values and current and future impacts of coal mining in the Upper Hunter Valley coalfields.

The assessment of direct and indirect impacts on biodiversity includes measures to avoid and minimise potential impacts from the proposal. It includes a biodiversity offset strategy to compensate for the loss of threatened ecological communities (TECs), woodland habitat and threatened species.

The ecology study categorised the WSW and WSG separately from the non-WSW/WSG vegetation given the limited distribution of the WSW community. As a result and in response to the Secretary's requirements, the impacts of the proposal were separated into the following components for assessment:

- Component 1: WSW/WSG vegetation impacted by the proposal;
- Component 2: Non-WSW/WSG vegetation impacted by the proposal; and
- Component 3: Non-WSW/WSG vegetation impacted by the 2003 extension.

As referenced in Chapter 1 of this report, policy changes in ecological assessments for major projects have been made since the Warkworth Extension 2010 and the L&E Court judgment, with the key change being the introduction of quantification tools such as BBAM, BCAM and the FBA. These tools are designed to provide a quantitative assessment of the loss of biodiversity from a development and the gain in biodiversity from an offset, providing a reliable and repeatable method based on the best available science.

The *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) was released in March 2014 to guide the assessment and quantification of offset requirements for major projects.

As required by the Secretary's requirements, the biodiversity assessment and offsetting approach for the proposal follows the principles and guidelines outlined in the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) and the accompanying FBA.

The biodiversity assessment and offsetting approach of the policy and the FBA are described below and shown in Figure 6.14:

- Stage 1 Biodiversity Assessment Requirements: the ecology study includes information on native vegetation, threatened ecological communities, landscape features and threatened species and populations.
- Stage 2 Impact Assessment Requirements: the ecology study includes information on how impacts have been avoided and minimised. The study then determines the remaining direct and indirect impacts and calculates credit requirements for these. As the FBA calculator described in the policy is still under development, the recognised BCAM, as modified by the UHSA, has been used to calculate credit requirements.
- Stage 3 Biodiversity Offset Strategy: the ecology study considers offset delivery options for the proposal, including:
 - establishing offset sites; and/or
 - the purchase of credits from the market/retiring credits; and/or
 - undertaking mine site rehabilitation; and/or
 - undertaking supplementary measures.

In order to assess whether the BOS is suitable to offset the proposed impacts, it has been assessed against the principles within the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final).

These principles provide clear, efficient and certain guidance for stakeholders, improve outcomes for communities and the environment and importantly, provide a practical and achievable offset scheme for applicants. The policy principles also respond to relevant aspects of the L&E Court judgment. The loss of vegetation and fauna habitat will be compensated according to the principles and strategies provided in the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final), FBA, and UHSA. The offset strategy provides a combination of land-based offset sites, mine rehabilitation, supplementary measures and the retirement of biodiversity credits under the UHSA or purchasing credits on the open market to meet the calculated BCAM (as modified by the UHSA) requirements.

The current policy regime for ecological assessment is different to that which operated during the assessment and determination of the Warkworth Extension 2010. The policy at that time was subjective, allowing for the negotiations of offset ratios, whereas the current policy requires the use of transparent methodologies.

Section 7.5 of the ecology study (EIS Appendix H) demonstrates the proposal's consistency with these principles. As substantiated above, the assessment and offset methodology adopted for the proposal is highly acceptable.

6.8.3 Biodiversity certification and offset strategy

Of the submissions of objection related to ecology, 24 per cent (representing nine per cent of the total submissions of objection) stated that the offset strategy does not sufficiently or adequately offset the impacts of the proposal and that there is no guarantee that offset areas will be preserved in perpetuity. The submissions also queried the use of the BCAM tool to quantify ecology into 'credits'.

Contrary to the above matters, the BOS provides a significant ecological benefit in the long-term. The BOS has been certified by OEH in accordance with clause 14(3) of the Mining SEPP as adequate for the impacts of the proposal.

A quantitative assessment of the loss of vegetation communities and value of fauna habitats provided by vegetation communities, particularly for threatened fauna species, as required under the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) has been adopted for the ecology study through the use of the BCAM.

BCAM is the methodology used to assess impacts under the UHSA (ie for the Warkworth BAA). Further detail on BCAM can be found in Section 2.3.5 of the ecology study. The *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) provides a clear and transparent framework for proponents to avoid and minimise impacts, assess the remaining impacts and then develop an offset strategy to sufficiently compensate the impacts.

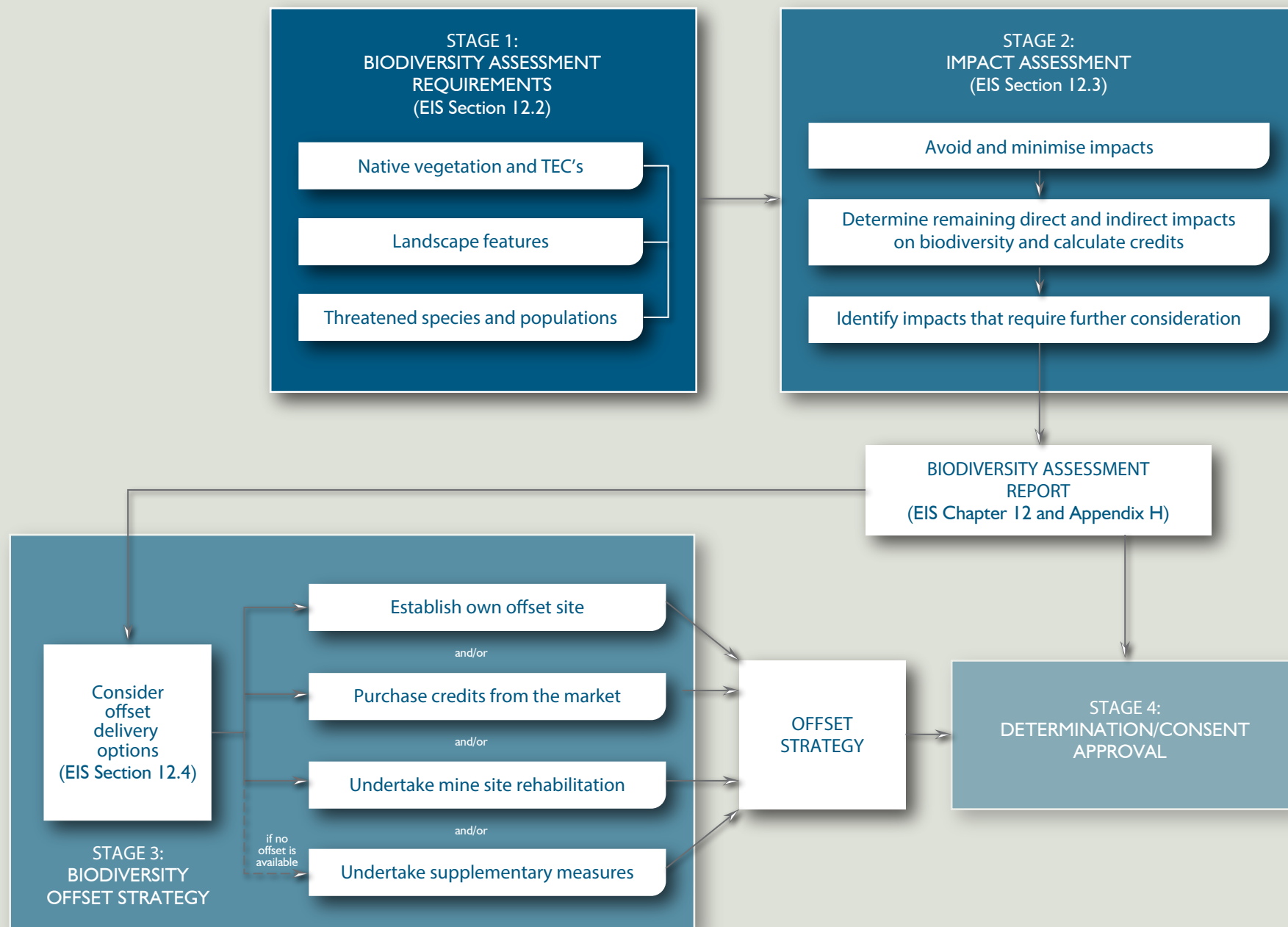
As described in Section 6.3 of this report, impacts have been avoided (par. 69 of L&E Court judgment – Preconditions and relevant matters to be considered), where possible, through modification of the design and relocation of mine associated infrastructure. Chapter 23 of the EIS provides further discussion on alternative designs considered and discounted to avoid significant impacts. This process is also consistent with the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) and FBA for ecological assessments (par. 146 of L&E Court judgment – Conclusion on impacts on biological diversity).

WML, through its biodiversity commitments, aim to have a net positive effect on biodiversity. The impacts of the proposal will be mitigated through the update and revision of the biodiversity offset management plans, strategies and procedures to be implemented at Warkworth Mine should the proposal be approved.

Consistent with the L&E Court judgment (par. 147 – Strategies to manage the project’s impact on biodiversity) and the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final), the residual biodiversity impacts and loss of vegetation and fauna habitat will be compensated through the provision of biodiversity offset areas. The offset requirements have been calculated in accordance with current government policy and the Secretary’s requirements outlined in Section 2.4.3 of this report using quantitative assessments (BCAM as modified by the UHSA). As discussed in the previous section, the BOS will retire these BCAM credits through a combination of land-based offset areas, mine rehabilitation, supplementary measures, retirement of biodiversity credits under the UHSA or purchasing of credits on the open market to meet these requirements.

The long-term security of offset areas was a matter of concern in submissions received, citing the previous Green Offsets associated with the 2003 extension. It is important to note that the proposal’s BOS has been prepared in accordance with a clear and contemporary offsetting policy which has been developed in consideration of improvements that could be made to early attempts of offsetting arrangements such as those associated with the 2003 extension.

The BOS will form part of the UHSA, which is a strategic partnership led by the NSW and Commonwealth governments to inform the Upper Hunter Biodiversity Plan pursuant to section 146 of the EPBC Act. Part of the offsetting framework includes the Upper Hunter Offset Fund that will be used to secure offset lands and fund ongoing management in perpetuity.



Source: OEH (2014), Draft Framework for Biodiversity Assessment, NSW Biodiversity Offsets Policy for Major Projects

Biodiversity impact assessment and offset strategy approach

Warkworth Continuation 2014
Response to Submissions

Figure 6.14

Biodiversity credits are used by the UHSA to quantify development impacts and improvements from offsetting for biodiversity. Ecosystem credits were calculated using BCAM as amended by the UHSA to quantify impacts on vegetation and fauna habitat. Species credits were also generated for those threatened species that cannot be reliably predicted to use an area of land based on habitat values. These baseline calculations were subject to OEH review.

Component 1 (WSW/WSG vegetation) and Component 2 (Non-WSW/WSG vegetation) of the proposal are part of the Warkworth BAA which will be certified by OEH under the rules of the UHSA. The offset strategy for these components includes some supplementary measures which have been discussed and agreed to by OEH (see Section 4.2.1 of this report). These measures are part of the offset package which has been certified by under clause 14(3) of the Mining SEPP as being adequate.

Component 3 has not been included within the BCAM assessments, as the proposal would impact portions of HMAs and NDAs established for the 2003 extension. As such, the proposal includes the provision of alternative offset areas to compensate for the 2003 extension that meet the BCAM credit requirement for the 2003 impacts to non-WSW/WSG vegetation.

The following sections provide information in response to submissions regarding the status or approach to offsetting the impacts of the proposal, including the use of the BCAM/BBAM tool (as modified for the UHSA).

i **Component 1: WSW /WSG vegetation impacted by the proposal**

The proposed offset for Component 1 includes land-based offset areas, and additional supplementary/conservation measures. The land-based offset areas comprise:

- immediate conservation of WSW within SBA and NBA; and
- re-establishment of WSG to WSW within these offset areas.

The additional supplementary / conservation measures comprise:

- Integrated Management Plan;
- contribution to Saving Our Species – Regent Honeyeater;
- implementation bond;
- conservation of WSG established under 2003 development consent;
- development of completion criteria for WSW; and
- commitment to secure and manage land-based offsets of equal or greater biodiversity value to the 72ha of WSW impacted by the proposal with a spend of up to \$3million within 12 months of development consent.

The BCAM/BBAM assessment methodology is discussed in Section 2.4.1. The offsetting approach for Component 1 is summarised in Table 6.6 and illustrated below in Figure 6.15. Note that additional supplementary/conservation measures are also proposed to offset the impact on WSW.



Figure 6.15 Component 1 BCAM/BBAM offsetting approach

Table 6.6 Component 1 credit summary¹

| | Impact credits (BCAM) | Offset | | Remaining |
|--------------|--------------------------|----------------------------|----------------------------|--------------|
| | | Land-based – SBA (BBAM) | Land-based – NBA (BBAM) | UHSA (BBAM) |
| Ecosystem | 3,059 | 427 | 1,897 | 735 |
| Species | 2,798 | 397 | 117 | 2,284 |
| Total | 5,857 | 824 | 2,014 | 3,019 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEH.

a. Land-based offset areas

As stated above land-based offset areas would be established in two areas, the SBA and NBA. These land-based offset areas will be secured using BioBanking agreements following project approval.

A total of 75.5ha of WSW (approximately 19.5ha of existing WSW in the NBA and 56ha of WSW in the SBA) is available to offset the proposal's impacts. Additionally, approximately 160ha of WSG is available for re-establishment of WSW on Aeolian sand.

Furthermore, the proposed WSW re-establishment programme in the SBA and NBA builds on comprehensive scientific understanding of the vegetation community compiled with the assistance of the UNE and other regeneration practitioners.

These measures would form the largest known area of WSW under long-term conservation and result in a net increase of 87ha (or 19 per cent) to the current 465ha extant in the region. Assessments indicate that this is likely to provide a long-term viable community of WSW.

b. Retirement of credits under the UHSA

It should be noted that the EIS only provided an indicative amount of BBAM credits to offset WSW. The remaining offsetting credits equivalent will be retired via the rules of UHSA. The rules allow either providing further land-based offset areas or contribution to the UHSA Fund or supplementary measures.

The now rescinded approval for the Warkworth Extension 2010 granted by the PAC prior to being refused by the L&E Court, required \$500,000 to be spent on research for WSW. This research was targeted towards provenance testing using genetics. It is proposed that this contribution to research be assigned to retire the remaining 735 ecosystem credits as a supplementary/ conservation measure.

Using the BCAM calculators, outlined in Section 2.4.5 of this report, the \$500,000 already spent on research for WSW as part of the Warkworth Extension 2010 is equivalent to more than twice the residual 735 WSW credits to be retired. The 735 credits is equivalent to approximately \$240,000. That is $735 \text{ credits} \div 9.3 \text{ credits per ha} \times \$3,000 \text{ per ha}$.

Provenances testing included; climatic variables, germinate, stress in glasshouse experiments, survivors in the field, and also germination in the field with concurrent genetic trials. The results showed genetic differentiation among provenances was weak but heterozygosity was positively associated with plant health in the plants that survived the stress experiments. The stress testing results also informed target species, and how specific species will act during drought and flooding. The research also indicated that seed can be sourced from outside the Hunter Valley, if required.

Species credits are not specific to WSW, and can be found in other ecosystems. These remaining 2,284 credits will be retired using the rules UHSA. Should approval be granted, WML will lodge a BioBanking agreement with OEHS for approval which will include the certified BBAM credit calculation of any WML sourced land-based offset.

c. Additional supplementary / conservation measures

As stated above in Section 2.4.5iv WML acknowledges that due to the limited extent of WSW, consideration of additional supplementary/conservation measures is required.

In calculating the quantum of the additional supplementary/conservation measure WML has implemented a transparent and conservative approach.

The additional supplementary/conservation measures proposed by WML to offset the impacts of the proposal on the WSW include:

- Integrated Management Plan;
- contribution to Saving Our Species – Regent Honeyeater;
- implementation bond;
- conservation of WSG established under 2003 development consent;
- the development of completion criteria for WSW; and
- commitment to secure and manage land-based offsets of equal or greater biodiversity value to the 72ha of WSW impacted by the proposal with a spend of up to \$3million within 12 months of development consent.

Each of these is outlined in Section 2.4.5iv.

The BOS to offset the impacts of Component 1 was objectively assessed in accordance with the requirements outlined in the Secretary’s requirements and is considered adequate.

As described previously, the Chief Executive of the OEH has extensively considered and assessed the BOS and provided certification that the offset areas are adequate for the biodiversity impacts of the proposal. In accordance with clause 14(3) of the Mining SEPP the consent authority is to consider this certification. The BOS certification from OEH is provided in Appendix L.

The Component 1 offsets are further detailed in Section 2.4.5 of this report and Section 12.4 of the EIS.

ii **Component 2: Non-WSW/WSG vegetation impacted by the proposal**

The proposed offset for Component 2 includes:

- mine rehabilitation; and
- retirement of credits under UHSA.

The BCAM / BBAM assessment methodology is discussed in Section 2.4.1 of this report. The offsetting approach for Component 2 are summarised in Table 6.7 and illustrated below in Figure 6.16.



Figure 6.16 Component 2 offsetting approach

Table 6.7 Component 2 credit summary¹

| | Impact | Offset | Remaining |
|--------------|----------------|----------------------------|---------------|
| | Credits (BCAM) | Mine rehabilitation (BBAM) | UHSA (BBAM) |
| Ecosystem | 16,649 | 6,650 | 9,999 |
| Species | 22,132 | N/A | 22,132 |
| Total | 38,781 | 6,650 | 32,131 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEH.

a. **Mine rehabilitation**

The proposed BOS includes the rehabilitation of mined land for a proportion of Component 2. Under the UHSA up to 25 per cent of the credit requirements for the proposal can be met through the provision of mine rehabilitation.

The EIS provided an indicative amount of BBAM credits for rehabilitation which includes a conservative discount of 50 per cent of the land value scores. We note that due to the UHSA still being in draft phase, the quantum of the rehabilitation discount is yet to be finalised.

The rehabilitation proposed for Component 2 is approximately 1,227.5ha.

Should approval be granted, WML will lodge a BioBanking agreement with OEHL for approval which will include the certified BBAM credit calculation for proposed rehabilitation.

b. Retirement of credits under UHSA

The remaining offsetting credits equivalent will be retired via the rules of UHSA. The rules allow either providing further land-based offset areas or contribution to the UHSA Fund.

Should approval be granted, WML will lodge a BioBanking agreement with OEHL for approval which will include the certified BBAM credit calculation of any sourced land-based offset.

To offset the impacts of Component 2 the BOS was objectively assessed in accordance with the requirements outlined in the Secretary’s requirements and are considered adequate. As described previously, the OEHL has extensively considered and assessed the BOS and provided certification in accordance with clause 14(3) of the Mining SEPP which requires the consent authority to consider any certification by the Chief Executive of the OEHL that measures to mitigate or offset the biodiversity impact of the proposal (ie the BOS) will be adequate. The BOS certification from OEHL is provided in Appendix L.

The Component 2 offsets are further detailed in Section 2.4.5 of this report and Section 12.4 of the EIS.

iii Component 3: Non-WSW/WSG vegetation impacted by the 2003 extension.

The proposed offset for Component 3 includes:

- land-based offset areas;
- mine rehabilitation; and
- purchase of credits in open market.

The BCAM/BBAM assessment methodology is discussed in Section 2.4.1. The offsetting approach for Component 3 is summarised in Table 6.8 and illustrated below in Figure 6.17.

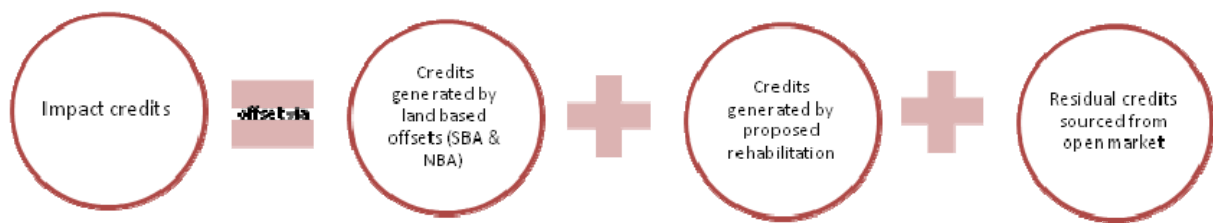


Figure 6.17 Component 3 offsetting approach

Table 6.8 **Component 3 credit summary¹**

| | Impact | Offsets | | | Remaining |
|--------------|----------------|-------------------------|-------------------------|----------------------------|-------------------------|
| | Credits (BCAM) | Land-based – SBA (BBAM) | Land-based – NBA (BBAM) | Mine rehabilitation (BBAM) | Residual credits (BBAM) |
| Ecosystem | 11,992 | 6,515 | 1,452 | 4,654 | -629 |
| Species | 12,360 | 3,952 | 623 | N/A | 7,785 |
| Total | 24,352 | 10,467 | 2,075 | 4,654 | 7,156 |

Notes: 1. Number of credits have been updated from the EIS following feedback from OEHL.

a. Land-based offset areas

Some of the BBAM credits calculated for Component 3 would be retired using land-based offset areas in the SBA and NBA (see Figures 2.15 and 2.16). These land-based offset areas will be secured using BioBanking agreements following development consent.

b. Mine rehabilitation

The proposed BOS includes the rehabilitation of mined land for a proportion of Component 3. As stated previously, under the UHSA up to 25 per cent of the credit requirements for the proposal can be met through the provision of mine rehabilitation.

The EIS provided an indicative amount of BBAM credits for rehabilitation which includes a conservative discount of 50 per cent of the land value scores, due to the UHSA still being in draft phase, the quantum of the rehabilitation discount is yet to be finalised.

The rehabilitation proposed for Component 3 is approximately 872.5ha.

Should approval be granted, WML will lodge a BioBanking agreement with OEHL for approval which will include the certified BBAM credit calculation for the rehabilitation area.

c. Residual credits sourced from open market

The EIS provided an indicative amount of BBAM credits; however, should approval be granted, WML will lodge a BioBanking agreement with OEHL for approval which will include the certified BBAM credit calculation.

The residual credits will be retired by purchasing further land-based offset areas that contain equivalent BBAM credits, and securing with BioBanking agreements, or purchasing BioBanking agreements with equivalent BBAM credits from the BioBanking market.

The BOS to offset the impacts of Component 3 was objectively assessed in accordance with the requirements outlined in the Secretary's requirements and is considered adequate. As described previously, the OEHL has extensively considered and assessed the BOS and provided certification in accordance with clause 14(3) of the Mining SEPP which requires the consent authority to consider any certification by the Chief Executive of the OEHL that measures to mitigate or offset the biodiversity impact of the proposal (ie the BOS) will be adequate. The BOS certification from OEHL is provided in Appendix L.

The Component 3 offsets are further detailed in Section 2.4.5 of this report and Section 12.4 of the EIS.

These offset requirements would be met through:

- land-based offset areas: non-WSW/WSG vegetation in the SBA and NBA would be protected generating 6,921 ecosystem credits and 4,436 species credits (Southern Myotis breeding habitat, Large-eared Pied Bat breeding habitat and habitat for the Regent Honeyeater); and
- mine rehabilitation: 4,654 of the credits requirements for Component 3 equates to 872.5ha of mine rehabilitation.

The offset areas adequately compensate for Component 3 by meeting the ecosystem credit requirements. The offset areas will also include the purchase of credits on the open market for any residual species credit requirements.

6.8.4 Re-establishment of WSW from WSG as an offset

Of the submissions of objection related to ecology, 10 per cent (representing four per cent of the total submissions of objection) stated that the provision of supplementary offset areas, including the re-establishment of WSW from WSG, would not adequately compensate for the significant impacts on this EEC.

The concern in relation to the ability to re-establish WSW on WSG is noted. WML is highly confident on that re-establishment will be successful.

Although there is anecdotal evidence that the community has self-re-established without intervention, the proposal includes science-based research and applied technique to ensure the community will be re-established. This is reflected in the comprehensive programme developed to re-establish the WSW community. One of the long-term benefits of the proposal is that the re-establishment will lead to a net increase of 87ha in the current 465ha extant area of WSW.

As outlined above in Section 2.4.4, the impact assessment and proposed BOS have been written to comply with contemporary NSW policies. The Biodiversity Assessment has been undertaken in the ecology study (EIS Appendix H) and supports the recommendation that there is a low risk of WSW not being viable in the short-term, and the viability of the community should be increased in the long-term. This is due to:

- clearing of WSW being progressive;
- 75.5ha of existing WSW of varying quality (from low to high), being protected and managed to transition to a higher quality WSW in the short-term;
- approximately 160ha of WSG proposed to be re-established to WSW from former grazing lands;
- the long-term conservation goal of the offset strategy for WSW providing a greater extant of WSW, this represents approximately 87ha more than the current extant in the long-term;
- improvements in protection mechanisms, ie BioBanking agreements on the WSW within the proposed SBA and NBA;
- under the 2003 development consent, areas of WSG in the SBA and NBA were identified for re-establishment but not protected as part of the offset, these will be protected using BioBanking agreements; and

- increase in patch size in the SBA and the development of a separate patch of WSW in the NBA. This reduces catastrophic risk of fire and disease to the WSW.

If the proposal is not approved and the BOS secured then:

- only approximately 75ha of existing WSW required to be protected by the 2003 development consent (DA-300-9-2002) will remain protected and managed;
- the WSW required to be re-established under the 2003 development consent will remain unprotected;
- the remaining WSW will not be permanently protected (ie 75.5ha in SBA and NBA as proposed);
- the opportunity for long-term extant to be increased by approximately 19 per cent (or net increase of approximately 87ha) to the current 465ha WSW extant through implementation of a re-establishment programme will not be realised;
- key threatening processes (for example, weeds, fire and catastrophic failure) to WSW would not be managed through a regime of ongoing regular and systematic site management practices;
- no ongoing funding to manage and protect the WSW; and
- less education and knowledge transfer among restoration ecologists and practitioners through the development and implementation of conservation management and re-establishment practices.

The BOS to offset the impacts of Component 1 was objectively assessed in accordance with the requirements outlined in the Secretary's requirements and is considered adequate.

Re-establishment of WSW can be achieved, as WML is committed to the successful re-establishment of WSW in the areas mapped as WSG in the SBA and NBA. The areas of WSG to be re-established would once have contained WSW and occur on the same geology. Re-establishment would provide a large, fully functioning example of the EEC through the enhancement of areas that are currently in reasonable ecological condition, and by re-establishing the community in areas where it is currently degraded.

A review of the WSW in Figure 5.2 of the ecology study (EIS Appendix H) and the historical aerials shown in Figure 4.3 (EIS Appendix H) indicates that WSW was heavily cleared in the early 1960s. This comparison is shown in Figure 2.12 of this report. By 1979, the vegetation had undergone significant regeneration and is now considered a good quality example of this community. Modern restoration techniques when applied to similar areas will enhance the natural regeneration of the WSW providing a high likelihood of successfully re-establishing WSG to WSW.

Further, the proposed WSW re-establishment programme in the SBA and NBA builds on comprehensive scientific understanding of the vegetation community compiled with the assistance of the UNE and other regeneration practitioners.

The WSW Restoration (provided in Appendix A of this report) summarises the previous work undertaken by UNE, Dr Anne Marie Clements and Associates, and Cumberland Ecology. This Restoration Manual provides a sound basis for guiding best management practices to restore WSW. The Manual also sets out a process for tracking the recovery of WSW sites toward a reference state as a result of appropriate applied land management restoration interventions.

The draft LOMP has also been developed, the LOMP establishes conservation objectives, key performance criteria and indicators for the SAB and NBA, as well as outlining conservation management actions and monitoring programmes that have been formulated based on the existing ecological condition of the SBA and NBA to achieve the conservation objectives.

These measures would form the largest known area of WSW under long-term conservation and result in a net increase of 87ha (or 19 per cent) to the current 465ha extant in the region. Assessments indicate that this is likely to provide a long-term viable community of WSW.

Compensation for impacts to WSW is included in Component 1 of the BOS. As discussed in Section 6.8.3i above, WSW has a limited geographic distribution in the region. As such, a range of compensatory measures have been included in the BOS for the EEC. These will be coordinated and approved by OEH as part of the UHSA.

Approximately 68 per cent of the land-based offset areas for WSW will be met through the commitment to re-establish the EEC in the SBA and NBA in areas currently containing WSG. The WSG refers to grassland with a native species component occurring on Aeolian Warkworth sands derived from the clearing of the original WSW canopy and mid-storey from previous land use. The areas of WSG to be re-established would once have contained WSW, occur on the same geology, and in some cases contain many of the same understorey species, but just lack the trees.

The methods for re-establishing WSW from WSG have been researched and tested since the 2003 development consent approval. Work undertaken by UNE has resulted in leading-practice advice on the enhancement, re-establishment and management of the WSW in the SBA and NBA.

As described above, the ability for WSW to naturally recover from previous disturbance has been shown through the analysis of historical aerial photography in the area (Bower 2004), which is shown in Figure 2.12. Therefore, with the existing scientific data, regeneration potential of the community and management commitments of WML, the re-establishment programme is likely to be highly successful. To ensure success, completion criteria would be developed for the re-establishment programme. Re-establishment would aim to provide a large, fully functioning example of the EEC.

To further compensate for impacts in WSW, the areas of WSG to be re-established in the SBA and NBA under the current development consent, but not protected as part of the offset, would now be protected and conserved as part of the BOS in the long-term. In addition, an Integrated Management Plan will be developed for WSW in consultation with OEH and neighbouring mines. It would establish an effective mechanism to provide improved conservation outcomes for WSW in the locality, through coordinated management activities, exchange of knowledge and consistency in monitoring programmes to increase the knowledge of management and re-establishment.

Any residual credit requirements, after these supplementary measures are considered under the UHSA, would be retired by contribution to the UHSA and/or the use of additional supplementary/conservation measures given the limited distribution of the community.

In summary, the offset package for WSW includes a combination of different methods, including the conservation and management of extant vegetation (short-term conservation gain) and the re-establishment of vegetation (long-term conservation gain).

The strategy of combining both extant vegetation and regeneration to increase the community's size and quality in the longer term is well recognised and consistent with the L&E Court judgment (par. 210). The Biobanking philosophy and the NSW Government's legislated practice for Biobanking offsetting uses transparent methodologies where both extant vegetation and re-establishment are used to generate offset credits at offset sites. The UHSA also uses similar methodologies for offsetting. As the UHSA requirements will be met for the proposal and additional supplementary/conservation measures are provided, it is considered that the BOS is adequate and in accordance with leading practice.

6.8.5 Green Offsets

Of the submissions of objection related to ecology, six per cent (representing two per cent of the total submissions of objection) raised concerns that the proposal included the mining of previously secured offset areas (ie Green Offsets) which formed part of the 2003 extension.

The Green Offsets package was one of the first projects in NSW to provide an offset package. The primary reason for mining through the existing offset areas, including parts of the NDAs is that the resources underlying these offset areas which were previously uneconomic to mine are now fundamental to the continuation of Warkworth Mine.

The Department of Planning and Infrastructure (now DP&E) and the PAC acknowledged in its assessment reports for Warkworth Extension 2010 that the design of the original offset was flawed, and should be replaced as soon as possible with a better offset that would not sterilise coal resources and could be safely protected in perpetuity.

This matter is addressed further in Section 4.2.1 of this report.

6.8.6 Cumulative impacts on EECs in the Hunter Valley

Of the submissions of objection related to ecology, two per cent (representing less than one per cent of the total submissions of objection) raised concerns that the proposal contributed to unacceptable cumulative impacts on EECs within the Hunter Valley.

An objective of the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) is to improve outcomes for the community and environment, specifically, promoting measures that achieve better environmental outcomes.

Current government policies provide a transparent assessment and long-term conservation gains for all vegetation types, as outlined above. The proposed vegetation loss is currently under assessment from OEH, via the UHSA. UHSA reviews the proposed cumulative impacts from mining in the Upper Hunter over the next 30 years, including providing suitable biodiversity outcomes by using offset areas. The UHSA will allow for the strategic purchase and consolidation of biodiversity offset areas.

6.9 Traffic and transport

6.9.1 Introduction

The assessment of potential traffic and transport impacts resulting from the proposal was summarised in Chapter 20 of the EIS, and presented in full in Appendix O.

A total of 34 submissions in objection referenced traffic and transport matters, representing 11 per cent of objectors.

Matters raised comprised concerns regarding the closure of Wallaby Scrub Road, stating it was a road predominantly used by locals including the NSW Rural Fire Service and that the closure of Wallaby Scrub Road would lead to congestion and safety issues with the Putty Road/Golden Highway intersection. The number of times the traffic and transport related matters were raised in submissions of objection is shown in Figure 6.18. It is noted that a number of submissions referenced more than one traffic and transport matter and, therefore, the number of matters raised as shown in Figure 6.18 totals more than 34.

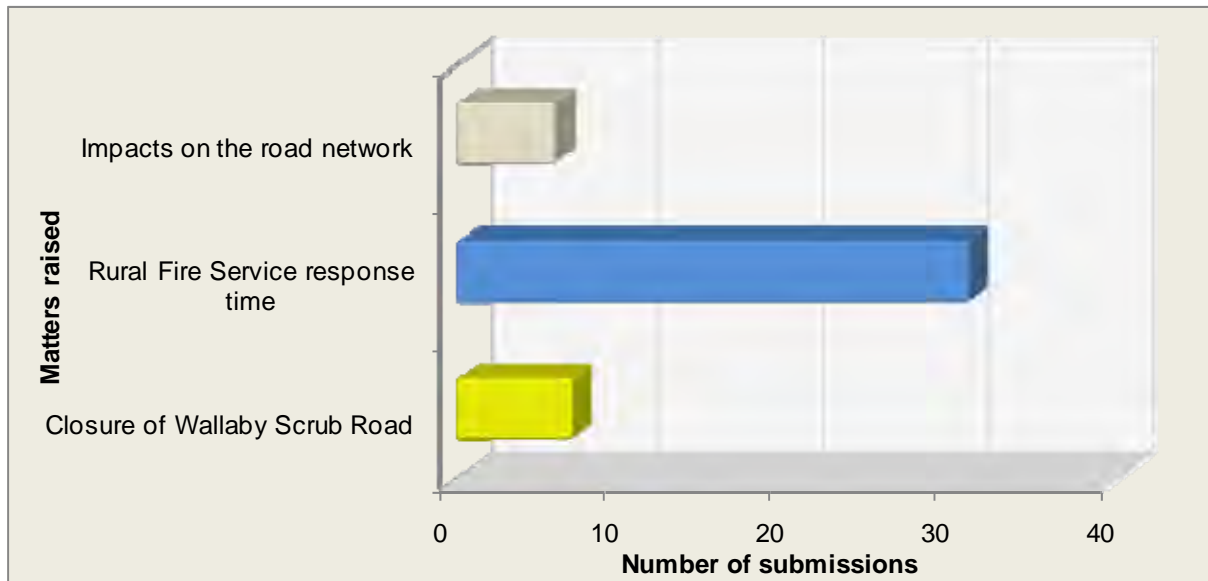


Figure 6.18 Traffic and transport matters raised within submissions of objection

6.9.2 Closure of Wallaby Scrub Road

Of the submissions of objection related to traffic and transport matters, 21 per cent (representing two per cent of the total submissions of objection) were concerned with the closure of Wallaby Scrub Road.

Community concerns regarding the closure of the road are noted. However, in order for the mine to be economically viable in the long-term, it must extend beyond the road.

Significant coal resources, which are the subject of the proposal, lie west of the currently approved operations, west of Wallaby Scrub Road. The only reasonable and logical method of extraction of these resources is a westward continuation of the existing mining pits at Warkworth Mine mining through Wallaby Scrub Road. As described in Section 2.1.2 of this report, the proposal contemplates its permanent closure and does not seek to relocate the road.

As discussed in Section 20.3.2iii of the EIS, the proposed closure of Wallaby Scrub Road would divert its existing traffic to use alternative routes via either the Golden Highway and Putty Road or the Golden Highway and Broke Road. The alternative traffic routes for the detoured traffic via the Golden Highway will provide generally safer travelling conditions due to higher design standard of the route with increased traffic lane widths and sealed shoulders, in comparison to the lower design standards of the existing route for Wallaby Scrub Road and Charlton Road traffic.

The closure is projected to affect approximately 863 daily vehicle movements from 2017. The affected traffic volume could potentially increase at approximately 2 per cent annually from 2017 onwards. However, the future effect of the Hunter Expressway route opening on this traffic flow has yet to be determined.

The major proportion of the Wallaby Scrub Road traffic (60-70 per cent approximately) is travelling to and from areas to the south via Charlton Road and will also potentially be able to access other travel routes such as the Golden Highway, from locations further to the south, now the Hunter Expressway route has opened.

The Putty Road and Charlton Road originating vehicle movements would be subject to increased travel distances of approximately 8.8km and 6.2km and additional travel times of 6 and 4 minutes per trip, respectively. For the residents of the village of Bulga, the impacts of these traffic detours are likely to be greater than for other regional traffic as they would be occurring in combination with other locality impacts from mining in the area.

6.9.3 Rural Fire Service response time

Of the submissions of objection related to traffic and transport matters, 91 per cent (representing 10 per cent of the total submissions of objection) were concerned with the increased response time for the Rural Fire Service due to the closure of Wallaby Scrub Road.

As discussed in Section 20.3.2iii(c) of the EIS, emergency vehicle access would be maintained by the construction of an emergency access road/fire trail between Putty Road and the Golden Highway, prior to the closure of Wallaby Scrub Road. The inclusion of an emergency vehicle access is an improved outcome of closure of Wallaby Scrub Road given that its closure is required to enable extraction of an economically significant resource.

The fire trail route would be slower and less direct than the existing Wallaby Scrub Road route which would increase emergency response times in the area.

The RFS supported this commitment in its submission on the proposal. The road would be constructed in accordance with the NSW RFS's access standards prescribed in *Planning for Bush Fire Protection* (RFS 2006) and the NSW Bushfire Coordinating Committee Policy No. 2/2007. In addition, a Road Closure Implementation Plan for Wallaby Scrub Road would be prepared in conjunction with relevant stakeholders including the RFS, which would include strategies to minimise the potential traffic and road safety impacts of the closure.

6.9.4 Impacts on the road network

Of the submissions of objection related to traffic and transport matters, 18 per cent (representing two per cent of the total submissions of objection) were concerned that the traffic detours resulting from the closure of Wallaby Scrub Road would result in additional traffic on the Putty Road/Golden Highway intersection for those travelling to and from Bulga.

The traffic and transport study assessed this intersection to be relatively safe in comparison to most other intersections in the area considered (see Section 2.2.1 of the traffic study) primarily due to its current configuration. The intersection's configuration comprises the grade separation and underpass design of the intersection and the recent road line-marking improvements which have improved separation of the traffic lanes for through and turning traffic on the eastern and western sides of the intersection.

The traffic and transport study describes the preparation of a Road Closure Implementation Plan for Wallaby Scrub Road as a key mitigation measure. The plan will include strategies to minimise the potential traffic and road safety impacts of the closure.

6.10 Historic heritage

The assessment of potential historic heritage impacts resulting from the proposal was summarised in Chapter 19 of the EIS, and presented in full in Appendix N.

A total of 14 submissions in objection referenced heritage matters, representing five per cent of objectors.

Matters raised comprised concerns regarding the identified impacts to historic heritage features of the local area, stating they had local significance (particularly the Great North Road/Convict Trail and RAAF Bulga) and should be avoided by the proposal. The number of submissions received on matters relating to historic heritage is shown in Figure 6.19. It is noted that a number of submissions referenced more than one historic heritage matter and, therefore, the number of matters raised as shown in Figure 6.19 totals more than 14.

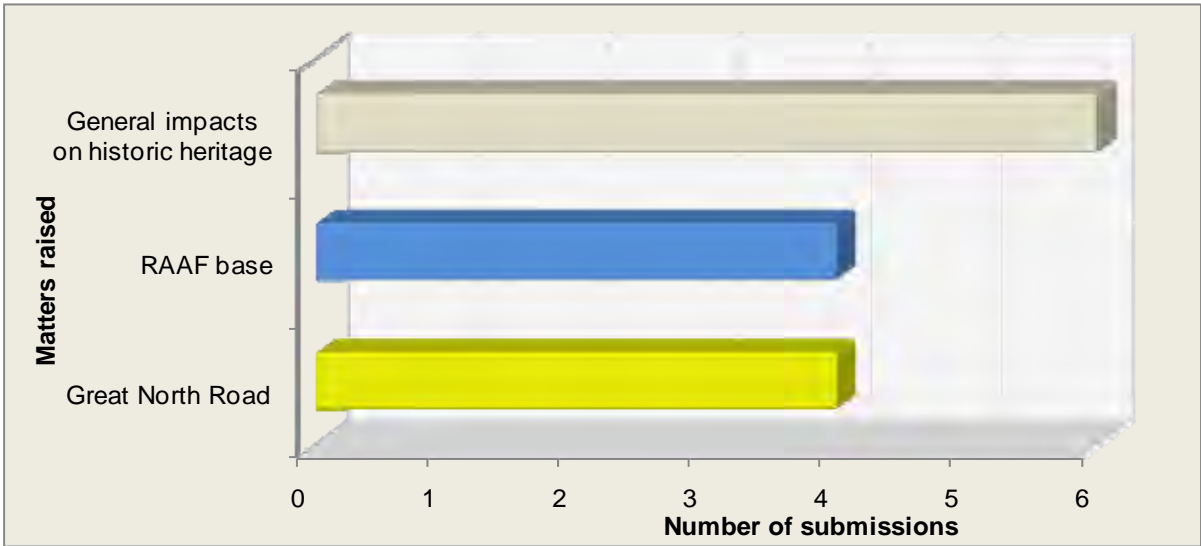


Figure 6.19 Historic heritage matters raised within submission of objection

6.10.1 General impacts on historic heritage

Of the submissions of objection related to historic heritage matters, 57 per cent (representing three per cent of the total submissions of objection) referenced the general impacts on historic heritage from the proposal.

An historic heritage study was undertaken in accordance with the Secretary’s requirements, paying particular attention to the likely impacts on the Great North Road and the former air strip (RAAF Bulga). The study identified 50 historic features within the surrounding area of the proposal including seven registered and 43 non-registered items or places.

The study found that while small portions of the former RAAF Base Bulga Complex and Great North Road Complex would be impacted by the proposal, heritage impacts are likely to be minor. Impacts on the P1 huts are likely to be moderate as these style huts are becoming rare. Other historic features within an in close proximity to the proposed 2014 disturbance area may experience indirect impacts associated with activities such as exploration and blasting. Impacts on these features are mostly negligible.

Where impacts on historic heritage sites or places are unavoidable, mitigation measures would be undertaken in accordance with their heritage value; for example, the mechanical excavation and recording of Well #2. Conservation management plans have been, or would be, prepared for the Great North Road Complex, former RAAF Base Bulga Complex, the Brick Farm House and Springwood homestead.

Coal & Allied also proposes to implement a Local Community Historic Heritage Conservation Initiative, the key element of which is to establish two historic heritage conservation funds – the Mount Thorley Warkworth Historic Heritage Conservation Fund and the Mount Thorley Warkworth Great North Road Conservation Fund.

6.10.2 Great North Road

Of the submissions of objection related to historic heritage matters, 29 per cent (representing one per cent of the total submissions of objection) referenced the Great North Road and the impact of the proposal on the road.

The proposal's impact on the Great North Road is correctly categorised as minor.

In the context of the entirety of the Great North Road alignment, the historic heritage study determined that the disturbance of a 5.4km section of its total length of alignment of approximately 240km is considered a minor impact. This assessment is based upon the results of:

- an archaeological survey conducted along an 8.8km section of the Great North Road alignment situated on Coal & Allied owned lands within the MTW mining leases;
- previous disturbance to the road, resulting from 20th century road upgrades and maintenance activities (particularly over the last 40 years); and
- general lack of integrity and intactness of this section of road as compared to other surviving sections of the road elsewhere along its total alignment, particularly those sections which are listed on the World- National- State- and local heritage registers/lists.

The survey undertaken for the preparation of the conservation management plan (CMP) identified that large parts of the road had been subject to major works over the last 40 years, to provide for a more level and consistent road gradient. Consequently, the integrity of the road was assessed as being low. Within the 5.4km section of the road that would be subject to development disturbance only a few small areas of archaeological potential were identified, being associated with remnants of potential pavement (three areas), drainage (one) and quarrying (one).

Furthermore, the only section of the roadway and alignment with viable and demonstrable integrity and intactness is outside of the development impact area and as stated in the assessment, it is proposed that this surviving section be incorporated within the adjoining WBACHCA to ensure that section's long-term protection and conservation.

The historic heritage study recognised the alignment of the Great North Road as being a contributory factor in its significance. In consultation with the community stakeholders of the Coal & Allied Community Heritage Advisory Group, including representatives of the Convict Trail Project, Coal & Allied has made the commitment to develop an interpretation programme for the alignment which will include the provision of landscape features marking the original road alignment within the final landform design as an element of the mine rehabilitation plan at the completion of mining activities. Coal & Allied has also committed to conduct archaeological test pitting along locations of Wallaby Scrub Road, prior to disturbance, where there is potential for subsurface remains associated with the early road system.

Based on the above, it is reasserted that the proposal's impacts on the Great North Road are minor.

6.10.3 RAAF Bulga

Of the submissions of objection related to historic heritage matters, 29 per cent (representing one per cent of the total submissions of objection) referenced the RAAF Bulga Base complex and the impact of the proposal on the complex.

The level of impact on RAAF Base Bulga has been assessed as minor, as the proposal is anticipated to affect only a very small portion (approximately 1.75 per cent) of the RAAF Base Bulga complex. The anticipated area of disturbance comprises approximately 4.8ha at the very eastern end of the east-west runway (see Figure 2.3). This is an area of cleared ground situated beyond the end of the constructed runway. The affected area is to be largely incorporated within a 200m wide infrastructure corridor extending eastwards from the western boundary of the proposed 2014 disturbance area. This infrastructure corridor will not be mined and will be used for provision of services such as an access road, water pipelines, power and drainage and, therefore, the anticipated impacts will be minor.

As to the current state of the RAAF Bulga Base complex, the remains of 1940s RAAF Bulga complex includes runways, hideouts, Mess building and other associated infrastructure. Overall the Mess building is in poor condition with trees physically impacting on the building fabric, and some minor settlement issues resulting in cracking and failing brickwork. The western section of the building is the most intact part and retains the original timber frame, corrugated asbestos cement roof sheeting and walls clad with corrugated iron sheeting.

A CMP has been prepared and Archival Recording conducted for the former RAAF Bulga complex. Recommendations within this plan would be implemented to ensure the heritage values of the complex are maintained and conserved. Additionally, prior to the disturbance of the eastern end of the east-west runway and archaeological test excavation programme will be conducted.

The history of the former RAAF Bulga complex in the Upper Hunter region is not widely published or known. Coal & Allied, in collaboration with local community groups, would implement an interpretation programme to ensure the historic heritage values of the study area are adequately captured.

Coal & Allied will conduct ongoing community engagement and consultation on historic heritage through the CHAG which is comprised of community representatives with particular knowledge and interests in historic heritage of the region, including representatives from historical groups, individuals and local government.

6.11 Groundwater

6.11.1 Introduction

The assessment of groundwater impacts resulting from the proposal was provided in Chapter 16 of the EIS. The groundwater study was presented in full in Appendix K.

A total of 82 submissions in objection referenced groundwater matters, representing 28 per cent of objectors.

Matters raised in submissions noted inadequate identification of water impacts, the impacts on Wollombi Brook and the Hunter River and nearby groundwater users, licensing requirements, final void and groundwater interactions with the surrounding environment. The number of submissions received on matters relating to groundwater is shown in Figure 6.20. It is noted that a number of submissions referenced more than one groundwater matter and, therefore, the number of matters raised as shown in Figure 6.20 totals more than 82.

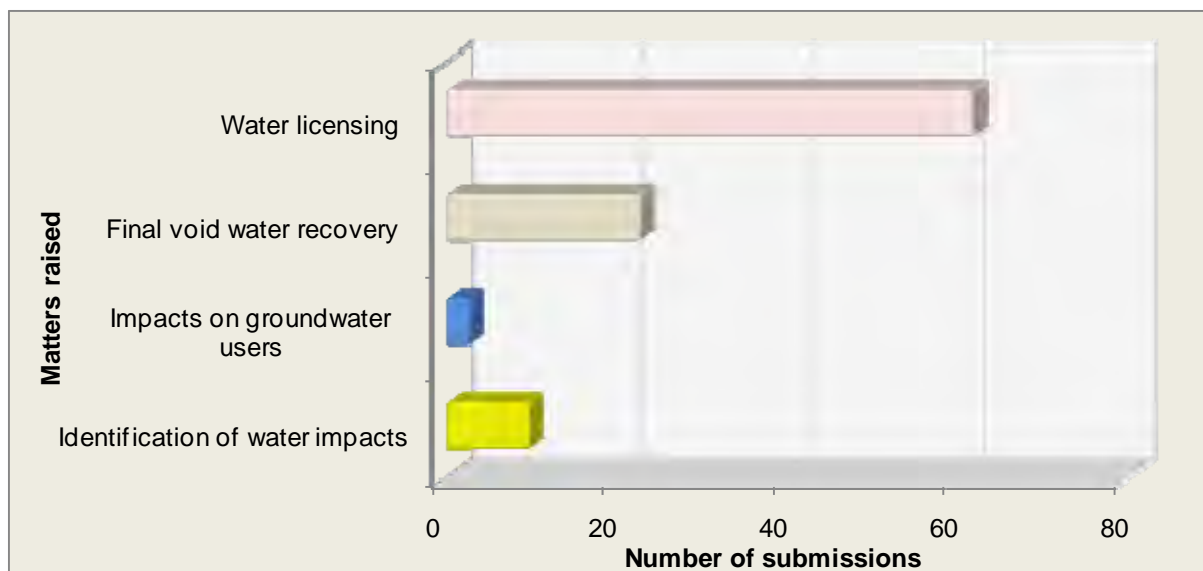


Figure 6.20 Groundwater matters raised within submissions of objection

6.11.2 Identification of groundwater impacts

Of the submissions of objection related to groundwater 12 per cent (representing three per cent of the total submissions of objection) contended that the groundwater study did not adequately identify water impacts resulting from the proposal.

The groundwater study does adequately address the water impacts resulting from the proposal. The groundwater study was prepared by industry leading groundwater consultants AGE, using a model which was rigorously calibrated with data from the extensive MTW monitoring network. The groundwater study was undertaken in accordance with the Aquifer Interference Policy (AIP) as required by the Secretary's requirements and independently peer-reviewed at important stages during the assessment by Kalf & Associates. The outcomes of the peer review are reflected in the results presented in the EIS. NOW did not raise any concerns with the groundwater study.

The groundwater model predicted a water take from the Permian and alluvial sources under the proposal less than the currently approved water take.

The AIP provides the framework for water licensing and assessment processes for aquifer interference activities within NSW under the EP&A Act. It explains the need to obtain water licences for these activities under the *Water Act 1912* (Water Act) and *Water Management Act 2000* (WM Act) and establishes whether 'minimal impact' occurs.

The AIP was designed to address the 'incidental' take of groundwater from significant developments (ie mines) which was not accounted for in the Water Act or the WM Act. The AIP ensures that all groundwaters are accounted for, in order for a water sharing plan to be implemented and function effectively. A water sharing plan is used to set out the rules for the sharing of water in a particular water source between water users and the environment and outline rules for the trading of water in a particular water source.

The criteria for highly productive and less productive groundwater sources, as well as high and minimal impact interference activities are defined by the AIP. In accordance with these definitions, the alluvial aquifers associated with Wollombi Brook and the Hunter River are both potentially highly productive aquifers, while low permeability units and saline groundwater within the Permian coal measures are classed as a less productive groundwater source.

The predicted total amount of water (peak) that would be taken from each connected groundwater or surface water source on an annual basis as a result of the proposal during operations and post-mining have been predicted based on the groundwater modelling. As explained in Section 16.2.8 of the EIS, the proposed operations at Warkworth Mine have the potential to interact with water sources that require licensing under these Acts, namely:

- the Permian groundwater is not yet covered by a water sharing plan and licensing is therefore still managed under the Water Act; and
- Wollombi Brook and its associated alluvium and the alluvium associated with the Hunter River, which is covered by the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009.

The Water Sharing Plan for the Hunter Regulated River Water Source 2003 is not relevant to the proposal as there would be no take from the Hunter River or other Hunter regulated water sources.

The compliance with the AIP was outlined in Section 9 of the groundwater study (EIS Appendix K) and includes:

- accounting for, or preventing the take of water;
- determining water predictions in accordance with the AIP; and
- other requirements to be reported in accordance with the AIP.

The risk to groundwater systems are considered to be negligible and manageable subject to the applicant holding appropriate licences to account for the predicted water take.

Warkworth Mine has a number of High and General Security water licences for the operation. As discussed further in Section 6.11.5 below, WML will ensure that the necessary licences are held with a sufficient share component and water allocation to account for all water taken from a groundwater or surface water source as a result of an aquifer interference activity, both for the life of the activity and after the activity has ceased.

An uncertainty analysis undertaken on the modelling results indicated that the predicted impacts on the alluvium and Permian groundwater units have a relatively high degree of certainty with limited error bands around the predictive results. The uncertainty analysis thus provides further validation to the assessment results. The uncertainty analysis is fully described in Appendix D of the groundwater study (EIS Appendix K).

6.11.3 Impacts on groundwater users

Of the submissions of objection related to groundwater matters, four per cent (representing one per cent of the total submissions of objection) referenced impacts on groundwater users.

Groundwater users within the predicted zone of depressurisation have been identified.

In 2010, ten privately-owned groundwater bores were identified west of the Site, north of Bulga village, as shown in Figure 16.3 of the EIS. Of the bores identified, seven were relatively shallow, at less than 25m in depth, indicating that these bores are likely to be constructed in the alluvial sediments. The remaining three groundwater bores had a depth greater than 60m and are expected to be constructed in the underlying bedrock. An updated search of the PINEENA groundwater database in 2013 identified no new bores within the predicted zone of depressurisation since 2010. The AIP stipulates that any bore where the maximum cumulative decline in groundwater levels is predicted to exceed 2m due to mining requires a make good agreement between the landholder and the applicant.

The modelling predicts water levels at all privately-owned water supply bores in the alluvium to reduce by less than 2m due to the proposal (see Figure 16.5 of the EIS). The predicted reduction in groundwater levels in these alluvial bores is relatively small compared with the available drawdown in each bore, and is considered unlikely to noticeably reduce the pumping yield from any bore.

Modelling has also predicted no drawdown greater than 2m in any privately-owned bores within Permian units. As a result, it is unlikely that there will be any impacts to private groundwater users as a result of the proposal.

With regard to the predicted impacts on water supply bores, the modelling indicates that there are no predicted impacts of over 2m on water supply bores in alluvium or Permian. However, predicted draw downs associated with the proposal of over 2m were recorded at three mine-owned bores intersecting the Permian groundwater units.

6.11.4 Final void water recovery

i Warkworth Mine

Of the submissions of objection related to groundwater matters, 28 per cent (representing eight per cent of the total submissions of objection) referenced final void water quality and volume.

The proposal would result in a final void at Warkworth Mine. It is noted that the single final void proposed for Warkworth Mine would be smaller than the two combined voids for Warkworth Mine and MTO that are approved under the current respective development consents and would eventuate should the proposal not be approved. The proposal seeks to backfill the MTO void with material extracted from Warkworth Mine (including overburden won from the current MTO lease). This would have the effect of reducing the groundwater influence of the MTO mining area which is closer to the alluvials than the void at Warkworth Mine.

The final void for the combined North and West Pit void would be approximately 445ha in area generally a shaped downward slope east to west with a depth of up to 250m to 300m. The void would develop to be a local 'sink' with groundwater, surface runoff and rainfall inflows slowly filling the void forming a water body. The level of the water body would be influenced by the balance of groundwater seepage, surface water runoff and infiltration from the rehabilitated landform with losses from evaporation.

As the water body begins to form in the void, the rate of groundwater inflow would slow and eventually a state of equilibrium would occur where inputs are balanced by outputs, the water level in the voids would stabilise and the groundwater levels in the aquifers would begin to recover. The rate of recovery would depend on rainfall, for example, several wet years would reduce the time for groundwater aquifers to recover.

Groundwater inflows to the pit would be a combination of leakage through spoil and seepage through the Permian coal measures. The greatest contribution to inflows would be from rainfall seepage through the spoils and leakage through the base of the tailings storage facilities. These inflows would not be groundwater, would not be required to be licensed and, therefore, limited discussion is provided groundwater study.

With regard to the groundwater inflows, the modelling indicates that the contribution of the Permian is initially 566ML/year (1,550m³/day) in 2015, peaking at 736ML/year (2,014m³/day) in 2023. In contrast to this, the simulated proportion of inflow from the Permian, which includes water lost through evaporation at the pit face and water that remains bound in coal, decreases after 2023 to 296ML/year (812m³/day) in 2035.

The long-term post closure average inflow from the Permian coal measures to the final voids is predicted to be 496ML/year (1,365m³/day) with a maximum of 551ML/year (1,507m³/day). The maximum inflow is predicted to be the worst case long-term inflow from the Permian and is less than the 736ML/year peaks during mining.

Due to the final void becoming a sink in the local groundwater environment, the salinity of water in the final void is not considered to be a risk to salinity increases in the surrounding aquifer systems.

During the proposal and into the post closure period, modelling predicts a recovery in flow from the Permian to the Wollombi Brook alluvium. This recovery in net flow can be attributed to cessation of mining at MTO and Bulga Coal Complex and increased recharge to spoil.

ii Interaction with Bulga Coal Complex

It is noted that a submission prepared by Bulga Coal Management referenced Bulga Coal Complex's proposed BOP and groundwater interactions associated with MTO. This matter is considered in the MTO RTS.

6.11.5 Water licensing

Of the submissions of objection related to water matters, 76 per cent (representing 21 per cent of the total submissions of objection) referenced the applicant's ability to licence water take predicted under the proposal.

The applicant will hold the necessary licences with sufficient share and water allocation to account for all water taken from a groundwater or surface water source as a result of an aquifer interference activity, both for the life of the proposal and after the proposal has ceased.

If required upon mine closure, any licences held for ongoing water take would be surrendered in perpetuity. As a result, there would be no net loss and no effect on water security.

Water sources relevant under the proposal are described in Section 6.11.2 of this report. Table 16.2 in the EIS summarises the predicted water take from these water sources due to the proposal, and water licenses held by the applicant for these sources and the WSPHRRWS.

Within the Wollombi Brook alluvium, licenses are required to account for up to 124ML/year during mining and less than 124ML/year post-mining while the take from the Hunter River alluvium requires licenses to account for up to 68ML/year, and less than 68ML/year post-mining.

A reduction in baseflow into the Wollombi Brook is predicted to reach up to 100ML/year at the end of mining. However, this is already accounted for by the take from the Wollombi Brook alluvium, and therefore no additional licensing is required for the Wollombi Brook.

There are no predicted impacts on base flow for the Hunter River.

The predictions of the impact on water resources are less in the current proposal than that in the approved 2003 Extension of Warkworth Coal Mine EIS.

6.12 Surface water

6.12.1 Introduction

The assessment of surface water impacts resulting from the proposal was provided in Chapter 17 of the EIS. The surface water study was presented in full in Appendix L.

A total of 81 submissions in objection referenced rehabilitation matters, representing 27 per cent of objectors.

Matters raised included increases in water catchment and operation of the Hunter River Salinity Trading Scheme. The number of times the surface water related matters were raised in objection is shown in Figure 6.21. It is noted that a number of submissions referenced more than one surface water matter and, therefore, the number of matters raised as shown in Figure 6.21 totals more than 81.

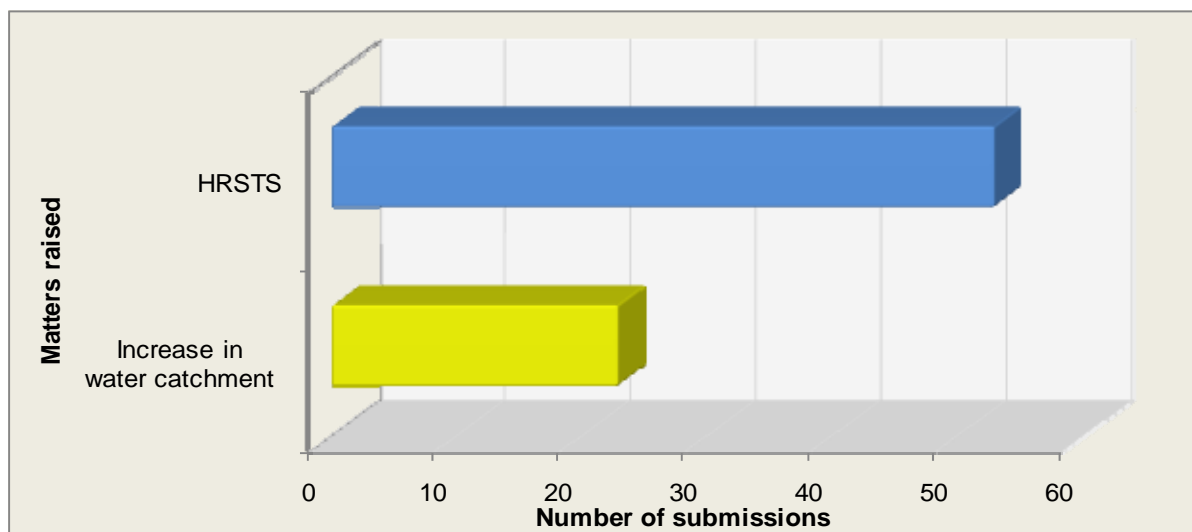


Figure 6.21 Surface water matters raised within submissions of objection

6.12.2 Increase in water catchment of Warkworth Mine

Of the submissions of objection related to surface water matters, 32 per cent (representing nine per cent of the total submissions of objection) referenced the increase in water catchment under the proposal.

As stated in Section 4.3 of the surface water study (EIS Appendix L), during active mining operations, the MTW WMS would capture runoff from areas that would have previously flowed to Wollombi Brook or the Hunter River. The influence of the loss of these areas on the catchment of these water features was assessed in the surface water study as less than one per cent.

The maximum total catchment area captured within the MTW WMS during the proposal is 10.5km² or 0.56 per cent of the Wollombi Brook catchment to the confluence of the Hunter River. Following completion of progressive rehabilitation, the Hunter River catchment area (excluding the Wollombi Brook catchment) influenced by the combined proposal and Mount Thorley Operations 2014 would be restored to 99.96 per cent of its pre-mining area. The final landform would capture 8.6km² or 0.44 per cent of the Wollombi Brook catchment to the confluence of the Hunter River.

6.12.3 HRSTS

Of the submissions of objection related to surface water matters, 65 per cent (representing 18 per cent of the total submissions of objection) contended that offsite discharges would adversely impact flow volume of the Hunter River, stream condition and water quality.

The Warkworth Mine currently has approval to discharge under the rules of the HRSTS. The proposal's modelling rules for HRSTS discharges were based on Hunter River stream flow and salinity, and discharge dam volumes and salinity.

The results of the water balance modelling indicate that, under the current model assumptions and configuration, no uncontrolled release of saline water would occur over the life of the proposal. Excess saline water would continue to be released in accordance with the existing rules of the HRSTS. There would be no downstream impacts on surface water quality as salinity would be in accordance with the acceptable limits under the HRSTS. Discharges to Doctors Creek under the rules of the HRSTS are currently approved to be undertaken by the Site and would continue under the proposal. Potential impacts on surface water quality in the receiving waters would be managed through compliance with HRSTS discharge limits and implementation of the management measures described in Section 17.5.1 of the EIS.

Controlled releases of saline water under the HRSTS may have the following impacts:

- impacts on the total flow volume in the Hunter River;
- impacts on stream condition, including bank erosion; and
- water quality impacts.

These potential impacts are discussed further below.

i Hunter River flow volumes

As reported in Section 17.4.5 of the EIS, median annual reduction in flows to the Hunter River varies between 16 and 75ML/year during the life of the proposal. Post-mining the median annual reduction is 104ML/year (approximately 0.02 per cent of the median annual Hunter River discharge to Singleton) due to a reduction in catchment areas and cessation of discharges and sediment dam overflows.

An analysis of the impact of MTW HRSTS discharges on the Hunter River flow was undertaken based on simulated flow in the Hunter River over the life of the proposal. The results showed that the impacts of HRSTS discharges on the Hunter River flow characteristics are negligible during both wet periods and dry periods.

ii Stream condition

The proposed flow rate of the controlled discharge via the EPA-licensed discharge point would be less than 100ML/day (1,160L/s) from Dam 1N to Doctors Creek (no change to approved rate of discharge). It is possible that controlled discharges may occur at times when there is no natural flow in Doctors Creek. It is noted that current MTW operations have discharged flows of this magnitude to Doctors Creek in the past when required and it is not expected that discharges under the proposal would have an additional impact on the stream condition of Doctors Creek to that already experienced under the current operations.

As specified under the rules of the HRSTS, controlled discharges may only occur when the 'high' or 'flood' flow block is passing MTW. Therefore, controlled releases from the proposal would only occur when the Hunter River is in an increased state of flow (at least 2,000ML/day). Based on the comparatively low controlled discharge rate, it is not expected that controlled discharges would result in adverse hydraulic impacts on the Hunter River, such as increased bed and bank erosion.

iii Water quality

Discharges under the HRSTS are controlled so that the salt concentration in the Hunter River Lower Sector (downstream of Glennies Creek confluence) does not exceed 900µS/cm. An important component of meeting the salinity goal is to discharge the salt load evenly throughout the discharge period to avoid short periods of elevated salinity in the Hunter River.

Controlled discharges under the proposal would continue to be released in accordance with HRSTS and EPL 1376 and EPL 1976 requirements for Warkworth Mine and MTO, respectively.

A comparison was undertaken of the Coal & Allied and NOW water quality monitoring data in the Hunter River in the vicinity of MTW, with the ANZECC (2000) water guideline trigger values and site water quality monitoring at the discharge dams. The comparison showed that discharge dam water quality (median) is:

- better than Hunter River water quality and the lowest recommended ANZECC guidelines trigger value for manganese, selenium, phosphorus (total) and zinc;
- better than the lowest recommended ANZECC trigger value, but worse than the Hunter River water quality for arsenic, boron, barium, calcium, calcium carbonate, iron (filtered), potassium, lithium, magnesium, rubidium, and strontium;
- poorer than the lowest recommended ANZECC trigger value but better than the Hunter River water quality for aluminium; and
- poorer than the lowest recommended ANZECC trigger value and the Hunter River water quality for chloride, sodium and sulphate.

It is likely that the elevated sodium and chloride concentrations are the main component of salts generated onsite, discharges of which are controlled by the HRSTS. The ANZECC (2000) water guideline trigger value of 115mg/L for sodium and 175mg/L for chloride applies to irrigation of sensitive crops. A trigger value of 300mg/L for sodium and 400mg/L for chloride applies for recreational use. There are no sodium or chloride trigger values for livestock drinking or ecosystem protection.

The median sulphate levels in the discharge dams exceed the ANZECC (2000) water guideline trigger value for recreational use (400mg/L), and are equal to the ANZECC (2000) water guideline trigger value for livestock drinking use (1,000mg/L).

As controlled discharges occur during high flow events in the Hunter River, significant dilution of discharges is expected. The 'worst case' dilution ratio for MTW discharges to Hunter River flows is 1:5 (400ML/day discharge rate to 2,000ML/day minimum flow required in the Hunter River flow for discharge under HRSTS). In the immediate vicinity of the Loders Creek confluence with the Hunter River, inside a mixing zone, contaminant concentration would be elevated compared to adjacent areas. However, secondary velocity currents induced by the nearby channel bends and turbulence induced by the riparian vegetation would promote mixing of the discharge water with the Hunter River flow. It is therefore likely that complete mixing of the discharge water with the river flow would occur within a few hundred metres of the outlet.

Bulga Coal Management (BCM) has requested that any approval for either the Warkworth Mine or MTO application be subject to a condition that requires MTW to develop a management plan agreed with BCM prior to MTW increasing the discharge to Loders Creek. Without a corresponding condition on the Bulga Optimisation Project (BOP) development application that is currently being assessed that is proposing an increase in licensed discharges to Loders Creek, there would be no incentive for WML to come to such an agreement which would hinder the ability of MTW to effectively manage water on its Site.

As Loders Creek is an approved discharge site for both MTW and BCM, MTW seeks an equitable share of the capacity of this creek system for controlled discharges under the HRSTS and relevant EPLs. To ensure equitable access, MTW has sought to increase the rate of controlled discharge from the current approval to 300ML/day (3,500L/s) from Dam 9S to Loders Creek. Approval of this discharge volume, without the requested condition that requires the development of the management plan in consultation with BCM prior to MTW increasing the discharge limit, would ensure that MTW has an equitable and fair access to this discharge resource in accordance with the maximum sustainable discharge limits of Loders Creek that were identified in the BOP (Umwelt 2014).

This matter is considered further in the MTO RTS.

6.13 Rehabilitation

6.13.1 Introduction

Rehabilitation activities as a result of the proposal were described in Chapter 13 of the EIS. Further information regarding performance/completion criteria was also provided in Appendix Q.

A total of 35 submissions in objection referenced rehabilitation matters, representing 12 per cent of objectors.

Matters raised included the mine's current performance and lack of adherence to rehabilitation requirements and the composition of the final landform. The number of times the rehabilitation related matters were raised in objection is shown in Figure 6.22. It is noted that a number of submissions referenced more than one rehabilitation matter and, therefore, the number of matters raised as shown in Figure 6.22 totals more than 35.

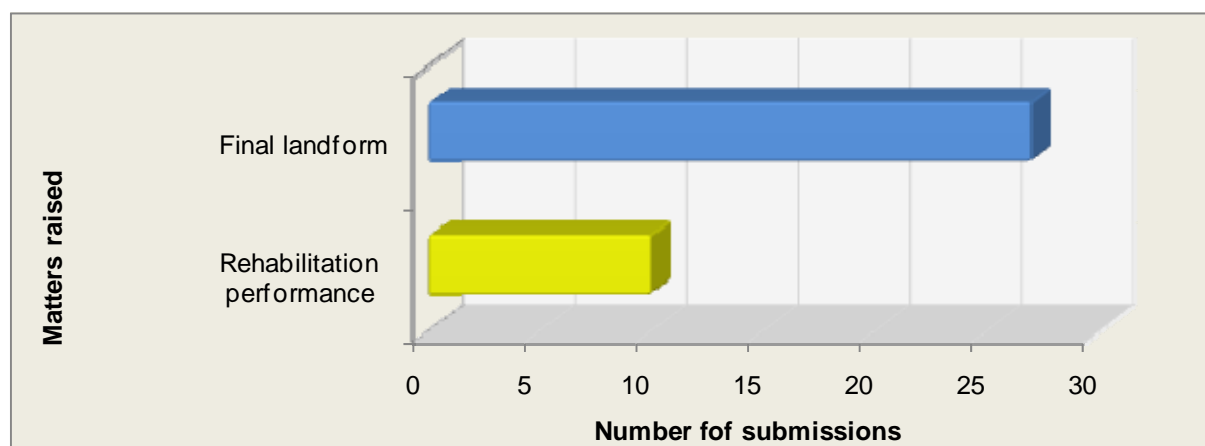


Figure 6.22 Rehabilitation matters raised within submissions of objection

6.13.2 Rehabilitation performance

Of the submissions of objection related to rehabilitation matters, 29 per cent (representing three per cent of the total submissions of objection) contend that Warkworth Mine's rehabilitation performance is unsatisfactory.

Warkworth Mine (and MTO) has consistently achieved the rehabilitation objectives contained within the approved MTW MOP. Therefore, Warkworth Mine's rehabilitation performance is not unsatisfactory.

As reported in Section 13.4 of the EIS, rehabilitation will continue to be undertaken progressively across the mined area under the proposal in accordance with the extensive performance/completion criteria outlined in Appendix Q. In the 2013 MTW Annual Review, which reported on the activities undertaken during the 2013 calendar year, the area sown for rehabilitation (61.6ha) exceeded the target (54.5ha).

Rehabilitation trials and applied research activities are currently undertaken at Warkworth Mine in an effort to continually improve the effectiveness and efficacy of rehabilitation of mined lands.

The results from the trials to date have been positive and from these, it is intended that compost will continue to be used and incorporated into the top layer of the growth medium to promote the development of the soil and soil structure. The seed selected for use in the rehabilitation represent a diverse suite of species across the vegetative strata found within the woodland and grass communities that will be returned to the post mining environment. The seed is being carefully managed to maintain high rates of viability and germinability, which will improve the quality of rehabilitation obtained and minimise the waste of these resources. The direct drilling trials have shown improvements over broadcast seed in enabling improved germination with lower seeding rates, minimise soil disturbance and subsequent weed germination, and ensuring the maintenance of the mulch layer which assists to protect the germinating seedlings from erosion and the elements.

The progressive rehabilitation would continue to be overseen by an onsite specialist who, along with mine planners, ensures that future rehabilitation resource requirements are available to enable the objectives of rehabilitation domains to be met.

Detailed baseline data from analogue sites would be used to develop and monitor a number of rehabilitation performance measures/criteria for specific rehabilitation domains. Rehabilitation of Warkworth Mine is planned to facilitate an integrated landform with MTO and adjacent areas and provide for enhanced rehabilitation objectives.

The primary objective of the final landform at the Warkworth Mine is to create a safe, stable, free draining, non-polluting feature that is able to maintain viable land uses where the post mining rehabilitated areas have been integrated with the surrounding landscape. The final rehabilitation undertaken on site to date has achieved these objectives and the Site is actively undertaking progressive rehabilitation in compliance with that reported in the MTW MOP.

The objectives of the rehabilitation domains of mined areas at Warkworth Mine are to:

- re-create approximately 1,617ha of EEC woodland communities to a standard comparable to similar reference EECs (analogue site);
- create approximately 222ha of trees over grass not conforming to any particular community, creating treed corridors to ensure connectivity of woodland community areas;
- recreate some 848ha of grassland;
- establish some productive grazing;
- provide additional habitat for threatened species; and
- create an additional north/south wildlife corridor providing connectivity to other habitat.

These areas can be seen illustrated in Figure 2.16 and 2.17 of the EIS.

The applicant has committed to progressively establishing approximately 2,100ha of EEC woodland (an ironbark community) within the rehabilitated MTW, predominantly at Warkworth Mine with the residual at MTO to a standard comparable to similar reference EECs (analogue site).

6.13.3 Final landform

Of the submissions of objection related to rehabilitation matters, 77 per cent (representing nine per cent of the total submissions of objection) contended that the form of the final landform was inconsistent with surrounding natural environment and, therefore, degraded visual amenity.

The development of the proposed final landform provided full consideration to the surrounding natural environment and visual amenity. It also considered various other factors including previous landform designs and the surrounding land use, external and internal planning requirements, existing management measures and rehabilitated landforms, and desired ecological and sustainability values inclusive of consideration of the local and regional surface and groundwater systems.

The post-mining land capability across Warkworth Mine is planned to provide biodiversity values in native habitat and support agricultural land predominately for cattle grazing in areas of rehabilitated grassland. This is shown in Figure 2.16 of the EIS.

A number of alternatives were considered in relation to the final void; however, all were assessed as unviable for various reasons such as prolonging environmental effects and, accordingly, discounted. One of these alternatives was backfilling the final void which was determined to initially increase the disturbance footprint of Warkworth Mine, prolong its environmental impacts particularly those related to dust and noise, and would be prohibitively expensive. Section 13.2.2 of the EIS provides further detail on this point.

The final landform at Warkworth Mine would be developed with the intent of blending with the surrounding landscape features of both the Warkworth Mine and MTO. The landform would be undulating, with slopes of generally 10 degrees for overburden emplacements and up to generally 18 degrees for internally draining areas such as low walls and ramps consistent with the approved landform design and extensive performance/completion criteria in the current MTW MOP (EIS Appendix Q). This would be achieved by creating gradients for the overburden emplacements similar to the adjoining natural slopes and cognisant of existing rehabilitation.

The existing overburden emplacement areas would be extended to the west as both West Pit and North Pit progress. The haul roads, water storage and TSFs would be covered or capped and rehabilitated. The grading on the overburden emplacement area batters would reduce surface water runoff and erosion and encourage vegetation establishment.

The overburden emplacement area would be constructed to enable the post-mined landscape to have some vertical relief created into these areas. Visually, this would enable the rehabilitated land to have a lower contrast and higher integration levels with that of the surrounding landscape (as described in Chapter 15 of the EIS). With the final void being largely hidden from view due to the surrounding topography and landscape, the post-mining environment would be difficult to determine from non-mined environments once the vegetation has established.

The modelling has indicated that the final void would fill with water as groundwater, localised surface runoff and rainfall inflows slowly fill the rehabilitated mining void until, over time, an equilibrium between inflows and outflows is reached. The speed with which this equilibrium is reached would depend on the climatic variability.

The final void is approximately 11m above the 1:100 year flood level so it is unlikely that the proposal would impact the regional flooding behaviour in Wollombi Brook.

By using an integrated approach through the MOP process including regular review of mine plans, progressive rehabilitation and monitoring; potential environmental or community impacts may be reduced, hence improving outcomes for the final landform.

The need for the final void is due to the economic limitations associated with backfilling the void with spoil. Where possible, considerations have been given to reducing the size of the void at MTW. In comparing the existing approved activities with the proposed mining activities, the size of the proposed void when combining both Warkworth Mine and MTO has been reduced through the backfilling of MTO with spoil won from the proposed operations at Warkworth Mine. This proposal is beneficial in terms of groundwater impacts and the net rehabilitation of both mines.

The long-term impact on groundwater of the final void at Warkworth Mine has been outlined in Section 6.11.4. The final void will be a groundwater sink and will retain groundwater and surface water unable to be directed away from the rehabilitated areas. The groundwater and surface water inflows have been modelled and show that over time, the water level in the void will rise to approximately 20RL (note check this) where it reaches equilibrium. The speed to which the water level achieves this equilibrium will be dependent on climatic factors.

The final void landform will retain the highwall and endwalls, while the low wall will be battered to generally less than 18 degrees and rehabilitated as indicated in the EIS. As a safety precaution, the highwall and endwalls will be remediated to the satisfaction of the DRE to prevent unintended access to the site. A detailed closure plan will be prepared in advance of the closure of the site as required by DRE and potential final uses of the void will be explored with stakeholders prior to relinquishment of the site as per the Rio Tinto Standards.

6.14 Visual

6.14.1 Introduction

The assessment of visual impacts resulting from the proposal was provided in Chapter 15 of the EIS. The visual study was presented in full in Appendix J.

A total of 440 submissions in objection referenced visual matters, representing 15 per cent of objectors.

Matters raised included the influence of Saddleback Ridge and impacts from lighting. The number of times the visual related matters were raised in submissions of objection is shown in Figure 6.23. It is noted that a number of submissions referenced more than one visual matter and, therefore, the number of matters raised as shown in Figure 6.23 totals more than 44.

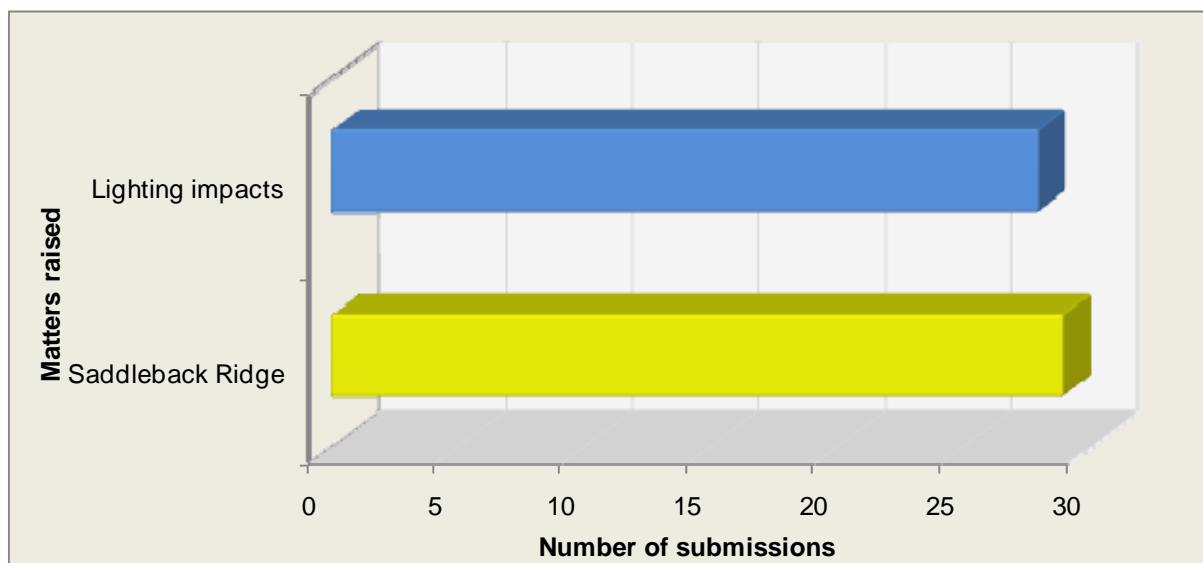


Figure 6.23 Visual matters raised within submissions of objection

6.14.2 Saddleback Ridge

Of the submissions of objection related to visual matters, 66 per cent (representing 10 per cent of the total submissions of objection) referenced adverse impacts on visual amenity from the mining of Saddleback Ridge.

As described in Section 2.3.2 of this report, mining of Saddleback Ridge is necessary to the long-term viability of the mine.

As discussed in Section 15.3.4iv of the EIS, the proposed removal of Saddleback Ridge and progression of mining westward would generally be concealed to most viewers in Bulga to a varying extent by the intervening vegetation and topography, particularly in lower lying areas where views are mostly of trees along Wollombi Brook. Some properties in elevated locations throughout Bulga would potentially experience high visual impacts, depending on the orientation of the property and intervening screening provided by vegetation. These impacts are, on balance, likely to be similar to those potentially occurring under the current approval.

As described in Section 4.11.13 of this report, SSVAs would be available upon request from landowners, including those in Bulga village, who perceive a significant visual impact from the proposal. Appropriate mitigations recommended from these assessments would be implemented, where requested, at these sensitive locations (as described in Section 15.4 of the EIS), which is consistent with the L&E Court judgment (par. 434). As stated in Chapter 15 of the EIS, the current Visual Impact Management Plan (VIMP) would be revised and adapted to the proposal, should it be approved. The relevant elements of the VIMP include:

- examination, in detail, of any high sensitivity viewing points and determination of the opportunities for relevant screening treatments including onsite boundary treatments or mitigation measures to individual residences;
- minimisation of the amount of pre-rehabilitation areas exposed to view by establishing grass cover to remove colour contrast; and

- establishment of planting patterns of trees and grasses in rehabilitation areas to create a high level of visual integration with the surrounding landscape.

Further, the applicant has committed to contributing to the establishment of a Near Neighbour Amenity Resource to provide support to residents surrounding the operation.

6.14.3 Lighting impacts

Of the submissions of objection related to visual matters, 64 per cent (representing nine per cent of the total submissions of objection) referenced adverse visual impacts from lighting under the proposal as a key concern.

As described in Section 15.3.4 of the EIS, the potential visual impacts of the proposal are assessed as being low to moderate.

Mitigation measures for potential lighting impacts currently implemented at MTW will be continued under the proposal. These include:

- keeping the amount of lighting to a minimum, consistent with ensuring a safe and efficient working environment for operations and staff;
- directing floodlighting and movement area lighting towards mine workings and away from mine boundaries wherever possible, taking particular care to avoid lighting impacts on neighbouring residences;
- fitting floodlights on the dragline with shields where practical and checking and adjusting lights to minimise the effects on adjacent areas. This is particularly important when the dragline is operating in an exposed location or close to a public road;
- fitting appropriate lights on conveyor walkways and other infrastructure that are infrequently utilised with sensor switches or time switches to keep their use to a reasonable minimum;
- switching off floodlights in maintenance areas when they are not needed;
- operators of vehicles and plant, including haul trucks, avoiding the use of high beam when it is safe to use low beam. Operators must avoid causing interference to vehicles on adjacent public roads;
- ensuring that operations being conducted at night time near public roads are inspected from the road during set up and whenever lights are moved during a shift; and
- ensuring that complaints regarding lighting are appropriately responded to and addressed.

As discussed in Section 15.4 of the EIS, a MTW VIMP was developed to the draft stage in accordance with industry best practice with consideration given to the full available range of reasonable and feasible mitigation and their effectiveness, inclusive of contingency plans to manage any residual risks, for implementation at the Site. The draft VIMP would be revised and adapted to the proposal, should it be approved.

The SSVA process is described in Section 4.11.13 of this report. This process would consider potential impacts from lighting and their mitigation.

6.15 Aboriginal cultural heritage

6.15.1 Introduction

The assessment of Aboriginal cultural heritage impacts resulting from the proposal was summarised in Chapter 18 of the EIS, and presented in full in Appendix M.

A total of 69 submissions in objection referenced Aboriginal cultural heritage matters, representing 23 per cent of objectors.

Matters raised included impacts on known Aboriginal places and particularly the impacts on the nearby Bora Ground. The number of submissions received on matters relating to Aboriginal cultural heritage is shown in Figure 6.24. It is noted that a number of submissions referenced more than one Aboriginal cultural heritage matter and, therefore, the number of matters raised as shown in Figure 6.24 totals more than 69.

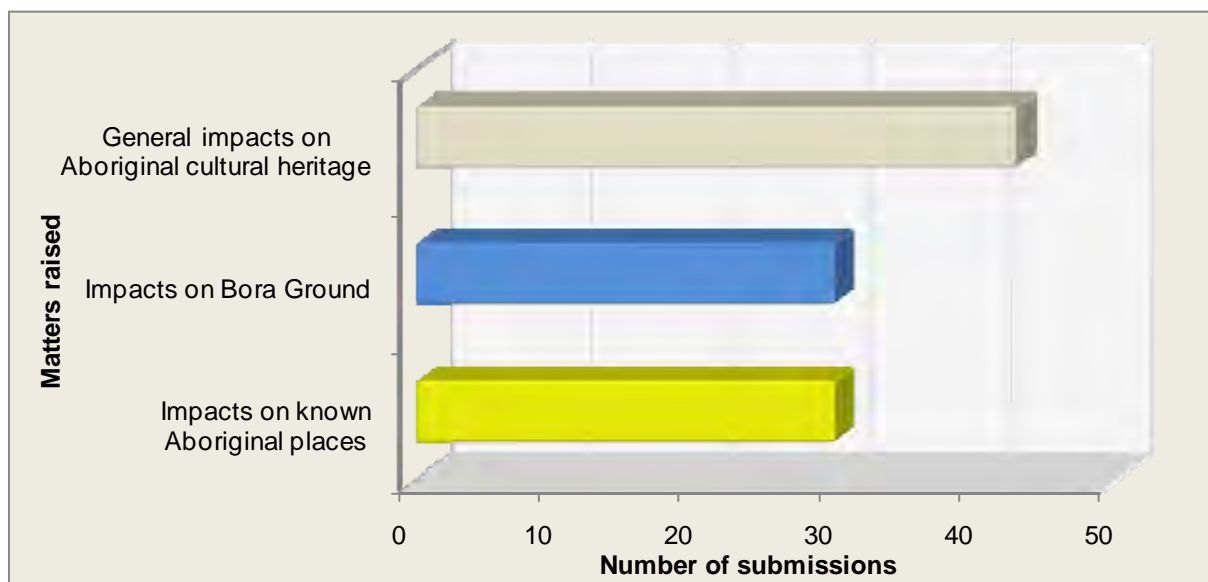


Figure 6.24 Aboriginal cultural heritage matters raised within submissions of objection

6.15.2 Impacts on known Aboriginal places

Of the submissions of objection related to Aboriginal cultural heritage matters, 43 per cent (representing 10 per cent of the total submissions of objection) referenced the impact of the proposal on known Aboriginal places.

Subject to the implementation of the measures set out below, the proposal will not have a significant and therefore, unacceptable, impact on Aboriginal cultural heritage.

A total of 110 extant places containing Aboriginal cultural heritage objects have been identified and recorded within the proposed 2014 disturbance area. The 110 extant places (including two partially destroyed places) primarily consist of stone artefacts with a smaller number of culturally modified (scarred) trees, areas of potential archaeological deposit (PAD), and an area containing grinding grooves. These are summarised in Table 6.9.

Table 6.9 **Extant Aboriginal cultural heritage places within the proposed 2014 disturbance area**

| Place type | Number | Per cent (%) |
|---|------------|--------------|
| Stone artefacts | 103 | 93.7 |
| Stone artefacts / PAD | 3 | 2.7 |
| Scarred trees | 2 | 1.8 |
| Scarred tree / Isolated stone artefact(s) | 1 | 0.9 |
| Grinding grooves | 1 | 0.9 |
| Total | 110 | 100 |

Given the nature of the activities to be undertaken within the proposed 2014 disturbance area, it is likely that all of the 110 extant Aboriginal cultural heritage places would be impacted as a result of the proposal. Prior to disturbance, these places would continue to be managed consistent with the provisions of the ACHMP and the CHMS.

As stated in the Chapter 18 of the EIS, while the RAPs have expressed a view that they would prefer that no additional disturbance to Aboriginal cultural heritage occur as a general principle, the RAPs have raised no objections to the measures proposed for managing and mitigating the impacts to Aboriginal cultural heritage associated with the proposal. One of the key mitigation measures endorsed by the CHWG RAPs is the establishment of the WBACHCA an offset for the 110 cultural heritage sites that will be disturbed over the 21 year life of the proposal. The WBACHCA incorporates approximately 698ha of land to permanently protect and conserve 265 significant Aboriginal cultural heritage sites and landscape areas including the highly culturally significant Bulga Bora Ground.

In addition to the creation of the WBACHCA, Coal & Allied also commits to the following impact management measures for these places:

- to only implement the agreed impact management measures for those places for which development impacts are unavoidable, with avoidance through design planning being the preferred option;
- to implement the agreed impact management measures with these staged over time based on a maximum five year mine operation plan requirements;
- that until such time as the agreed impact management measures need to be implemented, all Aboriginal cultural heritage within the area would continue to be managed in accordance with the provisions of the CHMS and ACHMP (or HMP). Avoidance and physical protection would comprise the key management strategy in this period;
- that if and when mitigation becomes necessary, the following measures would be implemented:
 - areas containing stone artefacts would be managed in accordance with the specific provisions for such objects within the ACHMP (or HMP). This would include standard salvage collection measures which, in the case of the four stone artefact scatters, would include controlled collections with the assistance of established grids;
 - the three areas noted as PADs would be investigated and managed in accordance with the specific provisions for such features within the ACHMP (or HMP). This would involve sub-surface testing to confirm or otherwise this potential. The results would be submitted to the DP&E and the OEH;

- the three scarred trees would be managed in accordance with the specific provisions for such objects within the ACHMP (or HMP) and WML's *Scarred Tree Management Procedure*. This may include removal and relocation; and
- consistent with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*, an Aboriginal Site Impact Recording Form would be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site subject to salvage mitigation.
- to continue investigations into the feasibility of moving the Site M grinding grooves (37-6-0163) although considerable review of the matter has already taken place. The final management and salvage measures for this place would be agreed in consultation with the CHWG, DP&E and OEH. Specific impact mitigation activities that would be undertaken include:
 - further geotechnical assessment and testing of the suitability for the removal and relocation of all or parts of this place;
 - the removal of soils which surround and cover portions of the place to gain the fullest appreciation of its constituents;
 - the completion of high definition laser scanning (including photography) of the site and its immediate surrounds; and
 - ahead of the completion of the final management and salvage measures for this place, the establishment of a blast monitoring regime to ensure that ongoing mining activities are not having deleterious effects upon the place.
- to the management of other currently unidentified Aboriginal cultural heritage places or place-type, which may come to light as part of the implementation of impact management measures, in accordance with the relevant specific provisions for such places within the ACHMP (or HMP). Any unidentified places would be reported to DP&E and OEH prior to implementation of the agreed impact management measures;
- to involving the Aboriginal community in the implementation of all impact management measures consistent with the existing CHWG processes and protocols with such being formalised and conducted under a terms of reference; and
- to all Aboriginal cultural heritage objects collected being curated and stored in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*. Until such time as an adequate facility is in place within the WBACHCA, objects would be stored in the secure facility at Coal & Allied's Hunter Valley Services office.

6.15.3 Impacts on Bulga Bora Ground

Of the submissions of objection related to Aboriginal cultural heritage matters, 43 per cent (representing 10 per cent of the total submissions of objection) referenced the Bulga Bora Ground and its location and asserted that the location is incorrect.

The location of the Bulga Bora Ground as established by the applicant is supported by the OEH, the CHWG and the RAPs and is recorded for the AHMIS site at this location. Even allowing for some error of several hundred metres, the site sits well within the WHACHCA, and well outside of the proposal area and, therefore, will not be impacted by the proposal and will be protected in perpetuity.

The applicant acknowledges that the most significant Aboriginal cultural heritage place in the greater MTW area is the Bulga Bora Ground site. The location of the Bulga Bora Ground as referred to in Chapter 18 of the EIS (and EIS Appendix M) is that as recorded in the OEH Aboriginal Heritage Information Management System (AHIMS) database as site #37-6-0056 and is described as carved trees with a ceremonial ground. A detailed examination of the historical record and other sources pertaining to the location of the Bulga Bora Ground is presented in Section 3.5 of the Aboriginal cultural heritage study.

The presence of a ceremonial site of great social significance to the Aboriginal community of the Upper Hunter Valley has required C&A to adopt the highest level of management response. Coal & Allied's response has been to excise the area of the Bulga Bora Ground site and additional surrounding lands covering 698ha to create a conservation area (ie the WBACHCA) that will be maintained in perpetuity, despite the presence of substantial coal reserves in this area. Coal & Allied has also committed substantial resources to the development of a comprehensive management plan for the WBACHCA, including the establishment of an Aboriginal management group to explore long-term management needs and mechanisms for enhanced Aboriginal management control.

In a submission by Dr Maria Cotter on behalf of Tocumwall Pty Ltd and the Plains Clans of the Wonnarua Peoples Native Title claimant group, Dr Cotter claims that:

the research relied upon with respect to the "Bulga Bora Ground" lacks the detail required to support the finding that the probable location of this important Aboriginal cultural heritage site has been satisfactorily determined.

Attachments 3 and 3a of the submission show plans of the Bulga Bora Ground area's indicative extent in relation to the WBACHCA boundaries as proposed in 2010. Dr Cotter contends on the basis of these plans that the indicative extent of the bora ground is 'likely to be in error'. Dr Cotter also provided Attachments 4a and 4b with the submission. The Attachment 4a document is blank with the exception of a statement in the header which reads: 'Attachment 4b: Historical Map Composite of possible locations of Bulga Bora Ground relative to 1918 description of it being located 2 miles Eather Property [blue rectangle]'. Attachment 4b is an image showing a composite of several extracts from parish maps in the vicinity of Bulga-Warkworth area c.1912-1920. This appears to be the composite map referred to in the statement in the header of Attachment 4a.

Dr Cotter notes in reference to Attachments 4a and 4b: 'From my observations it seems that the Bulga Bora ground was likely situated somewhat north of its current supposed location'. This more northerly location is presumably indicated in Attachment 4b as the terminal point of the red line running due north from the '... Eather Property'.

In considering the Dr Cotter's comments above Coal & Allied notes the following:

- During consultation for the current EIS the CHWG recommended that the indicative extent of the Bulga Bora Ground be extended to the north and west to incorporate the continuity of the WSW landform and vegetation in that area.
- The plans referred to in Dr Cotter's Attachments 3 and 3a are sourced from the earlier and redundant Warkworth Extension 2010 EA report and not from the Warkworth Continuation 2014 EIS. Both the Bulga Bora Ground indicative extent and the eastern boundary of the WBACHCA have been revised and extended in the vicinity of the Bulga Bora Ground since 2010 as is shown in Figure 18.1 of the EIS.

- The outcomes of consultation with the CHWG demonstrates there is a general consensus among Registered Aboriginal Parties of the CHWG that the location of the site has been accurately determined and that portion of the Bulga Bora Ground management precinct incorporating the carved tree/ceremonial site lies categorically within the boundaries of the WBACHCA as settled with the CHWG.
- Dr Cotter's indicative location for the bora ground being situated 'somewhat north of its current supposed location', as presumably indicated in Attachment 4b as the terminal point of the red line running due north from the Eather Property, lies within the boundaries WBACHCA and therefore in a location that will not be impacted as a result of the proposal.

6.16 Other matters

6.16.1 Introduction

A total of 58 submissions in objection referenced matters that were outside of the categories addressed in the preceding sections of Chapter 6, representing 20 per cent of objectors. Approximately half of these raised concerns regarding impacts to immediate natural environment at Bulga.

Other matters raised were the approval timeframe, the finite nature of the resource, the timeframe between the receipt of the Secretary's requirements and the lodgement of the EIS and the confusion of issues as a result of the lodgement of two applications (and EIS) for Warkworth Mine and MTO at the same time. These matters are addressed in the following sections. The number of submissions received on other matters is shown in Figure 6.25.

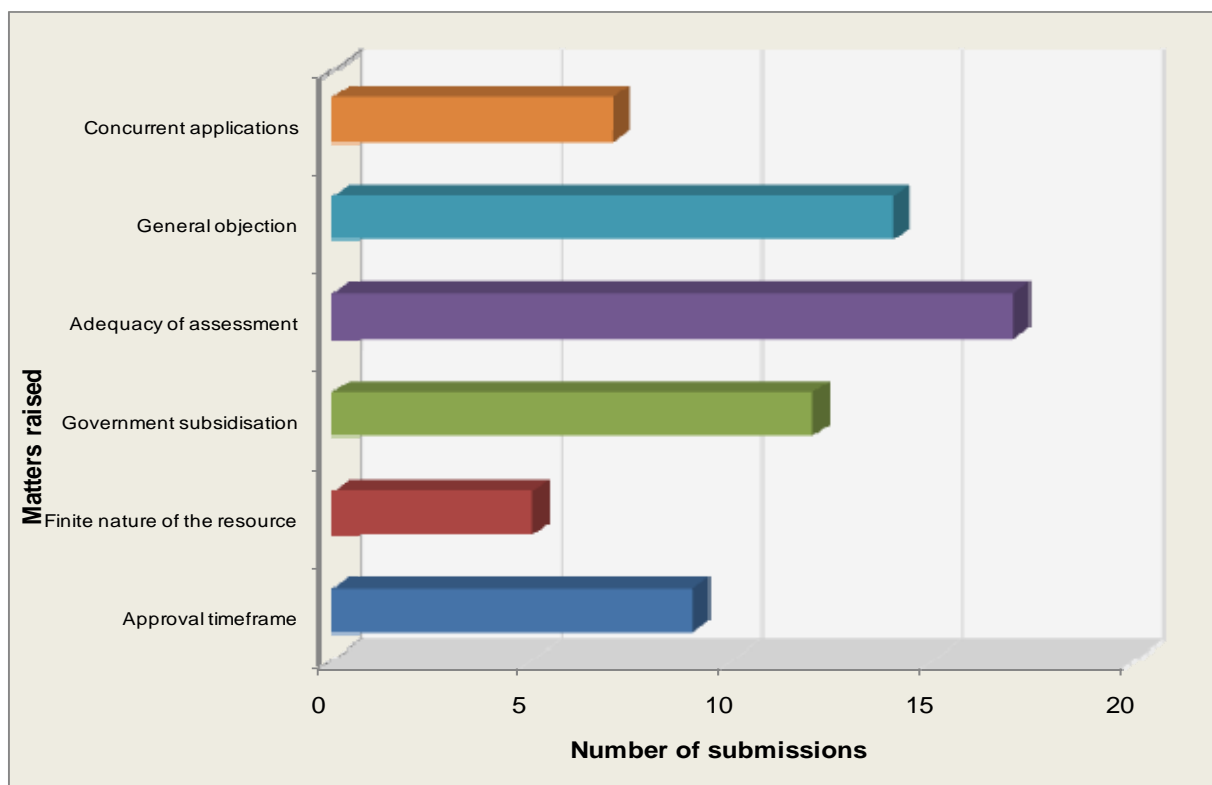


Figure 6.25 Other matters raised within submissions of objection

6.16.2 General objection

As noted above, 14 submissions generally objected to the proposal and the mining industry. These general objections are noted, and are addressed in various forms throughout Chapter 6.

6.16.3 Approval timeframe

Of the submissions of objection related to other matters, nine per cent (representing two per cent of the total submissions of objection) objected to the applicant seeking an extension to the approved timeframe for mining at Warkworth Mine. It was contended that it had always been known that the operations had a 30 year lifespan. Several submissions asserted that this was an example of greed by the applicant.

The timeframe or limits on development consents for mining projects were historically limited to about 21 years to be generally consistent with the timeframe or limit imposed on mining leases. Warkworth Mine's current development consent is limited for this same reason. However, these timeframe constraints do not limit the ability for mining companies to seek approval for extensions to these timeframes to allow for the extraction of the resource.

The proposed extent of mining is well within the limits of MTW's mining leases (CCL 753 and CL 219) on land privately-owned by WML and Miller Pohang Coal Company Pty Limited.

WML propose to extend mining operations at Warkworth Mine both beyond the spatial limits and current timeframe of its development consent so that the mine remains economically viable, enabling it to:

- provide approximately 1,187 jobs on average in the long-term;
- pay \$567million in royalties in NPV terms to the state; and
- indirectly, generate approximately \$75million in additional income in NPV terms and provide additional employment for 57 full-time people in the Singleton LGA.

6.16.4 Finite nature of the resource

Of the submissions of objection related to other matters, nine per cent (representing two per cent of the total submissions of objection) stated that the proposal has disregard to the finite nature of the resource.

It is acknowledged that the resource subject of the proposal is finite in as much as it is limited in size and extent within the boundaries of the leases. The proposal seeks to balance maximising the extraction of this finite resource with minimising environmental impacts.

It is also a condition of the respective mining leases that WML and Miller Pohang Coal Company Pty Limited are required to maximise the extraction of coal within their respective mining leases.

6.16.5 Government subsidisation

Of the submissions of objection related to other matters, 21 per cent (representing four per cent of the total submissions of objection) stated that government were subsidising the coal industry and ignoring climate change.

With regards to the claim that the mining industry is being subsidised by various levels of government, these claims have been made primarily by the Australian Institute (who has also undertaken an economic review of the proposal on behalf of the BMPA). These claims have been roundly criticised by government, industry and Australian Institute's economic peers, for being completely unfounded.

6.16.6 Adequacy of assessment

Of the submissions of objection related to other matters, 33 per cent (representing six per cent of the total submissions of objection) stated that due to the short timeframe between the issuing of the Secretary's requirements and the lodgement of the EIS, the EIS could not have adequately addressed the assessment requirements.

A request for environmental assessment requirements was submitted to the Director-General of the DP&E on 1 April 2014. The Secretary's requirements were issued on 22 May 2014. Public exhibition commenced on 25 June 2014.

The EIS (and the Mount Thorley Operations EIS), inclusive of technical studies, was commenced well in advance of the Secretary's requirements being issued on the basis of contemporary environmental assessment requirements for open cut mining projects in the Hunter Valley, environmental assessment requirements issued for the Warkworth Extension 2010, and contemporary government policies. This approach is not at all unusual for applicants. Prior to its finalisation, the EIS, inclusive of technical studies, was considered against the proposal specific Secretary's requirements.

6.16.7 Concurrent applications

Of the submissions of objection related to other matters, 12 per cent (representing two per cent of the total submissions of objection) stated that there was a confusion of issues associated with two applications being submitted concurrently.

Although Warkworth Mine and MTO have both been managed by Coal & Allied since 2004 as an integrated operation (MTW), they are owned by different entities, have standalone mining leases and development consents. To continue operations at MTW, as proposed, separate DAs under Part 4, Division 4.1 of the EP&A Act were prepared and lodged.

The proposal relates to, amongst other aspects, the extension of mining at Warkworth Mine beyond the current spatial limits of approval and of the mine life. The Mount Thorley Operations 2014 proposal relates to a continuation of the development consent beyond its current 2017 expiry to enable more time for the completion of existing approved mining. The timeframes for both applications were aligned to enable the continued integration of the two operations.

Secretary's requirements were received for both EISs. Both EISs were prepared to comprehensively address these requirements.

Chapter 7

BMPA submission



Chapter 7 — BMPA submission

- 7.1 Introduction
- 7.2 Responses to matters raised

7 BMPA submission

7.1 Introduction

The EIS exhibition period concluded on 6 August and, as noted in Section 3.1 of this report, this report addresses submissions received up to 5pm on 8 August. A holding submission was received from the BMPA by the DP&E on 6 August which objected to the proposal. This holding submission was captured in the submissions analysis in Chapter 4, along with other special interest groups that provided a submission.

The BMPA's final submission was received on 20 August 2014. As such, it forms the basis of standalone chapter; namely, Chapter 7. This chapter considers matters raised in the final BMPA submission.

BMPA engaged consultants to review the noise and vibration, economic and ecology studies and the social impact assessment. A response to each of these reviews is provided in Appendices F, G, H and I, respectively.

This chapter addresses matters raised in the main submission. The chapter generally mirrors the headings and sub-headings from the BMPA submission. The matter raised is indented for ease of reference with a response provided below each matter.

7.2 Responses to matters raised

7.2.1 Overview of the executive summary

i ES1 Context of the proposal

BMPA references spatial consent limits being reached in 2015 adversely impacting the viability of the mine. It states that in the 2003 approval, none of this area was to be mined and, accordingly, the mine should cease in 2021 as per the current development consent period.

As described in Section 6.16.3 of this report, the proposed extent of mining is well within the lateral limits of MTW's mining leases (CCL 753 and CL 219) on land privately-owned by WML and Miller Pohang Coal Company Pty Limited.

The timeframe or limits on development consents for mining projects were historically limited to about 21 years to be generally consistent with the timeframe or limit imposed on mining leases. Warkworth Mine's current development consent is limited for this reason. These timeframe constraints do not limit the ability for mining companies to seek approval for extensions to these timeframes at a later date and enables for the consent to be contemporised.

WML has always stated that reserves within Warkworth Mine's mining lease may be developed at a later stage. Whilst the 2002 EIS presented mine plans that identified Wallaby Scrub Road as the western limit of mining, it stated that there were other areas that may eventually be developed. Specifically, the Green Offset Strategy that was developed and presented in the 2002 EIS identified two types of land-based offset areas; HMAs and non disturbance areas NDAs.

Three HMAs were proposed in the 2002 EIS; one to the north of the proposed mining area and two to the west of Wallaby Scrub Road. The 2002 EIS stated that development of this land may occur in the future. It also stated that the land would be managed for the duration of the impact of vegetation clearance associated with the project or until the land is required for development. So it has always been a known option that the land west of Wallaby Scrub Road could be developed.

BMPA contends that government policies have been amended as required by Rio Tinto and with the concurrence of the DP&E in order to offset and overturn the L&E Court judgment.

BMPA's assertion is, incorrect and unjustifiable. Government policies apply to all of industry and there are no policies in place that only apply to Warkworth Mine, and absolutely no evidence of any policies being put in place just to make the proposal approvable.

Although this matter is beyond the scope of this report, Coal & Allied conducts its operations in accordance with NSW and Commonwealth legislation. Due process is followed at all times and Rio Tinto (and Coal & Allied) has strict internal standards by which it deals with all stakeholders including government.

The proposal will be considered by the NSW Government under the EP&A Act and a range of other legislation, regulations, policies and guidelines. These documents are frequently updated to ensure their ongoing relevancy.

Like the Warkworth Extension 2010, this proposal will be determined by the PAC, not the Minister for Planning. The PAC is a statutory body established under the EP&A Act and is independent of the NSW Government, the Minister for Planning and DP&E.

The EIS was prepared in accordance with current legislation and government policy and used the most recent and accurate scientific data relevant to the proposal. Feedback received from community and government stakeholder engagement together with the Secretary's requirements and the L&E Court judgment, provided guidance to the assessment approach, ensuring that all potential matters of relevance associated with the proposal were assessed.

The EIS is consistent with, and addresses all, matters raised in the L&E Court judgment. The Supreme Court judgment was on points of law only and, as it was in respect of the Part 3A process, has little specific application to the EIS or the proposal (refer to Section 6.2.1 of this report).

BMPA notes that the management 'in accordance with industry best practice' is not what residents of Bulga have experienced over the past five years.

While it is disappointing that certain residents of Bulga make this claim, as described in Section 4.5.1 of the EIS, important ongoing operational improvements have been implemented or are being implemented which the applicant considers provide significant mitigation to those residents by programmes established since the previous application in 2010. These improvements represent the outcomes of the planning and development for the future of Warkworth Mine following the disapproval of the previous application in April 2013. This planning and development has resulted in changes in the mine design and commitments aimed at minimising and offsetting the proposal's interactions with the community and environment and making a positive contribution where possible.

These have also been developed in response to ongoing stakeholder engagement and for noise, include, a continuation of attenuation of the mine's existing truck, drill, dozer and excavator mining fleet. As described in Section 6.4.6 of this report, all new haul trucks purchased for use at MTW are noise suppressed (or attenuated) units with attenuation of all heavy mining fleet a commitment of this proposal. As per the current MTW noise management plan, the operation also undertakes identification and rectification of defects to sound attenuation equipment through the normal maintenance process.

Additional measures adopted at MTW are:

- operational management supported by real-time monitoring and predictive modelling, as well as dedicated community response officers on each night shift;
- community response officers supporting every night shift;
- active dump management to respond to current and predictive meteorological conditions;
- continued use of hydraulic snubbers to electric rope shovels to reduce specific noise generated by shovel doors; and
- noise attenuated plant deployed preferentially to locations relevant to sensitive locations.

As of 2012, all mining fleet comprised 'quacker' style reverse alarms, eliminating the traditional tonal versions.

Warkworth Mine has also implemented a range of operational control strategies and measures to effectively manage noise to achieve compliance with noise criteria at residences. As described in Section 6.4.6 of this report, a hierarchy of control is followed by MTW's operational staff.

A part of the hierarchy of control is the successful implementation of a real-time noise alarm system which uses a set of rules to alert operational personnel to emerging noise levels in real-time. A programme of targeted supplementary attended noise monitoring is operated at Warkworth Mine to support the real-time directional monitoring network and ensure the highest level of noise management is maintained.

As part of the Warkworth Extension 2010, MTW committed to investigation of alternate noise monitoring technologies. During 2012 MTW committed capital funding to build and install a first of class directional noise monitor, known as an 'environmental noise compass' (ENC) in the Bulga village area, which was completed in late 2013.

The ENC aims to accurately pinpoint and identify noise emissions from multiple sources in real-time, to a greater level of accuracy than existing directional noise monitoring technology. This technology is expected to provide additional noise management value to MTW and is considered a first in noise management in NSW.

Predictive modelling interface (PMI), which allows for proactive planning of mining operations and weather conditions as a leading measure for managing noise emissions, is in the process of being developed at MTW. The PMI utilises predictive meteorological forecast data coupled with detailed mine plans and equipment sound power level information to predict noise levels at residences. The PMI is currently being refined and is expected to be fully integrated into day-to-day operations. Introduction of the PMI will be a significant step in the mine's continual improvement in operational noise management.

In regards to the air quality, a number of improvements were introduced, or continued to be implemented, in 2012 which included:

- installation of ROM dump hopper barrier hoods and water sprays at the Warkworth CPP;
- installation of dust aprons on drill rigs;
- construction of six new high flow, high capacity water cart fill points designed and located to maximise time available for water spraying to active mining areas;
- acquisition of four new water carts to replace older, smaller water carts and to increase the overall number onsite;
- continuation of the aerial seeding programme to provide temporary rehabilitation to active mining areas pending their full rehabilitation;
- continuation of operational management systems supported by real-time and predictive monitoring networks, including dedicated community response officers on each night shift;
- continuation of active dump management to respond to current and predicted meteorological condition; and
- commencement of capping of Tailings Dam No.1.

A focus of improvements in 2013 were activities associated with EPA's (2011) *Coal Mine Particulate Matter Control Best Practice – Site-specific Determination Guideline* (dust pollution reduction programme), which targeted wheel generated dust.

During 2013, a proactive air quality management system (Dust Risk Management System) was also implemented. Use of a proactive system is considered industry leading practice and Stage One of the Dust Risk Management System was successfully tested by Coal & Allied Environmental Services staff in mid 2013. In the months following implementation of Stage One of the Dust Risk Management System, MTW, as a member of the Upper Hunter Mining Dialogue, introduced a regional predictive forecasting tool which aims to ensure that all Hunter Valley mines are receiving consistent and similar information advising of adverse conditions.

A network of early warning units (EWUs) is used for supplementary monitoring. The EWUs are semi-portable, and able to be relocated as required to support operational control. In addition, MTW has installed two cameras (one on the Warkworth maintenance building and the other on Charlton Ridge) to observe dust on Putty Road. These cameras are streamed onsite via wireless telemetry, operate remotely and may be rotated 360 degrees to monitor/view dust emissions and sources to enable operational control by MTW staff.

Further discussion on these aspects and their role in the proposal is provided in Chapter 11 of the EIS.

As described in Section 6.4.3 of this report, an assessment of noise monitoring data (publically available via the Rio Tinto Coal Australia website (www.riotinto.com/coalaustralia) demonstrates that a high level of compliance with noise criteria has been achieved throughout the life of the mine. Non-compliant noise measurements account for only 0.39 per cent of the monitoring dataset (10 non-compliances measured from 2,540 individual assessments undertaken). In each non-compliance instance affected landowners were notified of the non-compliances and corrective actions implemented.

Reporting of air quality monitoring results in the most recent (2012 and 2013) annual reviews for MTW show that there was 100 per cent compliance during this period: there were no non-compliances. This is despite dust generation recorded in 2012 being generally higher than for previous years, attributed to lower rainfall.

It is clear that there is a misalignment between the number of complaints and the mine's strong compliance record. During 2012 and 2013 MTW received 800 and 633 noise complaints, respectively. During the same years MTW received 57 and 48 dust complaints, respectively.

With respect to noise, it is contended that this misalignment may be, in-part, due to LFN. This matter is addressed in Section 4.3.1 of this report. It is noted that the investigation by the 2014 NSW Ombudsman into LFN non-compliance complaints at MTW found that Coal & Allied is monitoring and managing noise in accordance with existing approvals, noise management plans, noise monitoring programmes and current best practice. LFN levels under the proposal are also predicted to meet relevant criteria for LFN (see Section 4.3.1 of this report).

Noise and air quality goals/criteria established under government policies are benchmarks set to protect the general health and amenity of the community in relation to noise and air quality. Therefore, compliance with these would suggest that general health and amenity are being protected. The applicant wishes to reemphasise its commitment to industry best practice. This is reflected in commitments made under the proposal and will continue to be evidenced by the outcomes of monitoring and auditing against noise and air quality criteria with the results publically available on Rio Tinto Coal Australia's website.

ii ES2 Background to the proposal

BMPA contends that while mines have a major visual impact on the Hunter, coal mining is not the biggest employer or contributor in the Valley.

BMPA's contention is incorrect. As reported in Section 7 of the SIA (EIS Appendix P), coal mining is a key industry in NSW and is the largest employer in Singleton, Cessnock and Muswellbrook LGAs, and the second largest employer in the Hunter region (ABS 2011). The potential visual impacts from the proposal are addressed in Sections 4.11.13 and 6.14 of this report.

BMPA notes the statement made in the EIS that the 'existing approval does not support further capital expenditure' and states that this is a matter of mismanagement with Rio Tinto as its lack of capital management plan can only assume approval until 2021. It is also states that as a high strip ratio mine it should not continue.

The resource within the footprint of the proposal is significant. This has been confirmed by NSW Trade & Investment which advised in its submission that it supports the proposal proceeding given its economic significance.

As noted in Section 2.3 of this report, the mine has a high strip ratio and, consequently, high costs of extraction. To be clear, a high strip ratio has nothing to do with mismanagement of a mine, but rather is a consequence of the area's geology. The resource, however, can be extracted efficiently and effectively by WML because of the hundreds of millions of dollars invested in the mine since it commenced operations in 1981 and, that as an existing mine, it has established access to product transport and distribution infrastructure such as road, rail and port. Potential impacts from the extension of the existing Warkworth Mine would be minimal when compared to a Greenfield development, irrespective of its strip ratio. This was noted in several of the submissions in support of the proposal.

iii ES3 Approval history

BMPA contend that as the proposal forms a new and different application, then Commonwealth approval obtained in 2010 is not applicable and must be applied for again for the 'new scheme'.

As discussed in Section 7.5.1 of the EIS, there are two approvals under the EPBC Act in place for Warkworth Mine comprising EPBC 2002/629 and EPBC 2009/5081. Approval of EPBC 2009/5081 was granted for the Warkworth Extension 2010 and its predicted impacts on listed threatened species and communities and listed migratory species for the same disturbance area as the proposal. Disturbance and required offset areas associated with the proposal are covered by EPBC 2009/5081.

The proposal will not result in any additional disturbance to that contained within EPBC 2009/5081 nor any new or increased impacts to matters of NES or other protected matters. Further, the proposal is exempt from requiring approval under the EPBC Act for impacts on water resources as it relates to an action approved by the Minister under Part 9 of the EPBC Act before 22 June 2013. Regardless, the proposal is not likely to have significant impacts on water resources as detailed in Chapters 16 and 17 of the EIS.

iv ES4 Improvements in differences to the Warkworth Extension 2010

BMPA notes that the EIS references 'operational improvements' since the previous application. It contends that the Bulga residents have not noted any operational improvements as evidenced by the number of ongoing complaints.

As stated in the section above, substantial improvements have been made to the management of dust and noise since the previous application. These have been, in part, made in response to ongoing stakeholder engagement. As noted, despite the strong compliance record there have been a large number of complaints. All complaints are responded to in accordance with Coal & Allied's complaints handling policy. Coal & Allied will continue to work closely with the community regarding the management of noise, dust and other matters related to amenity.

BMPA states that irrespective of the changes to the Mining SEPP, which is unacceptable, the impacts under the current proposal are no less than the Warkworth Extension 2010.

Changes in design elements, such as a more undulating landform at Warkworth Mine and emplacement of overburden at MTO enabling the void at MTO to be backfilled providing for an improved final landform, have resulted in improved outcomes for aspects such as visual, rehabilitation and groundwater.

Further, both acoustic engineers and air quality specialists worked collaboratively with mine planners to ensure noise and dust amelioration measures were incorporated into the mine design where feasible and reasonable. The effectiveness of these measures was continually tested in an iterative process with mine planners until adverse modelling predictions at assessment locations were minimised to the maximum extent that is feasible and reasonable. The design elements and management commitments are reflected in the modelling results presented in the EIS. Similarly, water engineers have worked closely with mine planners and operational teams over many years, including during the design of the proposal, to develop a water management system that minimises the risk of adverse impacts occurring on surface and groundwater resources.

It is acknowledged that the footprint of the extension area remains unchanged and, therefore, direct impacts on environmental aspects such as biodiversity, Aboriginal and historic heritage remain unchanged. However, additional commitments relating to biodiversity offsetting, the inclusion of an additional area within the WBACHCA, the establishment of local historic heritage conservation initiatives and adoption of relevant aspects in response to the concerns identified in the L&E Court for matters such as noise and economics demonstrate that the proposal will provide a net outcome for these aspects than the Warkworth Extension 2010.

BMPPA contends that change in 'design elements' does not make the proposal different to the Warkworth Extension 2010.

As described in Chapter 7 of the EIS, there are important improvements and differences under the proposal compared to the Warkworth Extension 2010. Design elements form one part of the improvements and differences which are summarised below.

- Operational improvements in response to ongoing stakeholder engagement particularly regarding the proactive and reactive management of noise and dust resulting in changes to operations.
- Additional commitments, for example: the inclusion of an additional area within the Wollombi Brook Aboriginal Cultural Heritage Conservation Area (WBACHCA); and establishment of local historic heritage conservation initiatives.
- Design elements, such as: a more undulating landform; optional underpass of Putty Road; emplacement of overburden at MTO enabling the void at MTO to be backfilled providing for an improved final landform; and extraction of coal as part of Warkworth Mine's operations which is approved for mining operations under MTO's development consent (DA 34/95) which avoids the need to relocate Putty Road.
- Key matters raised in the L&E Court judgment, such as those related to noise, ecology and economics, have also been addressed.

In addition to the above, there is a changed legislative and policy environment, including the introduction of Clause 12AA of the Mining SEPP. Non-discretionary development standards for mining were also introduced through the operation of Clause 12AB.

a. Noise

BMPPA requests that the details of discussions regarding background noise levels between EPA and the applicant should be made available to residents to ensure that these discussions were not at a disadvantage to the Bulga community.

The discussions were not at a disadvantage to the Bulga community. The discussions with the EPA included a presentation of the adopted approach to background noise and analysis thereof. The outcomes of discussions are reflected in the approach to the analysis of background noise as described in the EIS.

BMPPA contend that all residents, including those in Bulga, are not below the Mining SEPP's non-discretionary standard for cumulative noise as stated in the EIS. It refers to the outcomes of the peer review prepared on its behalf.

The BMPPA's contention is incorrect since it is shown that all residences in Bulga are predicted to satisfy the Mining SEPP's non-discretionary standard for cumulative noise from all industrial noise sources as demonstrated in Section 10.2 of the EIS.

Compliance with the non-discretionary standard is accepted as providing significant protection against noise impacts. This means that the total impact from all mines in the locality would achieve amenity level recommendations of the INP.

b. Ecology

BMPA contends that “contemporary policies are of course those altered by the Government to ensure that the previously rejected proposal now meets ‘contemporary policies’. This does not detract from the fact that the Endangered Ecological Communities will be substantially damaged and in particular the loss of Warkworth Sands Woodlands. Government should not be changing the policies to allow the destruction of these endangered ecological communities. These communities must be preserved and not lost due to artificial and biased changes in policy. The policy changes will not save the endangered species and have been altered only to ensure this application receives approval.”

BMPA’s contention that government policies have been altered to allow the destruction of these endangered ecological communities is incorrect and unjustifiable.

The proposed BOS has been developed to fully satisfy contemporary NSW government policies; such as, *Draft NSW Biodiversity Offset Policy for Major Projects*, FBA and UHSA.

The *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) has three key objectives:

1. to provide clear, efficient and certain guidance for stakeholders;
2. to improve outcomes for the environment and communities; and
3. to provide a practical and achievable offset scheme for proponents.

WML has achieved these objectives in the assessment of proposed impacts and the proposed BOS.

As outlined in the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final), the assessment has provided a transparent method to assessment impacts on biodiversity and likely gains on an offset site. This assessment can be found in section 6 and 7 of the ecology study (EIS Appendix H).

Short-term conservation outcomes would result from the proposed BOS in the form of 75.5ha of existing WSW of varying quality (from low to high quality) being protected and managed. This area is not currently protected or managed. Additionally, the proposed BOS offers long-term conservation outcomes of approximately 160ha of WSG which is proposed to be regenerated to WSW from former grazing lands. Overall, this means an addition of approximately 87ha of WSW to the current 465ha extant (representing an increase of 19 per cent), accounting for the 72ha of WSW to be cleared within the proposed 2014 disturbance area. Should approval not be granted, the existing extant of WSW will remain unchanged, unfunded and unprotected, and the threats described by the NSW Scientific Committee in the listing, will remain unmanaged.

c. Economics

BMPA asserts that the L&E Court judgment required the economics study to use a new model.

The assertion that the L&E Court judgment required the economics study to use a new model is incorrect.

The L&E Court judgment states that economic models are a tool only to assist the consent authority in respect of determining the proposal (par.19). There is nothing in the L&E Court judgment that specified the economic model that must be applied to all future major projects. Further, it is suggested in TAI's submission (Appendix 5 of the BMPA submission) that use of Computable General Equilibrium (CGE) model would have been more appropriate. However, CGE models are complex and require detailed regional/state information not available in Australia in sufficient quality to provide appropriately robust assessments for projects in smaller regions, such as these proposals. TAI has also recognised the issues with CGE modelling elsewhere, in a recent article (refer to Appendix H of this report) in which TAI describes CGE models as 'complex' and 'bizarre'.

The economic study used an input-output model for the regional economic assessment of the proposal. The following statements are made with respect to the decision regarding the use of this:

- the input-output modelling approach adopted by BAEconomics reflects the recommended 'best practice' approach to regional input-output modelling advocated by the U.S. Bureau of Economic Analysis, as referenced in the BAEconomics Report (Bess and Ambargis 2011);
- the input-output modelling approach adopted by BAEconomics is furthermore consistent with its recommended use, as outlined in the ABS Information Paper (Australian National Accounts: Introduction to Input-Output Multipliers); and
- while the Productivity Commission paper referenced by TAI (Appendix 5 of the BMPA submission) points out a number of 'misuses' of input-output multipliers, it also highlights the circumstances where input-output analysis is a valuable research tool (Gretton 2013, pp. 12-13):

"While there are clear concerns about input-output multipliers and their misuse, the input-output tables on which multipliers are based provide a rich source of information about the structure of economies that is not available from other frameworks:

- Input-output tables provide key information for analysing linkages between activities.
- The tables also provide the underlying core database used in a range of economic models. While these models can overcome many of the limitations of input-output multipliers, they too, rely on restrictive assumptions, which need to be tested before the models are applied. [emphasis added]"

It should also be noted that in any event, input-output tables form part of the building blocks generally used in the construction of general computable equilibrium models. The model adopted for the assessment was highly appropriate.

BMPA also contends that the model used unreasonably favours the proposal.

The regional impact assessment (REIA) undertaken by BAEconomics is both transparent and conservative: regional adjustments are made explicit and only Type 1A multipliers are reported in the results (refer also to Section 6.6.3).

The economic study sets out that the accounting conventions that form the basis of input-output models impose a number of restrictive assumptions (EIS Appendix E, pp. 41-42), including that relative prices do not change as a result of a project, and discusses these in the context of the proposals. Specifically, the assumption that relative prices, in particular wages, do not change as a result of the proposals is appropriate, since the proposals relate to the *continuation of existing* mining operations. In the event that the proposals are approved, MTW's existing employees and contractors would be retained. If the proposals are approved, MTW would continue operating, and there would be no effect on relative wages in the Mid and Upper Hunter region.

BMPA contends that the mine is not viable and that economic benefits flowing to the community are inflated.

The financial viability of the proposal is a risk assumed by the private owners of Warkworth Mine and MTO, and related assumptions concerning the expectations of the owners as to the future financial performance of the mine are commercial in confidence. Mines like Warkworth (and MTO), which have been operating for over 30 years, are large scale businesses built on hundreds of millions of dollars in capital investment. The owners have already invested significant time and resources on planning applications to secure the future of this mine, and have done so in the belief, using long-term economic assumptions, the mine is valuable to its owners.

The assertion that the mine is not viable is further explained in Appendix H of this report in a response to the TAI submission (Appendix 5 of the BMPA submission).

TAI mischaracterise the purpose of the cost benefit analysis (CBA) prepared by BAEconomics. Furthermore, the assertion that MTW is not financially viable is an artefact of two key (incorrect) assumptions:

- that it is appropriate to use *today's* coal prices and exchange rates to evaluate future revenues and the economics of a long-term project; and
- the decision to substitute the operating costs of a *different* mine for those of MTW.

The methodologies used to prepare the economic study applied a highly conservative approach to ensure that the benefits of the proposal are not overstated. The underlying assumptions to the assessment have been clearly stated throughout. A number of sensitivity analyses were undertaken to test the extent to which the results would change if the assumptions were also changed.

BMPA refer to L&E Court judgment and note it was critical of WML's approach to measuring social impact. The BMPA reference Professor Albrecht's review of the SIA.

The SIA was prepared in accordance with Secretary's requirements and provides 'an assessment of the likely social impacts (including perceived impacts), paying particular attention to any impacts on Bulga village'. The SIA is consistent with L&E Court judgment and, as per par. 430, considers the 'subjective fear or concern' of stakeholders and the 'concrete likely effects of the proposed development'.

A response to Professor Albrecht's review is provided in Appendix J.

BMPA contends that the term 'reasonable and feasible' is broad and vague.

Reasonable and feasible is an important term applied to all contemporary mining approvals and is key to the INP.

Chapters 3 and 6 of the noise and vibration study are dedicated to reasonable and feasible management. They describe the existing and proposed noise management system, controls implemented, engineering measures, elimination measures, continual improvement practices and compliance history.

'Feasible and reasonable' is a term defined in the INP as follows:

Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgment in arriving at a decision, taking into account the following factors:

- noise mitigation benefits (amount of noise reduction provided, number of people protected);
- cost of mitigation (cost of mitigation versus benefit provided);
- community views (aesthetic impacts and community wishes); and
- noise levels for affected land uses (existing and future levels, and changes in noise levels).

The above INP notes are considered in Chapter 10 of the noise and vibration study (EIS Appendix F). The application of the terms 'reasonable and feasible' are consistent with the INP and, therefore, appropriate.

BMPA contends that the predicted noise levels are well above acceptable limits given incorrect assignment of background noise levels and not derived in accordance with the INP.

Contrary to BMPA's assertion, predicted noise levels are not well above acceptable limits which were derived in accordance with the INP. It is assumed BMPA's contention is derived from the Day Design review (see Appendix G of this report) where information on its own background noise monitoring is provided.

Day Design state that an Infobyte iM4 Type 2 noise logger was used alongside the applicant's (BarnOwl monitoring Location A in the EIS's) device at 98 Wollemi Peak Road in Bulga NSW. This was installed by Day Design's Mr Gauld on 18 July 2014 and measured noise for seven days and was returned by the property owner Mr John Krey on 30 July 2014.

It is assumed that reference to Type 2 relates to Class 2 as per Australian Standard AS IEC 61672.1. This instrumentation is inferior to Class 1 hardware, used by the applicant (BarnOwl). The BarnOwl statistical data (ie $L_{90,15\text{minute}}$, the metric used to calculate background noise) is captured by one of the three microphones and in this configuration the BarnOwl satisfies a Class 1 sound level meter in accordance with AS IEC 61672.1, the Australian Standard Electroacoustics sound level meters. This implies a measurement tolerance limit difference between the two units of generally $\pm 1\text{dB}$ for the frequency range relevant to environmental noise and used to derive RBL values as per AS IEC61672.1 Table 2.

It is unclear why only seven days of data is provided and analysed if the device was in place for 12 days (18 to 30 July 2014 as stated). The security of the data could be compromised in that time and it is unclear whether calibration of the unit was completed at the commencement and conclusion of monitoring as is required practice for mobile devices to ensure the data is valid.

It is stated that an RBL was calculated to be 30dB(A) for the day, evening and night period, with charts presented in Appendix D. It is not apparent how this result was derived. It is normal practice to provide the daily Assessment Background Levels (ABLs) used to define the RBL. The RBL is the median value of at least seven valid ABL values (refer to the EPA's INP for definitions). The ABLs have not been provided and, as such, the RBL cannot be verified. It is therefore concluded that Mr Gauld has not applied the EPA's INP methods to determine the RBL. Similarly, there is no mention of effects of weather on the data set in accordance with the INP.

To provide further information on the period in question EMM analysed data from the same period Mr Gauld addressed (18 to 25 July 2014) and beyond (to 11 August 2014) using the applicant's BarnOwl data. This is attached to the Day Design review in daily ABL tabular form derived in accordance with the INP and in daily charts.

The BarnOwl data shows that ABL levels (used to calculate RBL) rarely drops below 30dB(A), in the period 18 to 25 July 2014 (Day Design sampling period). Further, only 10 single 15 minute L_{90} samples (used to calculate ABL) drop below 30dB(A) from a total of 768 samples (ie approximately 1 per cent). For the Day Design seven day period (18 to 25 July 2014), the applicant's BarnOwl data was analysed in accordance with the INP and shows RBL values of 33dB(A), 36dB(A) and 37dB(A) for the day, evening and night respectively. This matter is addressed further in Appendix G of this report.

In addition, historic data presented in other publicly available documents also support RBL values greater than 30dB(A) for some areas in Bulga. This includes Section 8.1 of the noise and vibration report prepared for the 2002 EIS. The independent review by SKM prepared on behalf of the NSW Department of Planning & Infrastructure (April 2012), whilst not specifically commissioned to review background noise, provides 134 $L_{A90\ 15\text{-minute}}$ samples at various locations in Bulga between 2 December 2011 and 30 January 2012. These were all greater than 30dB(A).

In conclusion, the adopted and reported RBL values in the EIS are supported by an overwhelming dataset as shown in the EIS and reaffirmed by data collected by others. Therefore, the predicted noise levels are not well above acceptable noise limits as suggested by BMPA.

BMPA contends that a secret agreement exists on noise limits between the EPA and DP&E, whereby these are achievable and not in accordance with INP limits.

Consultation with all regulators is a critical part of any environmental assessment. It is important to note that negotiation between the regulator and the applicant can occur as prescribed in the INP (Section 8.2) where PSNLs cannot be achieved following the demonstrated application of all reasonable and feasible mitigation measures. As government policy, this process applies to all relevant development applications. The negotiation process between the regulator and the applicant must result in the establishment of statutory noise limits that reflect those that are achievable for the proposal, but does not compromise the amenity of sensitive receivers. The limits the EPA will license are typically within 5dB(A) of the PSNLs, as confirmed for this project in the EPA's submission. As described above, this can be above the INP's PSNLs where all reasonable and feasible mitigation has been adopted, and where the development is demonstrated to provide net benefits. This negotiation process is described in Section 8.2 of the INP. Section 8.2.1 of the INP provides a checklist for residual level of impact, which has been used and responded to in Section 10.6 of the EIS.

BMPA contends that the Broner criteria should not be used for LFN assessment.

As discussed in Section 9.7.1 and 10.9.1 of the noise and vibration study the INP method was considered in the assessment of LFN. As demonstrated in Section 4.3.1i of this report, the penalty does not apply based on predicted C and A weighted mine noise levels and therefore the EIS predictions are representative. The EPA's submission on the EIS (see Section 4.3) documents, however, acknowledges the limitations in the INP's LFN method.

To assist in understanding the potential for LFN impacts, the noise model developed as part of the EIS was used to quantify the L_{eq} dB(C) minus L_{eq} dB(A) levels as per the INP requirement. This was done for a representative set of residential locations in and around Bulga. The results are shown earlier in Table 4.3 of this report. Predicted L_{eq} dB(C) minus L_{eq} dB(A) are less than 15dB and therefore demonstrate the INP penalty does not apply during times when mine noise is predicted to be at its highest (ie worst case weather). This was done for a representative set of assessment locations within, east, west, north and south of Bulga village and therefore covering a wide expanse of that community. This reaffirms the predicted noise levels in the EIS for these areas in accordance with the INP.

Other considerations in assessing LFN are that measurements need to quantify dB(C) levels from the mine only in order to assess potential impacts. That is, the mine is not responsible for LFN outside its control. This is often very difficult in practice, particularly at large distances because of influences from the ambient environment (for example wind or road vehicles), leading to the C minus A INP approach being impractical and unrepresentative of the mine's contribution. This is also a reason for not using unattended real time noise monitors for dB(Cc) quantification for the purposes of assessing impacts (for example, under the INP's method).

As stated earlier, the EPA acknowledged the limitations of the INP LFN method and this is well documented (for example Broner 2010 and SKM Independent Review 2012).

Furthermore, LFN is a consideration of the 'in-service' target noise levels presented in the EIS (Table 10.3 of the noise and vibration study). The targets include both a linear (dB(L)) as well as a weighted (dB(A)) target to ensure attenuation does address LFN. Having these two targets means the attenuation cannot focus on the dB(A) while ignoring dB(L), which is important in reducing LFN. To demonstrate this, the 'work-in-progress' attenuation package used on trucks for example have been tested to show the improvement (at source) of the differential between dB(C) and dB(A). This is shown earlier in Table 4.4 of this report for one such tested truck at site. This test data shows that attenuated trucks have a smaller differential between C and A weighted noise. This at source improvement will also hold true at distance and means a better outcome for the community with respect to LFN.

BMPA refutes the assertion in the EIS that Bulga residences have a rural amenity.

Contrary to BMPA's assertions, the cumulative noise assessment in the noise and vibration study demonstrates that noise from all mining operations is expected to result in the INP's strictest 40dB(A) $L_{eq,9hour}$ night time rural residential amenity criteria being achieved at Bulga residences. This does not mean, however, that mining noise will not be audible or otherwise observed by Bulga residences.

BMPA contends predicted noise levels for the current proposal are higher in Bulga than the previous application.

Differences in predicted noise levels in the current and previous application are marginal for Bulga residences. The reason for Bulga properties having higher predicted noise levels in the current study is a consequence of adopting more conservative truck noise emission factors that, in practical terms, will likely be better than modelled (refer to Section 10.2.1 of the noise and vibration study).

BMPA contends that the compliance by the mine has not been demonstrated using noise controls.

Contrary to BMPA's assertions, Warkworth Mine has a strong noise compliance record, as evidenced by publicly available compliance monitoring records.

An assessment of monitoring data (publically available via the Rio Tinto Coal Australia website www.riotinto.com/coalaustralia) demonstrates predominant compliance with noise criteria has been achieved throughout the life of the mine. Non-compliant noise measurements account for a small percentage of the monitoring dataset at 0.37 per cent (10 non-compliances measured from 2,689 individual assessments undertaken). The results also demonstrate that there are no sustained exceedances.

When considering the impact of the Warkworth Mine on the area of Bulga village, the level of non-compliant measurements is relatively lower and accounts for 0.12 per cent of the monitoring dataset (two non-compliances measured from 1,643 individual assessments undertaken). The data also demonstrate that there are no sustained exceedances from Warkworth Mine. This matter is addressed in further detail in Section 7.2.1i above.

vi ES5.2 Air quality

BMPA contends that WML either cannot or will not control dust.

Contrary to BMPA's submission, Warkworth Mine has a strong dust compliance record and is committed to industry best practice dust management.

As discussed in Section 11.2.3 of the EIS, the recent compliance history at MTW as reported in the 2012 and 2013 annual reviews for the Site indicates monitoring results during this period for dust generation meet relevant criteria: there was 100 per cent compliance.

WML is committed to minimising impacts on near neighbours to the greatest extent possible using all reasonable and feasible industry best practice measures. Current management practices, operational control strategies and measures to effectively manage air quality impacts, both proactive and reactive, are detailed in the mine's air quality management plan and are considered sufficient to manage dust levels generated under the proposal.

BMPA contends that while the EIS states that significant air quality impacts will primarily be experienced at Warkworth Village due to mining activities moving closer, the mine plan shows mining activities moving substantially closer to Bulga. It is untruthful to state that air quality will be degraded at Warkworth and not at Bulga. BMPA further notes that while modelling indicates that air quality impacts will be below acceptable criteria for private dwellings in Bulga, it is logical that where an open cut mine moves two kilometres closer to a village that the dust impacts will be greater.

The EIS does not state that air quality will be degraded at Warkworth village and not at Bulga. Rather the EIS provides interpretation of dispersion modelling predictions that indicate dust generation as a result of the proposal will meet relevant criteria at privately-owned dwellings in Bulga.

The air quality and greenhouse gas study determined that cumulative PM₁₀ impacts are unlikely to occur at locations near Bulga. Cumulative impacts do, however, have potential to occur to the north and north-west of the Site as the mining activity moves toward the west. This would largely arise due to the prevailing meteorological conditions which favour the transport of material to these areas. Annual and seasonal windroses (see Figure 11.2 of the EIS) for the area show that the most common winds on an annual basis are from the south-southeast and south, generally the direction from the Site toward Warkworth village. Very few winds originating from the north-east, the direction from the Site towards Bulga village, occur.

The Mining SEPP's discretionary standard in respect to cumulative air quality impacts is met for all but two residential locations (77 and 264) which, consistent with the above, are located in Warkworth village. Both residential locations are significantly affected by a neighbouring mine (Wambo Mine). This, therefore, demonstrates that amenity under the proposal would not be compromised at Bulga.

BMPA notes that fine fraction dust, which is of concern to human health, typically originates from combustion sources. The mine burns 100,000,000 litres of diesel per year. It states that diesel fumes contribute to health impacts and must not be allowed to happen. BMPA contends that the statement that 'no air quality impacts are predicted to result from diesel emissions' is untruthful and that WML has not considered the cumulative impacts of diesel fumes from other mines in the wider Hunter Valley.

As described below, and consistent with the EIS, no air quality impacts are predicted to result from diesel emissions.

The majority of the particulate from diesel exhaust is in the PM₁ and PM_{2.5} size fraction, which is respirable deep into the lung. However, these emissions form a small part of the total dust emissions from mining.

The modelling in the air quality and greenhouse gas study explicitly considers PM_{2.5} impacts from the proposal, and the modelled particulate emissions (PM₁₀ and PM_{2.5}) include the emissions from diesel plant exhaust.

Whilst there are no established criteria for PM_{2.5}, an assessment of the incremental modelling predictions for annual average and 24-hour average PM_{2.5} with conservative estimates of background PM_{2.5} for Singleton was completed. This indicated that levels would not exceed the NEPM advisory reporting standards of 25µg/m³ at locations already predicted to comply for other parameters.

The supplementary diesel assessment in the air quality and greenhouse gas study was provided to also consider NO₂ effects from diesel plant. This additional assessment was provided as diesel engines also produce NO_x emissions.

OEH monitoring data in the Hunter Valley indicates the following in regard to emissions from diesel plant:

- The NO_x monitoring data show that NO₂ levels near Singleton are consistent with the levels at monitoring sites far removed from mining. The measured NO₂ levels are low and are well below the applicable criteria. Diesel combustion emits high levels of NO₂ and also fine particulate matter. If there were a significant effect from diesel plant it would be expected that this would appear in the NO₂ monitoring data. But this is not the case.
- The particulate monitoring data (see the figures below) show that PM_{2.5} levels in the Hunter are generally lower nearer to mines than the PM_{2.5} levels in the towns. The data show that OEH monitor at Camberwell, which is downwind of the Ashton, Glendell and Integra Mines (even when the Ashton North East Open Cut was operating) were the lowest levels measured in the Hunter Valley by OEH.

The PM_{2.5} monitor in Camberwell is downwind of the prevailing winds and is closer to mining activity than the monitors at Bulga, Muswellbrook and Singleton. Therefore, the data from Camberwell is most likely to reveal whether there is any significant effect due to fine particulate emissions from diesel mine plant. However, the PM_{2.5} levels in Camberwell are lower than at the locations much further from mining, such as Muswellbrook and Singleton, and importantly, the PM_{2.5} levels in Camberwell are similar or lower than the average levels measured in Sydney.

The data show that the PM_{2.5} levels in Camberwell, regarded as one of the most impacted locations in the Hunter Valley by mining, are lower than the levels in Hunter towns and are similar or lower than the levels of PM_{2.5} in Sydney that the majority of the people in NSW would experience. It is also clear that the OEH PM₁₀ data in the Hunter show the opposite trend to the PM_{2.5} levels. The PM₁₀ levels in Camberwell are higher than in the towns, and it is relatively clear that the upwind mines would be significantly responsible for increasing the coarser PM₁₀ levels in Camberwell. But it is also the case that these same mines and emissions do not have any significant effect on PM_{2.5} levels.

The data indicate that the rural towns experience high PM_{2.5} levels in the winter time. The proportion of PM_{2.5} in the PM₁₀ and shows that the proportion of PM_{2.5} increases in the winter time in the towns, but not so in Camberwell. The proportion of PM_{2.5} in the PM₁₀ measured in Muswellbrook is 0.49, in Singleton it is 0.38 and in Camberwell it is 0.34. It needs to be noted that the total PM_{2.5} concentration in Camberwell is generally lower, independently of the PM₁₀ level.

The OEH particulate monitoring data, as well as the OEH NO_x monitoring data therefore do not indicate any significant effect arising from the emissions released by diesel plant in comparison to the normal levels that occur across the state. The data show that the fine particulate levels near mining are low and are below the NEPM advisory reporting standards, and are below the levels that the majority of the population in NSW is exposed to. The data however indicate that fine particulate levels in Muswellbrook and Singleton are respectively above or very near the NEPM standard level, something that occurs in the rural towns and cities in which woodheater use is common.

It is the view of the BMPA that new draft policies were brought into being because of the Land and Environment court judgment and sets out to assist this Warkworth mine to gain approval. The Chief Judge Preston of the Land and Environment Court carefully weighed up the matters of ecology and found that in balance the high price of the damage to the ecology and the environment and the village of Bulga was too much. By changing the rules to make it easier for the mine to get approval does not change the impact on either the village of Bulga or the environment. Changing and lessening the effectiveness of the protection of the environmental laws will not save the destruction of the Warkworth Sands Woodlands or other endangered ecological communities.

BMPA also contends that these changes in the draft policies are simply a means to assist WML to gain approvals. These policies are only drafts and must be rejected for assessment purposes for this mine. Again we restate artificial changing of the policies to assist WML gain approvals does not assist in preserving the environment and the rural way of life in Bulga. We refer you to the substantial assessment carried out by Justice Preston and this must be applied to this application.

As stated earlier, BMPA's contention that government policies have been altered to enable the proposal to be approved is incorrect and unjustifiable. New or amended government policies introduced since the L&E Court judgment apply to all major projects in NSW: not just Warkworth Mine.

The *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) has three key objectives:

1. to provide clear, efficient and certain guidance for stakeholders;
2. to improve outcomes for the environment and communities; and
3. to provide a practical and achievable offset scheme for proponents.

The proposed BOS has been developed to fully satisfy contemporary NSW government policies including the *Draft NSW Biodiversity Offset Policy for Major Projects* (now final), FBA and UHSA. The assessment of the proposal's ecological impacts and the proposed BOS are consistent with these policies.

As outlined in the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final), the assessment has provided a transparent method to assessment impacts on biodiversity and likely gains on an offset site. This assessment can be found in Sections 6 and 7 of the ecology study (EIS Appendix H).

The proposed BOS, offset areas short-term conservation outcomes, should the proposal be approved, that would be 75.5ha of existing WSW of varying quality (from low to high quality) will be protected and managed. Additionally, the proposed BOS offers long-term conservation outcomes of approximately 160ha of WSG is proposed to be regenerated to WSW from former grazing lands. Overall, this means an addition of approximately 87ha of WSW will be added to the current 465ha extant (representing an increase of 19 per cent), accounting for the 72ha of WSW to be cleared within the proposed 2014 disturbance area.

Should approval not be granted, the existing extant of WSW will remain unchanged, unfunded and unprotected, and the threats described by the NSW Scientific Committee in the listing, will remain unmanaged.

BMPA contends that the impacts on WSW are not acceptable. The Land and Environment Court stated that the Warkworth Sands Woodlands is unique in the world and must be preserved. No Warkworth Sands Woodlands should be damaged or destroyed and it is not true that they can be confidently reproduced or expanded. The existing extant must be preserved and maintained and no further destruction can be permitted.

The proposal will result in a long-term net gain in WSW than currently exists. As outlined in Section 2.4.5 of this report, an Integrated Management Plan would be prepared to establish an effective mechanism to work with neighbouring owners of WSW to provide improved conservation outcomes through:

- coordinated management and re-establishment activities;
- exchange of knowledge;
- education; and
- consistency in monitoring programmes.

The final determinations of WSW points out that ongoing threats to WSW include open-cut coal mining. In response to this Coal & Allied has developed a significant BOS, which has since been certified by OEH as being acceptable for the proposal's impacts, a WSW Restoration Manual (provided in Appendix A to this report) and a draft LOMP which outlines management of the proposed offset areas.

The Biodiversity Assessment has been undertaken in the ecology study (EIS Appendix H) and supports the recommendation that the proposal represents a low risk to WSW not being viable in the short-term, and the viability of the community should be increased in the long-term. This is due to:

- clearing of WSW being progressive;
- 75.5ha of existing WSW of varying quality (from low to high), being protected and managed to transition to a higher quality WSW in the short-term;
- approximately 160ha of WSG proposed to be re-established to WSW from former grazing lands;
- the long-term conservation goal of the offset strategy for WSW providing a greater extant of WSW, this represents approximately 87ha more than the current extant in the long-term;
- improvements in protection mechanisms, ie BioBanking agreements on the WSW within the proposed SBA and NBA;
- under the 2003 development consent, areas of WSG in the SBA and NBA were identified for re-establishment but not protected as part of the offset, these will be protected using BioBanking agreements; and
- increase in patch size in the SBA and the development of a separate patch of WSW in the NBA. This reduces catastrophic risk of fire and disease to the WSW.

If the proposal is not approved and the BOS secured then:

- only approximately 75ha of existing WSW required to be protected by the 2003 development consent (DA-300-9-2002) will remain protected and managed;

- the WSW required to be re-established under the 2003 development consent will remain unprotected;
- the remaining WSW will not be permanently protected (ie 75.5ha in SBA and NBA as proposed);
- the opportunity for long-term extant to be increased by approximately 19 per cent (or net increase of approximately 87ha) to the current 465ha WSW extant through implementation of a re-establishment programme will not be realised;
- key threatening processes (for example, weeds, fire and catastrophic failure) to WSW would not be managed through a regime of ongoing regular and systematic site management practices;
- no ongoing funding to manage and protect the WSW; and
- less education and knowledge transfer among restoration ecologists and practitioners through the development and implementation of conservation management and re-establishment practices.

BMPA states the connecting corridor of woodland vegetation and fauna habitat across the site will take 22 years. This site will be an open cut pit destroying the existing corridors of Woodland vegetation and fauna habitat. It will be many years after that before the area can be established to provide a connecting corridor.

Section 5.3.1 of the ecology study assesses the proposed impacts on fauna corridors.

The proposed BOS includes mine rehabilitation that will form a north/south connecting corridor of vegetation between the existing vegetation to the north of the mine through the rehabilitation areas of MTO and Bulga Coal Complex (see Figure 7.6 of the ecology study) and in the future will connect to the large tract of intact vegetation at Singleton Military Training Area. The proposed rehabilitation corridor reduces the impacts of edge effects by forming one large linear block of vegetation rather than numerous scattered patches allowing for easier management due to reduced weed invasion and similar edge effects. With time, the rehabilitation areas will provide additional suitable habitat for threatened fauna species that may be impacted by the proposal.

WML believes the proposed land-based offset areas and contributions to the UHSA fund, will achieve a more beneficial outcome for the existing wildlife, should the proposal be approved. The long-term conservation outcomes would be an overall increase of extant vegetation protected, re-established in offset area and rehabilitated on site.

viii [ES5.4 Social](#)

BMPA contends that the SIA was generally not based on the interviews carried out and that there was not a comprehensive stakeholder engagement programme completed for the EIS.

Interviews carried out for the SIA were important to the assessment of potential impacts and a comprehensive engagement programme was completed for the EIS.

The applicant sought to consult as broadly as possible with both local and regional stakeholders to gain feedback regarding the proposal. A range of consultation tools were used during the preparation of the EIS and during the public notification period including one-on-one consultation (or semi-structured 'interviews'), community information sessions and provision of proposal information in various other forms (see Section 6.7.9 of this report).

A strong focus of the engagement that supported that SIA was with near neighbours and residents of local communities such as Bulga, as required by the Secretary's requirements. Approximately 44 per cent of interview participants were near neighbours, equating to 66 of the 151 participants. Approximately 20 per cent of Bulga's population was involved in the engagement programme, the highest participation of any stakeholder group. In addition to near neighbours, consultation was undertaken with MTW employees, local community groups, Singleton Council and other service providers and interest groups.

Throughout the SIA consultation process all data was coded and analysed to identify significant stakeholder identified themes across key topic areas which were then consolidated and summarised into Figure 21.6 of the EIS. The topic areas identified through consultation were used to guide the identification of impacts and opportunities, the analysis of which is presented in Table 21.5, Chapter 21 of the EIS and Appendix E of this report. The table provides an overview of community consultation findings in Column B and Technical Assessment in Column A. This clearly demonstrates that the assessment took into consideration the outcomes of the consultation with all stakeholders who were engaged through the development of the SIA. The assessment was based on both experiential information provided by those consulted and technical information from the broader EIS, particularly as it relates to amenity.

BMPA asserts that SIA's assessment regarding potential impacts to the viability of local services is creating an alarmist situation and has been well reported in other publications that a reduction in the workforce employed by the mining industry will have little or no impact on the Hunter Valley economy.

The SIA considers the social impacts on viability of services such as local schools should the proposal not proceed.

The SIA doesn't suggest that any schools would close, however the analysis indicates that given the small enrolment numbers of some local schools in the region, it could be assumed that if the proposal were not approved and employees who had children at those schools leave the region, further pressure would be placed on the viability of these schools. It should be noted that the figures used are highly conservative and don't take into consideration loss of employment from suppliers and contractors who may need to downsize as a result of any closure of MTW due to not being able to obtain approval for the proposal.

The SIA references a study undertaken by the Hunter Valley Research Foundation (HVRF). The HVRF's measure of employment intentions suggest that further weakness in the Hunter Valley labour market can be anticipated. ABS data shows that unemployment has increased in the Hunter Valley from 5.8 per cent in May last year to 9.2 per cent currently. Continued MTW operations would assist in maintaining a proportion of supplier revenues.

ix ES5.5 Economic

BMPA asserts that the economic study does not take into consideration the costs to the community and the environment should this application proceed.

The BMPA assertion is unfounded. The economic study in the EIS readily and transparently described the key assumptions used in the study and importantly, acknowledged that the economic models are a tool only to assist the consent authority in respect of determining the proposal. The study used market-based (also referred to as direct revealed preference) valuation techniques which refer to consumer behaviour and/or prices in a similar or related market (Department of Treasury and Finance 2013). These valuation approaches include:

- defensive expenditures: the costs incurred by individuals to mitigate the impact of changes and/or to recreate a situation that existed before a change, for instance by investing in noise insulation; and
- replacement costs: the cost of replacing or repairing a damage, for instance, to restore the environment to its previous condition.

BAEconomics used defensive and replacement expenditures – a form of market-based valuation - to value the noise, air quality and visual amenity impacts of the proposals.

x ES5.6 Groundwater

BMPA question that should the groundwater system be shown to be the dewatering or lowering of the water levels what can MTW do about this? The damage has already been done and this will be a disaster to the groundwater systems in this area.

The groundwater study prepared for the proposal provides a conservative and rigorous assessment of potential groundwater impacts.

The study was prepared by industry leading groundwater consultants AGE, using a model which was rigorously calibrated with data from the extensive MTW monitoring network. The study was undertaken in accordance with the Aquifer Interference Policy (AIP) as required by the Secretary's requirements and peer-reviewed at important stages during the assessment by Kalf & Associates. The outcomes of the peer review are reflected in the results presented in the EIS. NOW did not raise any concerns with the groundwater study.

The groundwater model predicted a water take from the Permian and alluvial sources under the proposal less than the currently approved water take.

An extensive monitoring network will continue under the proposal, which is included in the MTW water management plan. The management plan includes trigger values which provide a quantifiable measure for identifying adverse changes in groundwater levels and quality, including those on GDEs.

As a commitment under the proposal, additional monitoring bores along the Wollombi Brook and within the WSW. Consistent with existing practices, trigger values will be outlined in the management plan for these bores.

To provide further certainty in predictions, WML has committed to assessing the validity of the model predictions every three years. If substantial differences (previously unrecognised information) to those interpreted are identified, the validity data would be incorporated into the model and revised predictions made and publically reported.

xi ES5.7 Surface water

The BMPA notes that the EIS states that the MTW would capture runoff resulting in a minor reduction of maximum 0.44 per cent in the Wollombi Brook catchment area and a negligible reduction in the Hunter River catchment area. BMPA contends that this considers Warkworth Mine in isolation and this must be added to the cumulative effect of other mines that are currently proposing to expand in this area. BMPA states that it does not accept that this will have a minimal reduction in the Hunter River catchment nor should the proposal be able to reduce the runoff off 0.44 per cent for the Wollombi Brook.

As noted by the BMPA, the final landform has been calculated as capturing 8.6km² or 0.44 per cent of the Wollombi Brook catchment to the confluence of the Hunter River. This is a reduction on the maximum loss of catchment which occurs up to 10.5km² or 0.56 per cent of the Wollombi Brook catchment. The alternatives to the final void have been considered and discussed in Chapter 23 of the EIS. As described, these would either result in an increase to the proposed disturbance area, introducing additional risks to the rehabilitated site or be economically prohibitive.

xii ES5.8 Aboriginal cultural heritage

BMPA asserts that Rio Tinto has chosen to use the same data provided in the now disallowed 2010 EA.

The data utilised in the Aboriginal cultural heritage study for the EIS is an extensive and comprehensive knowledgebase drawn from the compilation of all Aboriginal cultural heritage and archaeological assessments and associated management activities (for example, excavations and mitigation) conducted within the MTW mining leases from the early 1980s through to as recently as January 2014. Since the Warkworth Extension 2010 there have been an additional five Aboriginal cultural heritage assessments and/or mitigation programmes from which data has been incorporated within the 2014 EIS. A detailed examination of these studies, including the currency and adequacy of data sets, are presented and addressed in Section 5 of the Aboriginal cultural heritage study. It is clear, therefore, that the study has not chosen to use the same data provided in the 2010 EA and any claim to the contrary is completely unfounded.

BMPA asserts that the proposal ignores the pleas of the Aboriginal groups requesting that their heritage not be disturbed. To date all 110 sites within the mined area have been destroyed and a further 104 in this proposal area are to meet the same fate. The submissions also stated that removal of artefacts such as grinding groove rocks and scarred trees from their original location is inconsistent with government law applying to other Aboriginal cultural heritage sites. BMPA also contends that Rio Tinto's methodology whereby historians, academics, anthropologists and legal representatives have not been included in the ACHWG can only cast suspicion on the possibility of the Aboriginal Community being disadvantaged in negotiations.

The BMPA make reference to previous consultation undertaken with the Coal & Allied CHWG for the Warkworth Extension 2010 to make the assertion that Coal & Allied 'has chosen to ignore the pleas of the Aboriginal groups requesting that their heritage be not disturbed', which is completely incorrect and misleading. As stated in the Chapter 18 of the EIS, while the RAPs have expressed a view that they would prefer that no additional disturbance to Aboriginal cultural heritage occur as a general principle, the RAPs have raised no objections to the measures proposed for managing and mitigating the impacts on Aboriginal cultural heritage associated with the proposal. One of the key mitigation measures endorsed by the CHWG RAPs is the establishment of the WBACHA an offset for the 110 cultural heritage sites that will be disturbed over the 21 year life of the proposal. The WBACHA incorporates approximately 698ha of land to permanently protect and conserve 265 significant Aboriginal cultural heritage sites and landscape areas including the highly culturally significant Bulga Bora Ground.

Coal & Allied notes that OEHL, as the key regulator with accountability for protection and management of Aboriginal cultural heritage, made a submission on the EIS stating the OEHL supported the Aboriginal community consultation approach undertaken by Coal & Allied for this assessment, specifically noting that no formal or informal opposition to the management measures proposed in the assessment had been received by OEHL from any RAP.

Furthermore, OEH acknowledges and supports Coal & Allied's approach in affording the CHWG the opportunity to consider the impacts and management of Aboriginal cultural heritage at a landscape level leading to a focus on the long-term management of a range of significant Aboriginal cultural heritage places and areas of high cultural significance within the broader regional context. OEH also states that it: "strongly supports all the management commitments proposed with respect to Aboriginal cultural heritage for the proposed Warkworth Continuation Project 2014" and that it had "no further comments or requirements for Aboriginal cultural heritage within the extension footprint".

xiii ES5.9 Historic heritage

BMPA contend that consultation regarding the proposed impacts on the RAAF Bulga Complex was inadequate as Air Force historians and heritage museums were not offered stakeholder input. The submission also states that it is unclear in the Historic heritage section (Part 19.2.1 page 319 2nd last para.) as to which base is described in the text. Bulga RAAF Base included 2 intersecting runways — the larger being capable of handling fully laden bombers and was strategically located for protection of both Newcastle and Sydney. Rio Tinto has downplayed the importance of the base during WW2.

The description provided in Section 19.2.1 of the EIS is referring to the RAAF Bulga Complex on the western side of Wallaby Scrub Road. Bulga RAAF Base was the parent aerodrome for three satellite airstrips located at Warkworth (Hunter Valley Gliding Club landing ground), Broke and Strowan. The location of the RAAF Bulga complex is shown in Figure 19.2 of the EIS with additional detailed descriptions and locational information provided in Section 3.4, Figure 4.2 and Table 4.3 and Annexure B - RAAF Bulga Conservation Management Plan (see p4 and Figure 5.2) of the historic heritage study (EIS Appendix N).

The relative significance of the RAAF Bulga complex is addressed in Section 6 of Annexure B - RAAF Bulga Conservation Management Plan in the historic heritage study. The complex is recognised as having State heritage significance. Personnel from the RAAF Museum Point Cook and Fighterworld Museum, RAAF Williamtown, were consulted on the history and significance of RAAF Bulga as noted in Sections 4.3 and 4.4 of Annexure B - RAAF Bulga Conservation Management Plan. Again, the BMPA's assertions as to the applicant's consultation are completely incorrect and misleading.

There is only one substantial built structure (building) associated with the site that was extant after the disposal of assets by Defence of Civil Aviation (DCA) during the early 1950s. The Mess Hall building was partially demolished after it was sold by the DCA to a private landowner for demolition or removal in 1953, well prior to Rio Tinto through Coal & Allied assuming ownership of the land in 2001. The Mess Building has been subject to vandalism and structural damage due to an adjacent tree collapsing on the building.

Only a very small portion of the RAAF Bulga complex, (approximately 4.8ha or 1.75 per cent of the complex) at the very eastern end of the east-west runway, will be affected by the development. This is an area of cleared ground situated beyond the end of the constructed runway. The affected area is to be largely incorporated within a 200m management buffer zone extending eastwards from the western boundary of the proposed extension area. This buffer area will not be mined and will be used for fencing off the mining area and for the provision of services such as an access road, water pipelines, power and drainage and, therefore, the anticipated impacts will be minor. The greater part of the RAAF Bulga complex will not be affected by the proposal and the historic heritage features will continue to be managed for their conservation.

BMPA also state that Wallaby Scrub Road has been deliberately downgraded in value by Rio Tinto, with an offer of \$200,000 to the Convict Trail Project to relinquish any interest in this portion of the Great North Road. Singleton Shire Council has previously rejected the mine extension proposal and any offer from Rio Tinto to acquire the road. Again, widespread consultation was not made available to other potential stakeholders.

While certain BMPA's assertions are perhaps best categorised as resulting from a lack of understanding of the consultation process undertaken by the applicant, the above submission is bordering on slander to suggest that Coal & Allied has offered the CTP \$200,000 to relinquish its 'interest' in the Great North Road.

It is important to note that the CTP does not hold any form of tenure or other statutory interest in the Great North Road that could be relinquished in exchange for a payment from the applicant.

As a result of the closure of the Wallaby Scrub Road section of the Great North Road, and based on feedback from its consultation Coal & Allied has committed to establishing the Great North Road Conservation Fund which will provide funding for priority heritage conservation works on significant surviving sections of the Great North Road. As would be expected the identification of such projects would require the input of the CTP, as well as other key stakeholders.

Coal & Allied will continue to conduct ongoing community engagement and consultation on the assessment and management of historic heritage places associated with the proposal through the CHAG and welcomes the participation of community representatives with particular knowledge and interests in historic heritage of the region, including representatives from historical groups, interested individuals and local government.

xiv ES5.10 Traffic and transport

BMPA notes that while the EIS discusses the beneficial effects of the opening of the Hunter Expressway, it ignores the projected increase in traffic flow along Putty Road after the completion of Badgery's Creek Airport. Further stating that a 200 per cent increase in traffic flow through Bulga will render the predictions in the EIS worthless.

The EIS discussed the potential beneficial effects of the opening of the Hunter Expressway as they have a direct impact on traffic in the local area. The timeframe and uncertainty of the Badgery's Creek airport proposal and the ongoing improvements being made to NSW's transport network, including large-scale infrastructure projects such as Northconnex, mean that the assertion that traffic through Bulga will increase by 200 per cent as a result of the airport proposal is entirely speculative and, at this point in time, not supported by any data.

BMPA contends that the statement that Wallaby Scrub Road is of inferior standard to other roads and dangerous is incorrect. Further noting that the accident rate is well below average.

The EIS does not state that Wallaby Scrub Road is of inferior standard to other roads and dangerous. The EIS simply makes the factual statement that Wallaby Scrub Road is a local road and is therefore constructed to less stringent design specifications than a state road, such as the Golden Highway.

The impacts of the Wallaby Scrub Road detour are discussed in Section 20.3.2iii(d) of the EIS. In this discussion it is noted that the detour would result in safer travelling conditions for detoured traffic (and lower accident rates per kilometre travelled) when travelling via the Golden Highway. This is, in part, due to, the higher road construction standards along this route, including improved intersection sight distances.

BMPA contends that Warkworth Mine has a poor rehabilitation performance record and that WML has no intention reinstating the landforms in relation to existing landforms (as evidenced by the proposed final void).

Contrary to BMPA's assertion, Warkworth Mine does not have a poor rehabilitation performance record. In regards to the final void, it is important to note that the single final void proposed for Warkworth Mine would be smaller than the two combined voids for Warkworth Mine and MTO that are approved under the mines' current development consents that would eventuate should the proposal not be approved. The proposal seeks to backfill the MTO void with material extracted from Warkworth Mine (including overburden won from the current MTO lease).

Land rehabilitation occurs at MTW in a progressive manner in accordance with timeframes that are outlined and approved in the MTW MOP and are consistent with the approved 2002 EIS. To date, the rehabilitation at WML has been concentrated in the north and east of the Site, predominately away from public roads. In the 2013 MTW Annual Review, which reported on the activities undertaken during the 2013 calendar year, the area sown for rehabilitation (61.6ha) exceeded the target for that year (54.5ha) which represents a 13 per cent increase in the rehabilitation commitment. The Annual Review is a public document and, following approval from the Department, is available from the Rio Tinto Coal Australia website.

In time, as active mining areas are completed and the final landform is developed, the area under rehabilitation will be expanded. Temporary rehabilitation is undertaken in exposed areas that are yet to be completed to reduce dust entrainment during dry periods. As indicated above, the rehabilitation activities that occur onsite are in contrast to the claims made in the above submission.

With regard to the final landform, the emplacement areas will be consistent with the surrounding landscape features. It is proposed that the slopes will be at 10 degrees wherever possible to encourage a stable landform that enables vegetation establishment. Where possible, relief will be constructed into top of the emplacement to minimise the visual impact and, once established, the vegetation will obscure the view of the rehabilitated emplacement areas from regional vantage points.

As shown in the viewshed analysis presented in Figure 15.2 of the EIS, the final void will not be visible from the point assessed to represent Bulga village.

BMPA notes that while the EIS states existing topography and vegetation would continue to provide screening to Warkworth Mine, the residences at Bulga are generally elevated with an unrestricted view of the mine. BMPA further notes that the proposed site mitigation measures would take many years to develop into appropriate visual screens and accordingly would not assist residents for a number of years.

The EIS acknowledges that there are elevated residences in Bulga with a view of the mine. Section 15.4.3 of the EIS states: "The visual impact of the proposal would generally be low/moderate for a majority of the primary visual catchment, with more prominent views and greater impacts on residences in elevated locations in and around Bulga village".

In regards to mitigation for any viewpoint with high sensitivity, a site specific visual assessment (SSVA) would be undertaken on request for properties in Bulga village. Any landowner affected by visual impacts from the proposal may request a SSVA, which may result in the application of appropriate screening treatments at the affected property or between the property and the source for impacts assessed as high.

For the small number of individual residences within the primary visual catchment, which may have high visual impacts at some stage of the proposal, suitable mitigation measures would be implemented, subject to agreement with the landowner. As discussed in Section 6.4.3 of the visual study (EIS Appendix J), Coal & Allied would be guided by the recommended extent of mitigation based on the SSVA and associated discussions and agreements with property owners. The design, including species selection, would be undertaken in consultation with the property owner, in keeping with the character and design of the residence. All designs would be agreed and signed-off by the landowner prior to implementation.

Plant species would be selected for their suitability for the local area as well as their aesthetic properties, including maturity. Maintenance of planting undertaken on private land would be the responsibility of the landowner from the time of installation, however, Coal & Allied will undertake fair and reasonable maintenance replanting of failed stock during the initial screen establishment period of approximately 12 months.

xvii ES5.13 Land and soils capability

BMPA notes that the land proposed to be mined under this proposal is shown in the draft 2012 State Regional Land Use Study as the area that should be maintained for viticulture and wine making purposes under the Broke Fordwich Wine Region. It states that “this proposed expansion does not recognise this internationally recognised wine region and intends to open cut mine areas that should be preserved for the Wine and Tourism uses. The rehabilitated areas can never be reused for grape or wine production. Some of the areas proposed have been used for grazing in the past but this cannot happen if this proposal proceeds. The depth of soil on rehabilitation is absolutely minimal and cannot provide a return to the original land use prior to mining.”

The draft 2012 Strategic Regional Land Use Policy (SRLUP) introduced several concepts for assessment for State significant mining proposals on biophysical strategic agricultural land (BSAL) and the Upper Hunter equine and viticulture critical industry clusters (CIC). In accordance with the submission requirements, the BSAL certificate was obtained prior to submission of the EIS which certifies that the area subject to the proposed open cut operation is not BSAL. Contrary to BMPA’s contention, the Critical Industry Cluster Land Map -Sheet CIC_003 (Map identification number: SEPP_MPEI_CIC_003_20130924) identifies land determined to be CIC which does not include the area subject to this proposal. The nearest CIC to the proposed 2014 disturbance area is approximately 5km to the south, outside the 2km barrier nominated by the SRLUP Guidelines for CICs.

While some of the areas proposed for biodiversity outcomes have been used for grazing in the past, the vegetation community in this area has been listed as the Central Hunter Grey Box – Ironbark Woodland endangered ecological community. The post-mining rehabilitation proposed is the re-instatement of this vegetation community and the development of a north-south vegetation corridor linking the proposed rehabilitation with adjacent vegetated areas.

BMPA disputes reference to Warkworth Mine and the adjoining MTO being long standing members of the community.

Ultimately, people's view as to MTW's contribution to the community is an individual opinion. However, what cannot be disputed is that both mines were established in 1981, over 30 years ago. The mines are an important employer to approximately 1,300 people including full time contractors, local suppliers and businesses, and an important contributor to support services and community organisations.

As noted in Section 6.6.1v, 82 per cent (or 1,066 people) of the workforce resides in LGAs of the Mid-Upper Hunter. Approximately 35 per cent of the workforce, or 455 people, live in the Singleton LGA, including Bulga. It is also noted that 56 per cent of the workforce have children who attend educational facilities in their local LGA and approximately 33 per cent participate in volunteering in their local LGA. The employee survey completed for the SIA found that 77.4 per cent of respondents either owned their home outright or had a mortgage.

BMPA disputes reference to the resource being significant referencing Judge Preston's comments, that even though there is a mineral resource below the ground it does not require that this must be extracted.

As described in Section 24.1.4 of the EIS, the resource within the footprint of the proposal is significant. The NSW Trade & Investment provided consideration of the significance of the resource in comparison with other resources across NSW in its submission. As described in Section 4.8.3 of this report, it concluded that the resource, the subject of the proposal, is of state significance.

The resource can be extracted efficiently and effectively by WML because of the hundreds of millions of dollars invested in the mine since it commenced operations in 1981 and, as an existing mine, it has established access to product transport and distribution infrastructure such as road, rail and port.

The continued operation of MTW has significant social and economic benefits in the form of continuing employment of its current workforce, approximately \$6billion in additional expenditure (including capital investment) and royalties of approximately \$617million in NPV terms. The economic benefits attributable to the Warkworth Mine include continuing employment for a workforce of some 1,187 people, approximately \$5.7billion in additional expenditure (including capital investment) and \$567million in NPV terms in royalties to the state.

BMPA notes that the EIS states that "the majority of the Mining SEPP non-discretionary standards are met" and that this assumed to mean that not all of the non-discretionary standards are met.

BMPA's assumption is correct, all of the Mining SEPP's non-discretionary standards are met under the proposal with the exception of air quality where the cumulative annual average criteria is exceeded for two properties already afforded acquisition rights by neighbouring mines, although this air quality standard is met for all privately-owned properties.

BMPA notes the statement that impacts on near neighbours have been minimised to the greatest extent possible using 'all reasonable and feasible measures while maintaining an economically viable mine plan'. It contends that simply stated, this is a matter of economics having priority over any other matters and this is not acceptable to the residents of Bulga.

This is an incorrect assertion. The statement acknowledges that there will be some impacts under the proposal including on near neighbours, as those stakeholders are located closest to the mine. Accordingly, WML is committed to industry best practice environmental management and continual improvement over the life of the proposal. As noted in the section above, extensive ongoing engagement with near neighbours will be implemented with feedback received continuing to be an important consideration in the operational management of the mine.

Further, as per Section 79C of the EP&A Act economic impacts are one of a number of considerations that must be made by the consent authority in determining a development application.

BMPA asserts that although the proposal meets all government policies, these were artificially put in place to ensure the Warkworth Mine gets approval. It states assessment of the application must refer to the balanced view of the L&E Court and the Supreme Court.

This matter is addressed in Section 6.4.2 of this report.

BMPA disputes the statement that Warkworth Mine has a long history of minimal non-compliance with government conditions of approval. It references the 800 noise complaints received in 2013.

This matter is addressed in Section 7.2.1i. It is important to recognise that a complaint does not equate to a non-compliance with government conditions of approval. As described, the mine has a strong compliance record with noise limits, and other measured environmental variables.

In 2014 (up to 29 September 2014), 667 complaints have been received. In the same period MTW had not received an infringement notice of non-compliance. Further, an analysis of these complaints indicates the following:

- 40 per cent of complaints were made by five individuals with approximately 78 per cent of complaints made by 20 individuals;
- of the 667 complaints made, over 88 per cent were related to noise impacts.

MTW has a strong compliance record with a total of 136 noise measurements taken for Warkworth Mine in 2014 (up until end of August 2014) with zero exceedances and zero non-compliances recorded. This further demonstrates that complaints received do not equate to non-compliance with government conditions of approval.

BMPA references the EIS statement that the proposal 'maximises returns on the substantial capital invested in the mine since it commenced in 1981 and has access to existing infrastructure such as road, rail and port'. It asserts that given the 2003 expires in 2021 the investment should be realised in this timeframe and is not a justification for the proposal.

Hundreds of millions of dollars have been invested on the mine since it commenced operations. Many millions have also been invested in training of its workforce. The proposal provides significant social and economic benefits in the form of the continuation of approximately 1,187 jobs on average in the long-term and payment of \$567million in NPV terms in royalties to the state (attributable to Warkworth Mine only).

These benefits would be realised with minimal environmental impact when compared with potential impacts from a greenfield development requiring the extraction of a resource of economic significance as identified in the proposal, particularly one that requires the construction of infrastructure such as road, rail and/or port. As stated in Section 23.3 of the EIS, continuation of existing mines, such as the proposal, is often more beneficial than the development of new mines as it inevitably involves less significant capital investment in infrastructure. Current and expected prices for coal are an obvious and significant determinant of investment decisions of mining companies. At current and expected prices for coal, applicants seeking approval for expansion/continuation of an existing mine or development of a new mine are those confident of an appropriate return on their investment. Applicants proposing to establish a new mining operation are likely to be at a cost disadvantage relative to applicants proposing continuation of an existing mine.

BMPA asserts that the benefits from the extraction of the resource are not as stated in the EIS. It references The Australia Institute submission prepared on its behalf.

As is outlined in detail in Section 7.2.9i the assertion here is false and the Australian Institute's analysis is shown to suffer from several fatal flaws as detailed in Appendix I.

As noted above, NSW Trade & Investment considered the significance of the resource in comparison with other resources across NSW in its submission. As described in Section 4.8.3 of this report, it concluded that the resource, the subject of the proposal, is of state significance.

7.2.2 The 2003 Development Consent and Deed of Agreement

i The new amending Deed of Agreement

The Deed of Agreement was considered by the DP&E before it recommended the Warkworth Extension 2010 should be approved. The original Deed was acknowledged by the DP&E to be an early attempt at offsetting and one that does not reflect current government policy. It was also considered by the independent PAC before it approved the Warkworth Extension 2010. In its report, the PAC noted the 'questionable condition and ecological value of much of the offset area' contained in the area covered by the Deed. Further, the Deed was incorporated into the PAC's assessment of Modification 6, before it determined in January 2014 that the modification should be approved.

The Deed has since been amended twice. The amended Deed makes provision for mining of the NDAs or Habitat Management Areas (HMAs) subject to a relevant planning approval issued under the EP&A Act.

As per Section 12.4 of the EIS, offset areas for the proposed mining of any land the subject of the Deed (and the subject of this development application) are provided for.

BMPA are concerned in respect of the mining of an area previously subject to the Deed. Specifically they raise the matter as to the proposal by BMPA include that:

- *areas of the land proposed to be mined are subject to permanent conservation;*
- *that WML did not rezone NDA land as required by the Deed; and*
- *that WML previously agreed to no disturbance in the Deed.*

At all times WML has complied with the requirements to rezone the NDAs. Under the Deed there is no obligation to rezone the NDAs until the last day of 2015.

The Deed has been amended such that if a planning approval is granted in respect of carrying out of development in the NDAs or HMAs the Deed is of no effect in respect of those areas.

While the proposal proposes development in the NDA and HMA areas the subject of the Deed, it proposes to replace the areas of these impacted with a replacement offset that will be protected in the long-term. See Section 12.4 of the EIS for details of the proposed offset.

BMPA raise issues regarding the proposed mining of NDA 1 (containing Saddleback Ridge) and noise, dust and visual impacts.

The existing development consent contains Specific Environmental Conditions for flora and fauna under Schedule 4. Under these specific flora and fauna conditions there is a requirement to enter into the Deed. This protection mechanism is specific to flora and fauna protection and is not related to protection of NDA 1 as a mitigation measure for noise, dust and visual amenity for Bulga village.

The original Deed was acknowledged by the DP&E to be an early attempt at offsetting and one that does not achieve the biodiversity goals of current government policy. The Deed was considered by the DP&E before it recommended the Warkworth Extension 2010 should be approved. It was also considered by the independent PAC before it approved the Warkworth Extension 2010. In its report, the PAC noted the 'questionable condition and ecological value of much of the offset area; contained in the area covered by the Deed.

The Deed has since been amended. The amended Deed makes provision for mining of the NDAs or HMAs subject to a relevant planning approval issued under the EP&A Act. The PAC assessment report for the recent Warkworth Modification 6 stated that they had been advised by the DP&E that the amended Deed allows for the land that was previously secured to be considered on its merits for mining and for a better conservation outcome to be found. The DP&E also advised the PAC that the Deed was created solely for biodiversity purposes. As described in detail in the EIS, offset areas for mining in this area are provided as part of the proposal.

In addition Chapters 10 and 11 of the EIS demonstrate that NDA 1, and in particular Saddleback Ridge, have no benefit in respect of noise or dust mitigation.

ii [The 2012 Planning Assessment Commission decision](#)

BMPA state that:

"The PAC acknowledged that the community had relied on that agreement in making their homes in the places that they did."

The PAC assessment report stated that reliance on the Deed was one of a number of factors to be considered in determining the significance of noise impacts. Other factors included the high stripping ratio and the implementation of off-site mitigation and management (ie double-glazing, insulation and air-conditioning).

As part of the project approval, the PAC required improved operational controls as means of mitigating potential impacts west of MTW. Coal & Allied also voluntarily offered to increase the number of properties to be afforded acquisition rights, subject to obtaining project approval. It should be noted that these property additions were not criteria-based. The additions were included in the Warkworth Extension 2010 project approval granted by the PAC.

As part of the current proposal, Coal & Allied committed to a number of upfront measures prior to lodging planning applications in March 2014. These measures included honouring the voluntary acquisition rights granted to some residents under the now rescinded planning approval for the Warkworth Extension 2010 determined by the PAC. These rights were lost when the L&E Court overturned the approval in 2013.

In undertaking individual discussions with respective property owners, Coal & Allied's intention is to reinstate residents' voluntary acquisition rights, subject to approval of the proposal, to put these residents in a comparable position to that which they held prior to the L&E Court judgment refusal of the Warkworth Extension 2010 and removing their acquisition rights.

Further, the approval for the Warkworth Extension 2010, before it was refused by the L&E Court, extended voluntary acquisition rights to commercial interests in the village of Bulga. Coal & Allied recognises that these local businesses are valued as community facilities and, as such, would aim to ensure that any offer of voluntary acquisition for the properties from which those businesses operate does not hinder the ability of independent commercial enterprises to continue to operate.

Despite the Warkworth Extension application being refused, WML has voluntarily maintained this offer to those persons who it offered it to in the statement of commitments (refer also to Section 6.7.4 of this report), subject to the proposal being approved.

7.2.3 Air quality and health

i Independent health study

BMPA joins other groups in the Singleton LGA calling for a comprehensive and independent health study and do not believe the air quality assessment adequately addresses the health implications of the proposal.

The potential health impacts of the proposal are described in air quality and greenhouse gas study, and discussed in greater detail in Sections 4.6.1 and 6.5.4 of this report and below. The call, made together with other groups in the Singleton LGA, for a comprehensive and independent health study is noted.

ii Generally

BMPA notes that the relationship between exposure to air pollutants, particularly fine particles and potential health impacts is now widely recognised, and that it is undesirable for governments to inflict a proposal on a community that has a high apprehension of health, injury and other serious environmental dangers.

The proposal would not result in unacceptable health impacts through the generation and airborne transportation of dust (principally, PM_{2.5}) to surrounding sensitive receivers.

As noted in Section 6.5.2 of this report, whilst there are no established criteria for PM_{2.5}, an assessment of the incremental modelling predictions for annual average and 24-hour average PM_{2.5} with conservative estimates of background PM_{2.5} for Singleton was completed. This indicated that levels would not exceed the NEPM advisory reporting standards of 25µg/m³ at locations already predicted to comply for other parameters.

The majority of particulate emissions from mining are dust particles, which originate from the soil. Due to the extreme forces required at the micro level to break down a particle of dust into smaller particles in the fine fraction, mining techniques used at coal mines generally cannot breakdown rock, coal or soil material into these very fine fractions. As a result, emissions from mines are predominantly in the coarse size fraction, which would not penetrate as deeply into the lung, or carry additional toxic combustion substances. PM_{2.5} emissions are usually generated through combustion processes or as secondary particles formed from chemical reactions rather than through mechanical processes that dominate emissions on mine sites.

As discussed in Section 6.5.4 of this report, the data show that the fine particulate levels near mining are low and are below the NEPM advisory reporting standards, and are below the levels that the majority of the population in NSW is exposed to. The data however indicate that fine particulate levels in Muswellbrook and Singleton are respectively above or very near the NEPM standard level, something that occurs in the rural towns and cities in which woodheater use is common.

The applicant wishes to reemphasise its commitment to industry best practice of dust particles of all sizes. This is reflected in commitments made under the proposal and will continue to be evidenced by the outcomes of monitoring and auditing against noise and air quality criteria with the results publically available on Rio Tinto Coal Australia's website.

iii The importance of the size of airborne particulate matter

BMPA notes the importance of the size of particulate matter when assessing health impacts, and asserts that the proposal will increase ground-level concentrations of nuisance dust (as indicated by TSP and dust deposition rates) and dust that can affect human health (PM₁₀ and PM_{2.5}) in Bulga.

Air quality goals/criteria established under government policies are benchmarks set to protect the general health and amenity of the community in relation to air quality. Therefore, compliance with these would suggest that general health and amenity are being protected. This includes the Mining SEPP's non-discretionary standard with respect to cumulative air quality impacts which, if met, demonstrates that amenity would not be compromised.

As described in EIS, technical studies for the proposal predicted that all privately-owned properties surrounding the operation would satisfy relevant all criteria with the exception of those already within, or inferred to be in, zones of affectation for mining operations (assessment locations 77, 102 and 264 located in Warkworth village). Further, the Mining SEPP's discretionary standard for all but two residential locations (77 and 264), both of which are already significantly affected by a neighbouring mine (Wambo Mine). This, therefore, demonstrates that amenity, including from nuisance dust, under the proposal would not be compromised.

Air quality and health are addressed in Section 6.5.4.

iv Dust in Bulga

BMPA notes that depositional dust maps from CCC meeting reports from October 2008 and March 2010 indicate exceedences of maximum allowable TSP criteria. At this time MTO was extracting coal only from the Abbey Green South eastern pit. These exceedences did not include dust emissions from Loders Pit at MTO and Warkworth operations to the west of Saddleback Ridge. MTO proposes to continue coal production well past its current consent date, working concurrently with Warkworth Mine and dust emissions from both mines, with no physical barrier (Saddleback Ridge) to mitigate dust flow, will substantially exceed the maximum allowable TSP criteria.

The indicative mine plan scenarios modelled for the air quality and greenhouse gas assessment of the proposal were selected to show the progression of the mine over time and to ensure that the maximum likely impacts at the receivers were captured in the assessment.

Modelling predicted no exceedances of TSP at privately-owned residences at any stage of mining with the exception of assessment location 78.

As discussed in Section 11.2.3 of the EIS, reporting of air quality monitoring results in the 2012 and 2013 annual reviews for MTW show that current dust generation has met the relevant criteria given in Table 11.1 of the EIS. This is despite dust generation recorded in 2012 being generally higher than for previous years, attributed to lower rainfall. A summary of the 2012 and 2013 dust monitoring results presented in the respective annual reviews is presented in the Chapter 11 of the EIS shows that annual average TSP concentrations were below the criteria of 90µg/m³ with recorded levels being generally 60µg/m³, with the exception of recorded levels of approximately 85µg/m³ at the most impacted monitoring location (WML-HV1 in 2012).

Under the Mount Thorley Operations 2014 proposal, mining at MTO would continue until nominally 2022, during which time overburden from Warkworth would be emplaced at MTO. Upon completion of mining at MTO, the emplacement of overburden sourced from Warkworth Mine would continue and achieve a more positive rehabilitation outcome for the site.

As noted in Section 6.5.3 of this report, the air dispersion modelling predictions do not indicate impacts above the relevant air quality criteria at Bulga village when the mine has progressed through Saddleback Ridge, including TSP. This indicates that the removal of Saddleback Ridge is unlikely to exacerbate the potential for air quality impacts in areas to the west of the mine.

v Statement from a Bulga resident

BMPA provided a statutory declaration with supporting photos (not received) showing coal dust collected in a Bulga resident's drink water filter. BMPA contend that as the mine moves closer this will only get worse.

As described in EIS, technical studies for the proposal predicted that all privately-owned properties surrounding the operation would satisfy the relevant criteria with the exception of those already within, or inferred to be in, zones of affectation for mining operations (assessment locations 77, 102 and 264 located in Warkworth village).

Although the air quality predictions are shown to be below relevant criteria, it is recognised there may be instances of perceived amenity concerns irrespective of achievement of this criteria. Coal & Allied has committed to contributing to a Near Neighbour Amenity Resource to provide services to residents surrounding the operation. It should be noted that this resource is to provide support for specific amenity concerns identified by individual residents and is not for compliance purposes.

vi Health Department report

BMPA state that NSW Health did not support the 2010 application, and that nothing has changed in this proposal.

In its submission, the NSW Department of Health raised no objection to the current proposal. Responses to the matters raised in its submission can be found in Section 4.6 of this report.

7.2.4 Surface water and groundwater

i Water

BMPA contends that mining which removes alluvium to reach coal beneath has an obvious impact on an alluvial aquifer ... with very little probability of successful restoration afterwards.

The applicant does not propose to mine into the alluvials associated with Wollombi Brook or the Hunter River. While the mining of alluvials and the successful return of the mine land to agricultural production has occurred previously at Hunter Valley Operations, no such activity is proposed under the proposal.

BMPA states that groundwater dependent ecosystems should be protected from salt concentrating in mined pits.

Groundwater dependent ecosystems will not be adversely impacted by salt concentrating in mined pits.

Section 8.1.9 of groundwater study (EIS Appendix K) indicates that the final void will act as a sink in the local environment. The final lake water level was calculated as reaching 20mRL at equilibrium. At this level it is not possible for the surface water to overtop the void walls and discharge towards the Wollombi Brook. In addition, the predicted final water level is below the level of these groundwater dependent ecosystems and hence there would be little interaction of the saline water in the void with the vegetation.

Further, during operations, the mine water would be managed in accordance with the approved water management plan and only be released in accordance with the HRSTS during flood events when the salinity can be diluted with the flood water and have negligible impact on downstream ecosystems.

BMPA states that (the EIS has) no measures and procedures to mitigate or offset any adverse impacts on groundwater dependent ecosystems or riparian vegetation.

As described in Section 8.15 of the groundwater study, the proposal has been modelled as having no adverse impact on GDEs. This includes WSW which utilises a perched water table which has no direct hydraulic connection with the underlying Permian fractured rock. The groundwater dependent vegetation communities in the SBA utilise groundwater from the shallow alluvial aquifer which will not be impacted by mine dewatering at that location. Further, no significant change is predicted in the baseflow of the Wollombi Brook or Hunter River and hence, no adverse impact will occur on the associated aquatic and riparian vegetation. As a result, no measures and procedures to mitigate or offset any adverse impacts on groundwater dependent ecosystems or riparian vegetation have been proposed.

As a precautionary measure, Section 16.4.1 of the EIS outlines proposed amendments to the monitoring programme with the installation of additional monitoring bores along the Wollombi Brook and within the Warkworth Sands Woodland. Trigger values are proposed and would be outlined in the MTW water management plan. The data would be reviewed regularly and reported annually in the annual reviews for the mine which are publically available on the Rio Tinto Coal Australia's website.

ii Cumulative impacts

BMPA states that there is no response plan which will be triggered by exceedances to groundwater and surface water assessment criteria.

In accordance with the current consent conditions, WML has an existing MTW water management plan that has been prepared in consultation with NOW and the EPA. The MTW water management plan includes performance criteria and trigger levels for the surface and groundwater and mechanisms for response to exceedance of the trigger values.

The MTW water management plan will be updated to reflect the proposal, subject to its approval. The management plan is reviewed within three months of the completion of an independent environmental audit, any exceedance of the consent's criteria or any modification to the conditions of the consent. To enable these reviews and ensure best practice, a detailed response plan is best located as a separate management plan that is developed to the satisfaction of the Director-General and is publically available as opposed to including the detailed monitoring and mitigation actions in the EIS which limit the ability to improve the plan.

BMPA contends that the EIS does not adequately assess the cumulative impacts in a catchment already heavily dominated by other open cut operations.

This matter is considered in Section ES5.7 surface water above.

iii Alteration of catchment regimes

BMPA notes its objection to any impact on the Wollombi Brook water source and requests that WML secure the water entitlements before any recommendation on the EIS is made.

WML will ensure that the necessary licences are held with a sufficient share component and water allocation to account for all water taken from a groundwater or surface water source prior to commencement of works under the proposal.

The current consent conditions for Warkworth Mine require that the applicant has sufficient water for all stages of the development and, if necessary, adjust the scale of its operations to match its available water supply. It is anticipated that a similar condition would be in the new development consent, subject to the proposal's approval. Activities such as sourcing the necessary water allocations to cover the business needs would be undertaken once certainty of the proposal is obtained.

BMPA states that the approval for water sharing from other mines cannot be guaranteed.

In sourcing water for its operational needs, WML will preferentially source water from non-potable sources over potable sources and the Hunter River. WML has an agreement with adjacent operations to obtain excess mine water when this is available and practical to do so and is continuing to investigate alternative sources of lower grade water for use in its operations. Access to water is a critical requirement for Warkworth Mine and, hence, should these alternative sources be unavailable then the applicant would have to source the required water from elsewhere or adjust its operations to match the available water supply.

BMPA objects to the eastern catchment being reconfigured to allow increased flows to the Hunter River.

Water engineers have worked closely with mine planners and operational teams over many years to design a water management system that minimises the risk of adverse impacts occurring on surface water resources. This same approach was extended to the design of the proposal.

The proposed mine water storages located to the east of the Site will assist the operation to minimise any impact on the surface water resources and is not a significant departure from the existing approved water management system. WML's licensed discharge point is into Doctor's Creek with no increase in the approved discharge being proposed. Any discharge under the proposal would continue to be undertaken in accordance with the HRSTS. As a result, there would be no downstream impacts on surface water quality arising from the proposal.

iv HRSTS

BMPA contends that no accurate quantities of pit water seepage have been predicted to allow assessment of the capacity of the mine water management plan.

The proposed operation is an extension of the existing mine extracting coal from the same seams. The hydrological investigations undertaken for the EIS combined with the seepage realised in the current operations provide a good understanding of the strata permeability and the storage required to contain and manage the mine water.

The groundwater inflows into the proposed operation are not anticipated to be significant and the proposed mine water storages located to the east of the Site will assist the operation to minimise any impact on the surface water resources. Dams, contour banks and drainage lines across MTW are regularly inspected to assess their integrity and efficiency to control and capture water. In the unlikely event that the capacity of the mine water storages is insufficient, there will be little risk to the environment as the excess water can be maintained in pit until it can be pumped to a more appropriate storage facility.

The MTW water management plan will be updated to reflect the proposal in accordance with the development consent conditions and in consultation with the appropriate State government agencies.

More information is required as to the Water Management Plan in respect of holding the water in prolonged dry periods when the HRSTS might not permit discharge.

In prolonged dry periods, based on the groundwater studies, the seepage rates into the pit would decrease. Correspondingly, the amount of water that is managed at Warkworth Mine also decreases. For this reason, the request for additional information is considered unnecessary. The MTW water management plan will be updated to reflect the proposal and in accordance with the development consent conditions, should approval be granted. The revised MTW water management plan would be publically available on the Rio Tinto Coal Australia website.

The BMPA believes that further information needs to be provided on the site's water balance with particular attention to the capacity of the mine waste water storage to hold all runoff and seepage in dry times when the HRSTS cannot be accessed.

This matter is considered in the preceding sections.

v **Water needs**

BMPA states "The EIS notes that should the contingency plan be utilised that an extraction licence for this purpose would need to be obtained. It is not clear whether this would be a groundwater or river water licence."

The licence sought would depend on the water source impacted. The applicant has made a commitment to obtaining the water licences applicable to its potential and realised impacts of the continued extraction should the proposal be approved.

vi **The final void**

BMPA contends that it is unconvincing and not proven that the water from the void will not drain back into the Wollombi Brook alluviums.

Due to the depth of the void and the vertical height differential between the stored water and the Wollombi Brook alluvium, the water held in the void will be unable to drain uphill from the void to the alluvium. This can be visualised by the exaggerated graphic in Figure 8.4 of the groundwater study. The void cannot drain back uphill into Wollombi Brook alluviums.

BMPA asserts that there is no convincing evidence in the EIS that there will be no hydraulic gradient from the Wollombi Brook and the alluvial aquifers towards the mine.

Section 8.1.1 and 8.1.3 of the groundwater study discuss the impact of the operations on the groundwater levels and the alluvium. A groundwater gradient does occur towards the final void. The hydraulic gradient is typically steep immediately adjacent to the highwall and shallow as distance increases away from the void. This is illustrated in Figure 8.4 of the groundwater study mentioned above.

While there is a groundwater gradient towards the completed operations with the alluvium drawdown predicted to be less than 1m, the sensitivity analysis indicates that leakage from the Wollombi Brook does not buffer any drawdowns during the predictions.

BMPA notes its concern that high groundwater pressure levels (driven by recharge from surface runoff) may result in final void water levels above those existing pre-mining, thus potentially leading to a breach of the void walls (overtopping) and, consequently discharges of super-saline water.

The final levels of the surface water collected in the mining void have been calculated with the knowledge of the groundwater inflows, annual rainfall, the evaporation rate occurring onsite and the surface area of the void. Given that the crest of the void at the end of mining is approximately 11m above the 1 in 100 flood level and surface flows in the Wollombi Brook are unlikely to contribute to the final water level, it is not possible for the surface water to overtop the void walls and discharge towards the Wollombi Brook.

7.2.5 Ecology

i Key differences between the 2010 and 2014 proposals

BMPA notes key differences between the 2010 and 2014 proposals. It states that while these differences are many, they do not constitute a substantially different project to that applied for in 2010 and rejected by the Land & Environment Court and the Supreme Court.

These differences are addressed in Appendix I of this report, which provides a response to the Eastcoast Flora Surveys review, however, it is important to recognise and understand the context of the proposal with regard to the Warkworth Extension 2010, specifically the consistency with the L&E Court judgment and whether a precedent had been set. The L&E Court judgment was in response to a merit appeal under the L&E Court's Class 1 jurisdiction in regard of the Warkworth Extension 2010. As stated in the L&E Court judgment, in a merit appeal:

The Court re-exercises the statutory power originally exercised by the Minister to determine Warkworth's project application by either approval or disapproval. The Court stands, metaphorically speaking, in the shoes of the Minister and determines for itself, on the facts and law that exist at the time of determination of the appeal, whether to approve or disapprove the application for the Project.

Given this, merits appeals are of limited precedent value as the function the L&E Court is performing in a merit appeal is that of a consent authority in respect of a planning application. Accordingly, merit appeals are decided specifically on the facts relevant to the specific development they relate to and have no more precedent value than any other decision of a consent authority.

Further, it should be noted that WML is within its rights to lodge a development application for the proposal, despite that the application for the Warkworth Extension 2010 was refused by the L&E Court. The NSW planning system permits an applicant to make as many applications as it wishes in respect of the same parcel(s) of land.

The above position is further supported by information given in Section 6.2.2 of this report.

In summary, given the changed legislative regime, differences between the Warkworth Extension 2010 described in Section 1.2 of this report and the proposal, and the fact that the NSW planning system supports the making of multiple development applications in respect of the same parcel of land, there is no basis for any submission that the development application for the proposal is unlawful or improper.

ii Distribution and extent of Warkworth Sands Woodlands

BMPA state that the extant and area pre- European settlement have important implications insofar as the significance and impacts on Warkworth Sands Woodlands and more generally on the acceptance to remove portions of such critically restricted vegetation community.

The proposal will have a net positive impact on biodiversity, including providing long-term benefits for WSW. The BOS has been certified by OEH in accordance with clause 14(3) of the Mining SEPP as adequate for the impacts of the proposal.

Differences of opinion exist between various ecologists on the interpretation of the scientific committee's listing of WSW. These differences are based on either floristics or the state of modification caused natural or man-made processes. UNE found that areas within the NBA contained components of WSW 'several significant remnants that contain *A. floribunda* and re-growth *B. integrifolia*. Significantly there are many large 'sentinel' trees of *A. floribunda*, *E. mollucana*, *E. crebra* and *E. tereticornis*.' and 'The area is a very valuable area in which to plan the re-establishment of WSW' (C.L. Gross (UNE) Vegetation Survey Warkworth Sands Woodlands December 2007).

In the L&E Court judgment (par. 220 – 227) Dr Robertson and Dr Clements mapped large areas of the NBA as WSW which Mr Bell, an ecologist for the appellant, described as better characterised as being of vegetation communities other than WSW.

During the L&E court case Dr Robertson described the extant WSW as 746ha, compared to Mr Peake's, who had been engaged by the DP&E to review the Warkworth Extension 2010 ecology study calculation of 464.8ha. Justice Preston found that the extant of WSW was closer to 464.8 ha (par. 91 and 98 of L&E Court judgment).

By taking a conservative approach, the EIS uses the areas from the L&E Court judgment for its assessment of WSW as being 464.8ha. It is noted, however, that further research and data may confirm a larger area.

Currently, no areas of WSW occur within a conservation reserve. However, some areas of WSW have been required to be protected 'under conditions of approval for the Wambo Coal Mine, but these are not permanently protected as subsequent approvals can revoke the requirement to conserve the areas of WSW' (par. 103 of L&E Court judgment).

Since the L&E Court judgment, 70ha of WSW required to be offset under the 2003 development consent, have been protected in perpetuity. The remaining WSW is still without conservation protection.

iii Significance of WSW

BMPA note the significance of Warkworth Sands Woodland. BMPA contends that the proposal to remove the bulk of high quality areas of Warkworth Sands Woodlands and to compensate with low-to-medium condition Warkworth Sands Woodlands in the northern biodiversity area and the southern biodiversity area land-based offsets is unacceptable. The areas of old growth Warkworth Sands Woodlands should be attributed greater conservation significance.

BMPA states that Warkworth Sands Woodlands is a factually critically endangered ecological community of highly restricted distribution. To date there has been no demonstration of successful restoration of Warkworth Sands Woodlands so claims that such activities will be adequately offset the removal of 72 hectares of this community are unsupported.

As noted above, the proposal will have a net positive impact on biodiversity, including providing long-term benefits for WSW. The BOS has been certified by OEI in accordance with clause 14(3) of the Mining SEPP as adequate for the impacts of the proposal.

Since the WSW EEC listing updates to the TSC Act have added an additional listing category 'Critically Endangered'. The current extant and possibly the pre-European extant of WSW may qualify as a CEEC under the TSC Act, due to its limited extent. Regardless of the listing category, the WSW is a significant community and changes to the listing category will have only minor conservation outcomes for the community. A change in listing would not alter the issues for the consent authority, or change current management practices.

The NSW Scientific Committee, in its final determination in 2002 listing WSW as an EEC, found that WSW is now mainly confined to a small area near Warkworth, around 15km south east of Singleton. This occurrence now comprises nearly 80 per cent of the extant vegetation. The current WSW extant may be as little as 13 per cent of its pre-settlement occurrence (par. 88 of L&E Court judgment). No areas of WSW occur within a conservation reserve.

The long-term conservation goal of the offset strategy for WSW providing a greater extant of WSW, this represents approximately 87ha more than the current extant in the long-term. The proposed BOS anticipates that lower quality WSW and WSG will transition to higher quality WSW over time. This is consistent with the concepts of additionality contained in the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) and the calculations supporting BBAM. This is also consistent with federal government's offsetting policy.

If offset areas were provided with only like for like quality, then the only conservation gain would be greater protection for the existing, and not an increase in extant and quality as proposed. The short-term conservation outcome, should the proposal be approved, will be the protection and management be 75.5ha of existing WSW of varying quality from low to high. In the longer-term, the conservation outcomes would be 160ha of WSG re-established to WSW from former grazing lands. The proposed BOS provides an addition of approximately 87ha of WSW will be added to the current 465ha extant (representing an increase of 19 per cent), accounting for the 72ha of WSW to be cleared within the proposed 2014 disturbance area.

Should approval not be granted, the existing extant of WSW will remain unchanged, unfunded and unprotected, and the threats described by the NSW Scientific Committee in the listing, will remain unmanaged.

iv UNE research

BMPA refer to the University of New England research and states that the fact that no papers or any results have been incorporated into plans to restore Warkworth Sands Woodlands.

The UNE undertakes independent research. The unpublished document 'A blueprint for the restoration of Warkworth Sands Woodland' was a Coal & Allied commissioned document outlining the scope of the research to be undertaken by the UNE. As an independent research body the research must follow strict scientific protocols. Setting up research, undertaking trials, collecting data, data analysis and writing up of reports takes considerable time. The conversion of these reports into published papers requires internal review, peer review, acceptance by a journal and publishing.

As an independent research body it is unlikely that the UNE would release publically, the results of research until this process is completed.

WML has worked closely with UNE whilst this research has been undertaken and has a sound knowledge of its outcomes and applications for the approach to restoring WSW.

v NBA and SBA

BMPA contends that mapping of WSW in northern and southern biodiversity areas is inaccurate, and not consistent with the L&E judgment.

Mapping is consistent with the L&E Court judgment (par. 227):

I find therefore that the areas of extant WSW and CHGBIW should remain as previously estimated, most recently in the Biodiversity Offset Strategy [sic 2010 Warkworth Extension EIS], namely 19.5ha of WSW.

The ecology study uses 19.5ha of WSW in the NBA, and calculates BBAM credits which will be verified by OEH.

vi Supplementary offset measure 2

In regards to supplementary offset measure 2 the BMPA states that in its current form to be a minor compilation task of existing data and should not be presented as an offset measure of any significance.

It further contends that offset measures proposed have been overstated in value and restoration efforts planned offer no certainty that WSW can be re-established successfully on former grazing land.

Performance criteria for WSW re-establishment are contained within the draft LOMP (Appendix B of this report). Additional supplementary/conservation measures have been proposed, and these are detailed below. The risk to re-establishment is also detailed below.

vii Risk of extinction and precautionary principle

BMPA raise the risk of extinction and precautionary principle in regards to WSW.

The precautionary principle was considered in the assessment of ecological impacts, including on WSW, and in the development of the BOS for the proposal.

The precautionary principle as defined in the *Protection of the Environment Administration Act 1991* states:

- (a) the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
- (ii) an assessment of the risk-weighted consequences of various options,

It is inappropriate to apply the precautionary principle to a single component (ie restoration of WSW) of a larger comprehensive offset package. The *NSW Biodiversity Offsets Policy for Major Projects* (now final) provides a framework for applicants to develop offset packages through a combination of measures. The policy states that while most offset requirements can be determined during assessment, some impacts will require further consideration by a consent authority. In accordance with the policy, when considering impacts on WSW, the consent authority may make the following recommendation: *the project can proceed with additional offsets, supplementary measures or other actions to be undertaken to mitigate that impact.*

Consistent with the *NSW Biodiversity Offsets Policy for Major Projects* (now final), the application of the precautionary principle requires a decision-maker to evaluate the impacts with consideration of the full suite of offsetting measures provided, including that of restoration of WSW and its likelihood of success.

In light of this, the biodiversity assessment undertaken in the ecology study concludes there is low risk of WSW not being viable in the short-term, and the viability of the community should be increased in the long-term. This is due to:

- clearing of WSW being progressive;
- 75.5ha of existing WSW of varying quality (from low to high), being protected and managed to transition to a higher quality WSW in the short-term;
- approximately 160ha of WSG proposed to be re-established to WSW from former grazing lands;
- the long-term conservation goal of the offset strategy for WSW providing a greater extant of WSW, this represents approximately 87ha more than the current extant in the long-term;
- improvements in protection mechanisms, ie BioBanking agreements on the WSW within the proposed SBA and NBA;
- under the 2003 development consent, areas of WSG in the SBA and NBA were identified for re-establishment but not protected as part of the offset, these will be protected using BioBanking agreements; and
- increase in patch size in the SBA and the development of a separate patch of WSW in the NBA. This reduces catastrophic risk of fire and disease to the WSW.

If the proposal is not approved and the BOS secured then:

- only approximately 75ha of existing WSW required to be protected by the 2003 development consent (DA-300-9-2002) will remain protected and managed;
- the WSW required to be re-established under the 2003 development consent will remain unprotected;
- the remaining WSW will not be permanently protected (ie 75.5ha in SBA and NBA as proposed);
- the opportunity for long-term extant to be increased by approximately 19 per cent (or net increase of approximately 87ha) to the current 465ha WSW extant through implementation of a re-establishment programme will not be realised;

- key threatening processes (for example, weeds, fire and catastrophic failure) to WSW would not be managed through a regime of ongoing regular and systematic site management practices;
- no ongoing funding to manage and protect the WSW; and
- less education and knowledge transfer among restoration ecologists and practitioners through the development and implementation of conservation management and re-establishment practices.

viii Biodiversity offsetting

In regards to biodiversity offsetting, the BMPA states that the 2014 application has reduced the offset from seven parcels of land to two, presumably in response to the judgment in the L&C court judgment, which found many of the proposed offsets to be inappropriate (NSWLEC 48, 2013, paragraph 202-207)...This approximates to 1/5th of that originally proposed.

As noted by the BMPA, the proposal has not put forward the same offset package following the L&E Court judgment. As outlined in the EIS, the proposal includes a new 2014 BOS that would result in a net positive impact on biodiversity and meets contemporary NSW Government policies. The notion that the BOS approximates to one-fifth of that originally proposal is incorrect and irrelevant to the current proposal.

BMPA states that given uniqueness and highly restricted distribution of WSW it is perfectly understandable that no amount of land-based offsetting can be expected to satisfactorily compensate for the removal of portions of this community.

The BOS has been developed to have a net positive benefit on biodiversity, including a combination of measures outlined in the BOS and the additional supplementary measures which will adequately offset impacts on WSW. The BOS has been certified by OEH in accordance with clause 14(3) of the Mining SEPP as adequate for the impacts of the proposal.

The proposed BOS also provides for the re-establishment of WSW from WSG increasing the current 465ha extant by approximately 19 per cent (a net increase of 87ha). The re-establishment activities include utilising rehabilitation resources of the proposed 2014 disturbance area so that the native vegetation on the Warkworth Sands can be re-established as a long-term viable self-sustaining ecosystem. This will reduce potential unforeseeable environmental risk of harm to the WSW and improve the long-term conservation outcomes for WSW. As described above, the risk to extinction of WSW may be increased should approval not be granted.

ix NBA

BMPA contend that the mapping of vegetation communities within the Northern Biodiversity Area is inaccurate.

Mapping is consistent with the L&E Court judgment (par. 227) which states:

I find therefore that the areas of extant WSW and CHGBIW should remain as previously estimated, most recently in the Biodiversity Offset Strategy [sic 2010 Warkworth Extension EIS], namely 19.5ha of WSW.

The ecology study uses 19.5ha of WSW in the NBA, and calculates BBAM credits which will be verified by OEH.

The BMPA argues that there is a high probability of failure in any attempt to recreate ecosystems.

The restoration of WSW forms a part of a comprehensive BOS for the proposal. WML is highly confident in its ability to successfully re-establish ecosystems, in particular, WSW.

As previously stated, the scientific research undertaken to date has contributed to an extensive scientific understanding of the vegetation community to enable restoration activities to commence. Other offsetting measures to compensate for impacts on WSW include land-based offset areas and other supplementary/conservation measures such as contributions to an Integrated Management Plan, development of completion criteria and upfront provision of an Implementation Bond valued at \$1million. The Implementation Bond is provided as security that the expected results of appropriate applied land management restoration interventions be achieved within a 15 year target. If the 15 year targets are not met, the Implementation Bond does not remove the requirement to deliver the WSW re-establishment programme. The bond provides WML an incentive to continually commit resources to delivering WSW in a timely manner.

WML is committed to the successful re-establishment of WSW in the areas mapped as WSG in the SBA and NBA. The flora species that make up the unique assemblage that is WSW are not in themselves unique and are found in various other ecosystems. Propagation of most species such as the keystone eucalyptus in the overstorey and understorey species such as banksia, acacia and native grasses have been successfully germinated by UNE and elsewhere. The re-establishment areas are on in-situ sand deposits that once would have grown WSW. These sand deposits have the same water regimes, micro-organisms, climate, and in many cases component species already present. Re-establishment would provide a large, fully functioning example of the EEC through the enhancement of areas that are currently in reasonable ecological condition, and by re-establishing the community in areas where it is currently degraded.

A review of the WSW in Figure 5.2 of the ecology study (EIS Appendix H) and the historical aerials shown in Figure 4.3 (EIS Appendix H) indicate that WSW was heavily cleared in the early 1960s. This comparison is shown in Figure 2.12. By 1979, the vegetation had undergone significant regeneration and is now considered a good quality example of this community. Modern restoration techniques when applied to similar areas will enhance the natural regeneration of the WSW providing a high likelihood of successfully re-establishing WSG to WSW.

Further, the proposed WSW re-establishment programme in the SBA and NBA builds on comprehensive scientific understanding of the vegetation community compiled with the assistance of the UNE and other regeneration practitioners.

A WSW Restoration Manual has also been prepared (provided in Appendix A of this report), which summarises the previous work undertaken by UNE, Dr Anne Marie Clements and Associates, and Cumberland Ecology. This Restoration Manual provides a sound basis for guiding best management practices to restore WSW. The Manual also sets out a process for tracking the recovery of WSW sites toward a reference state as a result of appropriate applied land management restoration interventions.

A draft LOMP has also been developed. The LOMP establishes conservation objectives, key performance criteria and indicators for the SBA and NBA, as well as outlining conservation management actions and monitoring programmes that have been formulated based on the existing ecological condition of the SBA and NBA to achieve the conservation objectives.

The WSW/WSG offset areas add to existing protected areas containing WSW and other extant vegetation in the locality. Together, these would form the largest known area of WSW under long-term conservation in the region. Assessments indicate that this is likely to provide the best long-term viable community of WSW.

BMPA also states that in this case the chances of collecting sufficient seed from the trees themselves are low as they do not flower every year and then the period of pollination is short and might be missed or dry conditions might make them useless or the birds or ants might get them first. If there is no demonstrated, viable seed bank then this project will fail and the WSW will be lost since the prospects for finding seed elsewhere are very poor.

WML is highly confident in its ability to collect sufficient seed to support the re-establishment of WSW.

WML has several programmes in place to assist with increasing collection of viable WSW seed. These include:

- seed collection programme in disturbance and restoration areas;
- translocation of some key WSW species; and
- seed increase lots.

Additionally, the restoration implementation is well resourced and supported by a substantial operational budget, an internal Offsets Manager, Offsets Specialist, Rehabilitation Specialist and external restoration technical experts.

The mine plan for the proposal results in the progressive clearing of 72ha of WSW. Clearing is scheduled to commence in approximately 2018 with approximately 6ha on average being cleared per year. This enables WML sufficient time to collect seed from WSW in the proposed disturbance area.

The Restoration Manual also outlines planting and management for re-establishing WSW, which has been informed by UNE's research. Some of the planting measures include the use of tube stock from nurseries, and transplanting cuttings and tissue culture. Further detail is contained in Appendix A of this report.

As part of the now rescinded approval for the Warkworth Extension 2010 granted by the PAC prior to being overturned by the L&E Court, \$500,000 was required to be spent on research for WSW. This research was targeted towards provenance testing using genetics and has been completed.

Provenances testing included; climatic variables, germinate, stress in glasshouse experiments, survivors in the field, and also germination in the field with concurrent genetic trials. The results showed genetic differentiation among provenances was weak but heterozygosity was positively associated with plant health in the plants that survived the stress experiments. The stress testing results also informed target species, and how specific species will act during drought and flooding. The research also indicated that seed can be sourced from outside the Hunter Valley, if required.

BMPA also contends that even if successful in seed collection and propagation it will take up to 25 years or more before a sustainable ecosystem is recreated which will replace the habitat loss at Warkworth. By this time some of the endangered and vulnerable bird species will have been lost.

WML agrees that it will take a substantial amount of time to recreate a fully functioning eco-system like that of WSW; however, the objective of the re-establishment of WSW will provide a long-term gain in the extant of WSW.

Should development consent be granted, the implementation of WSW restoration will commence immediately, and large area of WSG will begin the trajectory towards a functioning WSW ecosystem in the long-term. As noted, clearing of WSW would occur progressively commencing in approximately 2018 with approximately 6ha on average per year being cleared.

xi [Review by Dr Stephen Bell](#)

A response to the remainder of ecological matters raised in Section 4 of BMPA's submission is provided in Appendix I of this report.

xii [BMPA conclusion](#)

BMPA also calls for an integrated assessment of the vegetation loss and ecological impacts of all the mines in this location and in the Hunter Valley as a whole. Just as this is imperative for air quality assessment, for noise and water effects, a regional assessment must also be done for biodiversity issues.

Current government policies provide a transparent assessment and long-term conservation gains for all vegetation types, as outlined above. The proposed vegetation loss is currently under assessment from OEHL, via the UHSA. UHSA reviews the proposed cumulative impacts from mining in the Upper Hunter over the next 30 years. BMPA's request is, therefore, unwarranted.

7.2.6 [Fauna](#)

i [Impact on endangered and vulnerable fauna](#)

The BMDP asserts that the proposal is likely to have an adverse effect directly and indirectly on a number of threatened and vulnerable species under both the TSC Act and EPBC Act, so that the viable local populations are likely to be placed at significant risk of extinction. Woodland bird species are in serious decline in NSW and the Hunter Region evidenced by the number of species on the TSC Act list.

The proposal will not adversely affect a number of threatened and vulnerable species listed under both the TSC Act and EPBC Act, so that the viable local populations are likely to be placed at significant risk of extinction.

Potentially occurring threatened woodland bird species forage within the study area are ubiquitous to most vegetation types in the Hunter Valley, and are not unique to the vegetation communities that will be gradually cleared over the life of the proposed extension. As described in Section 5.4 of the ecology study (Appendix H of the EIS), seven woodland birds species listed as Vulnerable under the TSC Act have been recorded within the Site. All of these recorded species are largely dependent on woodland communities although some will also occur in forest communities or the ecotonal zone between woodland and derived native grassland. The proposal will result in the removal of forest, woodland and adjacent derived native grassland vegetation communities that provide foraging, shelter and breeding habitat for these threatened woodland birds.

A range of mitigation and compensation measures will be implemented under the proposal, including the protection of known habitat for these species and rehabilitation of woodland and forest. These measures will ensure the viability of populations of these species in the long-term. Assessments of significance on woodland birds were also undertaken and described in Appendix H of the EIS. With the implementation of the proposed mitigation measures, the proposal is not predicted to significantly impact on woodland birds.

In addition, the proposed BOS includes a contribution to the SOS programme for the Regent Honeyeater.

Section 5.4.2 of the ecology study assesses potential impacts from the proposal on the 18 threatened species found in the study area.

Additionally, Appendix F of the ecology study provides the assessment of significance (7 part test) for potentially occurring threatened species in the study area.

BMPA states removal or modification of habitat and other mining disturbances caused by noise and lighting have not been adequately assessed by the proponent in this EIS.

Direct and indirect impacts have been assessed in Section 5 of the ecology study (refer also to Section 4.2.1 of this report). Proposed mitigation measures are provided in Section 5.1.2. Assessments were completed in accordance with contemporary government policy, legislation and Secretary's requirements. Therefore, contrary to BMPA's assertion, the removal or modification of habitat and other mining disturbances caused by noise and lighting have been adequately assessed.

BMPA states that for each species or population likely to be affected, the proponent failed to provide details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or threat abatement plan applying to it.

Appendix C of the ecology study provided in the EIS lists the conservation status of all the fauna species recorded within the study area.

Appendix F of the ecology study provides the predicted impact, and habitat, and if any recovery or abatement plans exist for threatened species potentially occurring within the study area.

BMPA argues that the proposal is not consistent with the goals and findings of the Recovery Plans for the Green and Golden Bell Frog, Grey-Headed Flying-Fox, Regent Honeyeater and the Swift Parrot.

Section F.1.12 of the ecology study assesses the significance (7 part test) for the Grey-Headed Flying-Fox. Additionally, Section F.1.5, of the ecology study assesses the significance for nectarous birds, which includes Regent Honeyeater and Swift Parrot. The assessments consider the consistency of the proposal with recovery plans. Of note, no recovery plan has been prepared for the Green and Golden Bell Frog, Regent Honeyeater or Swift Parrot.

Green and Golden Bell Frogs were found within the study area despite targeted surveys over the last 10 years in the area and, accordingly, detailed assessment was not required.

BMPA states that conserving habitat for the Swift Parrot, and other wide-ranging fauna species, is challenging since impacts in one area tend to be dismissed based on the assumption that there is sufficient habitat in other areas and this applies to all species identified.

The BOS has been developed to achieve a net positive impact on biodiversity, including the Swift Parrot.

It is noted that the Swift Parrot is listed as endangered under the Commonwealth EPBC Act. Therefore, the impacts of the 2010 proposal have been assessed by the Department of Environment, and deemed to be acceptable.

BMPA disputes that progressive clearing will mitigate against impacts on the wildlife. This argument is flawed for a number of reasons. If existing habitat were suitable in the offset areas it would already have a population of similar species. The EIS does not demonstrate this is the case. Further the offset areas are separate and fragmented. Setting aside these areas does not prevent an overall loss of specialized fauna habitat or a loss of the displaced animals.

As stated above, objective 2 from the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) is to improve outcomes for the community and environment, specifically, encouraging broad, strategic and enduring environmental gains. The BOS has been developed to achieve a net positive impact on biodiversity, including wildlife and is consistent with the *Draft NSW Biodiversity Offsets Policy for Major Projects* (now final) objectives.

The assessment of significance of the impact on fauna species is provided in Appendix F of the ecology study.

BMPA argues that the application of the precautionary principle which requires that a lack of scientific certainty about the potential impacts of an action does not itself justify a decision that the action is not likely to have a significant impact. If information is not available to conclusively determine that there will not be a significant impact on a threatened species or its habitat, then it should be assumed that a significant impact is likely.

The precautionary principle was considered in the assessment of ecological impacts, including on threatened species and its habitat, and in the development of the BOS for the proposal.

The precautionary principle is considered in Section 7.2.5vii.

ii The extension area

BMPA contends that clearing from the proposal may cause long term decrease of populations already close to extinction, for example, Regent Honeyeater, Swift Parrots, Speckled Warbler, Grey-Crowned Babbler, Brown Treecreeper, threatened micro-bats, nectarivorous bird species, Glossy Black-Cockatoo, Spotted-Tail Quoll, possums and gliders.

BMPA argues that the evidence for the conservation of this area and for refusal of the development application. The impact on woodland dependent birds and animals that currently occupy the area, of the removal large areas of foraging, is highly significant.

The fauna listed above may occasionally use the area for foraging habitat. An assessment of significance of impact is presented in Appendix F of the ecology study and concludes that the proposal would not significantly impact on these species.

The proposed BOS is substantial and includes additional supplementary measures, one of which includes contributions to the Saving Our Species programme for the Regent Honeyeater.

iii Endangered and vulnerable fauna

BMPA states that many threatened and vulnerable species of birds and mammals were recorded across the study area; the removal of their habitat would have high impacts. The offsetting and rehabilitation are inadequate to ensure long term viability due to the large amount affected.

As stated previously, Appendix F of the ecology study contains the assessment of all vulnerable and listed species and found that the fauna would not be significantly impacted under the proposal. The proposed BOS is designed to provide net benefits to biodiversity. OEH has assessed the proposal, including the significance of impact, and provided certification that the proposed BOS is adequate. The BOS certification from OEH is provided in Appendix L.

iv Regional corridors and the synoptic plan

The BMPA references that the Synoptic Plan Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley NSW (1999) states: "Many fauna are particularly sensitive to the size and shape of remnant vegetation patches as well as the distance between remnants. As a result the decreasing size and increasing distance between remnants in the valley has reduced the viability of natural ecosystems."

BMPA's statement is noted. The synoptic plan identified the amount of existing vegetation on Hunter Valley floor in 1999, the plan also identified that mining rehabilitation is a significant contributor to increasing vegetation patch size and joining remnants in the future.

BMPA contends that the wildlife corridors shown in the EIS will not be freely available to fauna within the working mine area. The chance of survival for wildlife contacting heavy mining equipment is nil. Example of fatal encounters can be seen on visiting any mine haul road. The regeneration process is a slow process on a very small scale, historically rarely more than 40ha per year. The regeneration of flora on spoil dumps will occur but take decades to provide consistent habitat for displaced fauna.

Further, BMPA states that the quiet habitat will not be present till mining ceases. The movement of equipment throughout both the MTO and the Warkworth Mine will be maintained to provide shortest access to each end of the open cut. The maintaining of the haul roads throughout the mine will cause fauna to leave the area. The access to the adjoining Bulga Mine rehabilitation area is also across a working haul road.

Section 5.3.1 of the ecology study assesses the proposed impacts on fauna corridors.

The proposed BOS includes mine rehabilitation that will form a north/south connecting corridor of vegetation between the existing vegetation to the north of the mine through the rehabilitation areas of MTO and Bulga Coal Complex (see Figure 7.6 of the ecology study) and in the future will connect to the large tract of intact vegetation at Singleton Military Training Area. The proposed rehabilitation corridor reduces the impacts of edge effects by forming one large linear block of vegetation rather than numerous scattered patches allowing for easier management due to reduced weed invasion and similar edge effects. With time, the rehabilitation areas will provide additional suitable habitat for threatened fauna species that may be impacted by the proposal.

BMPA also contend that the existing corridor in front of the MTO highwall links with the adjacent Bulga Coal Complex providing a wildlife corridor. The proposal is to over dump this corridor and design wildlife access for many years while the transfer of overburden continues across the Putty Road.

The approved MTO highwall position remains unchanged from the approval in 1995.

WML considers that the proposed land-based offset areas and contributions to the UHSA fund, will achieve a more beneficial outcome for the existing wildlife, should the proposal be approved. The long-term conservation outcomes would be an overall increase of extant vegetation protected, re-established in offset area and rehabilitated on site.

v Key threatening processes

BMPA noted that the Secretary's requirements specifically say that measures must be taken to avoid impact on biodiversity. The EIS has ignored potential indirect impacts from mining operations on the local wildlife. The BMPA states that it can identify the impacts of project related activities which can affect species such as loss of shade or shelter, predation by domestic or feral animals, deleterious hydrological changes, increased soil salinity, erosion, fertiliser drift, bio-solid spreading, noise and lighting.

Section 5.5 of the ecology study identified and assessed some of the indirect impacts on fauna, for example noise and lighting. The EIS assesses other potential impacts such as hydrological changes, soil and erosion. Other indirect impacts such as fertiliser drift and bio-solid spreading are not expected to have a long-term significant impact.

BMPA stated that felling of hollow-bearing trees has the potential to impact considerably on hollow-dependent fauna species during the felling process. BMPA also contended that the inability of these animals to escape the area and the loss of potential habitat may result in disruption of breeding habitat and the loss of a vital gene pool for those animals.

One of the assessment criteria in the BBAM is hollow-bearing trees, which was assessed for the proposed disturbance area. Additionally, a large percentage of the proposed disturbance area is regrowth vegetation and does not contain a significant number of hollow-bearing trees that would be found in a climax community.

Proposed mitigation measures include pre-clearing assessments which identify hollow-bearing trees and manages fauna within any hollows. These mitigation measures minimise the impact to fauna during the felling process. Further, WML has a tree clearing procedure that assesses tree hollows which allows animals to move beyond the area.

Distribution of breeding habitat is a key consideration of assessment of BBAM. An assessment of biodiversity losses and gain has been undertaken using BCAM and BBAM. Therefore, full account of the proposal's potential impacts on hollow-bearing trees has been taken.

The evaluation of impacts did not adequately consider noise and light as it may affect the species in the Offset Areas and adjacent woodland.

Indirect impacts from noise and light were assessed in Section 5.5 of the ecology study.

Noise has the potential to impact breeding frogs with females unable to hear the calls of males. This flows on to reduce spawning activity recruitment and population size.

A total of 13 amphibian species, including frogs have been recorded during all surveys conducted within the study area (see Appendix H of the EIS). No threatened amphibian species were recorded during current or previous surveys.

Noise can affect animal physiology and behaviour, and can affect the way that animal-created sounds are heard and interpreted by other animals. This can include mating calls, territorial calls and alarm calls. Interference with these calls by noise created by MTW has the potential to disrupt the species relying on these calls with deleterious results including reduced reproductive success and mortality (AMEC Americas Limited 2005).

Notwithstanding this, background noise levels already exist as a result of current mining for MTW and are being managed in accordance with relevant regulations. It is unlikely that the proposal will create noise significantly above current levels as the proposal will continue to comply with regulatory standards.

The impact of light spill disturbance from operations during the night must be determined and its likely impacts on woodland habitat adjacent to roads. The impact of light on terrestrial fauna is poorly understood but is most likely to affect nocturnal fauna such as frogs, bats and mammals. Many frog species are sensitive to light including the Green and Golden Bell frog which may inhabit the area. Male frogs may not call in areas illuminated at night which will affect breeding recruitment of frogs and eventually the population sizes. The response to light of bats also needs investigating. While bats are not attracted to light many of their prey items for example moths, are. The abundance of prey items around a light may attract bats on warm nights.

Light spill was assessed in Section 5.5 of the ecology study, which found that while the continued operation of the mine under the proposal will have some effect on the surrounding woodland environment, the impacts from night light pollution are likely to remain close to the immediate disturbance boundary of the operational pit. Artificial night light will diminish within areas that are progressively rehabilitated and, in the long-term, night light levels will return to normal following completion of rehabilitation of the total mined area and cessation of mining.

The Ecology Assessment is further flawed in the absence of any cumulative ecological assessment taking into consideration the compounding impacts on fauna and flora of the other near and regional, multiple, large mining enterprises.

The ecology study was completed under contemporary NSW government policies, legislation and Secretary's requirements. Appendix F of the ecology study presents an assessment of significance which includes an assessment of local and regional significance.

7.2.7 Noise

i Background noise levels for Bulga

BMPA contends that background noise levels are not appropriately assigned and refer back to the 2002 ERM noise study, 2010 noise study and current EIS noise study, BMPA further contend that background noise levels are overstated as demonstrated in the Day Design submission for 98 Wollemi Peak Road (pg 49).

As discussed in Section 6.4.3, a comprehensive and rigorous approach was taken to assigning background noise levels. Contrary to BMPA's contention, background noise levels are appropriate for the proposal.

The 2002 noise study by ERM was authored by Mr Ishac, the author of the 2010 and current EIS noise and vibration studies. Reference to Warkworth Mine being "slightly audible" in the 2002 study does not imply that background noise was elevated as a consequence of this mine. For a source of noise to influence the background noise metric (L_{90}) it must be present 90 per cent of the time. This was not the case and therefore background noise levels are not considered influenced by the existing operation.

The approach to establishing background noise levels in the noise and vibration study, particularly for residential areas west of the proposal was comprehensive, rigorous and has provided for appropriate criteria for the local area. The current study included background noise surveys at six locations throughout the Bulga community to define levels in accordance with the INP, and to better understand changes in levels for residences north, south and west of the centre of Bulga (see Chapter 8 of the noise and vibration study). The data captured at each of the six locations far exceeds the requirements of the INP, which states at least seven days of data is to be collected that is unaffected by rain or wind. The survey captured between three and 11 months of data each location, ie over 12 to 47 times the minimum survey requirements as prescribed in the INP.

The Day Design review states that an Infobyte iM4 Type 2 noise logger was used alongside the applicant's (BarnOwl monitoring Location A in the EIS's) device at 98 Wollemi Peak Road in Bulga NSW. This was installed by Day Design's Mr Gauld on 18 July 2014 and measured noise for seven days and was returned by the property owner Mr John Krey on 30 July 2014.

It is assumed that reference to Type 2 relates to Class 2 as per Australian Standard AS IEC 61672.1. This instrumentation is inferior to Class 1 hardware, used by the applicant (BarnOwl). The BarnOwl statistical data (ie $L_{90,15\text{minute}}$, the metric used to calculate background noise) is captured by one of the three microphones and in this configuration the BarnOwl satisfies a Class 1 sound level meter in accordance with AS IEC 61672.1, the Australian Standard Electroacoustics sound level meters. This implies a measurement tolerance limit difference between the two units of generally $\pm 1\text{dB}$ for the frequency range relevant to environmental noise and used to derive RBL values as per AS IEC61672.1 Table 2.

It is unclear why only seven days of data is provided and analysed if the device was in place for 12 days (18 to 30 July 2014 as stated). The security of the data could be compromised in that time and it is unclear whether calibration of the unit was completed at the commencement and end of monitoring as is required practice to ensure the data is valid.

It is stated that an RBL was calculated to be 30dB(A) for the day, evening and night period, with charts presented in Appendix D. It is not apparent how this result was derived. It is normal practice to provide the daily Assessment Background Levels (ABLs) used to define the RBL. The RBL is the median value of at least seven valid ABL values (refer to the EPA's INP for definitions). The ABLs have not been provided and, as such, the RBL cannot be verified. It is therefore concluded that Mr Gauld has not applied the EPA's INP methods to determine the RBL. Similarly, there is no mention of effects of weather on the data set in accordance with the INP.

To provide further information on the period in question EMM analysed data from the same period Mr Gauld addressed (18 to 25 July 2014) and beyond (to 11 August 2014) using the applicant's BarnOwl data. This is attached to the Day Design review (Appendix G of this report) in daily ABL tabular form derived in accordance with the INP and in daily charts.

The BarnOwl data shows that ABL levels (used to calculate RBL) rarely drops below 30dB(A), in the period 18 to 25 July 2014 (Day Design sampling period). Further, only 10 single 15 minute L_{90} samples (used to calculate ABL) drop below 30dB(A) from a total of 768 samples (ie 1 per cent). For the Day Design seven day period (18 to 25 July 2014), the resulting RBL values were calculated to be 33dB(A), 36dB(A) and 37dB(A) for the day, evening and night respectively. This matter is addressed further in Appendix G of this report.

In addition, historic data presented in other publicly available documents also support RBL values greater than 30dB(A) for some areas in Bulga. This includes Section 8.1 of the noise and vibration report prepared for the 2002 EIS. The independent review by SKM prepared on behalf of the NSW Department of Planning & Infrastructure (April 2012), whilst not specifically commissioned to review background noise, provides 134 L_{A90} 15-minute samples at various locations in Bulga between 2 December 2011 and 30 January 2012. These were all greater than 30dB(A).

In conclusion, the adopted and reported RBL values in the EIS are supported by a comprehensive dataset as shown in the EIS and reaffirmed by data collected by others.

ii Comparison with the 2010 application

BMPP asserts that the current proposal is identical to the previous in noise terms.

The mine plans and equipment schedule significantly influence off site noise levels. These differ between the 2010 and current EIS studies for Warkworth Mine and MTO. The current study is representative of the latest mine planning sequence, corresponding equipment schedule and commitments to industry best practice noise management. The current study mine plans are considered more flexible and allow for improved contingency when, for example, equipment relocation is required during adverse weather conditions.

iii Noise monitoring

The BMPP contends that noise monitoring, noise alarms and plant shut downs demonstrates exceedances (pg 51).

It is important to distinguish the real time monitoring process, used as a management system, from compliance monitoring. The BarnOwl alarms are not a demonstration of exceedances of noise criteria. The BarnOwl based triggers are set below the criteria as described in Section 3.2.1 of the noise and vibration study to aid the management of noise to prevent a potential exceedance occurring. Further, such alarms ignore weather conditions and therefore do not represent a non-compliance for times when atypical weather means noise criteria do not apply. Such alarms will diminish with the plant attenuation programme that will reduce emission levels of all major noise sources. The noise and vibration study (Table 6.2) presents the annual breakdown between 2006 and 2014 of noise measurements for Warkworth Mine and demonstrates a strong compliance record.

iv Saddle Ridge

BMPA contends that Saddle Ridge (Saddleback Ridge) provides an important barrier for Bulga (pg 52).

As demonstrated in Sections 4.11.1 and 6.4.5i of this report, Saddleback Ridge does not provide an important acoustic barrier for Bulga.

This matter on the ridge is reflected in the Day Design submission by Mr Gauld. The EIS states and it is agreed by Mr Gauld that the ridge provides good attenuation during calm weather. The presence of calm weather and its occurrence is well documented through analysis of weather data at this and many sites across NSW. The condition of zero (or <0.5m/s) wind speed and no temperature inversion (calm or still-isothermal) is relatively infrequent as depicted in the air quality and greenhouse gas study wind roses at Figure 11.2 of the EIS. These roses show calm conditions are in fact very infrequent for the area. EMM's analysis of the Charlton Ridge Automatic Weather Station (AWS) data between 2007 and 2013 shows for example that at most only 4 per cent of a particular season and period (for example, winter nights) are calm conditions (ie wind speeds less than 0.5 m/s).

The Day Design review suggests a significant increase to mine noise can be expected post removal of the ridge, even though Mr Gauld notes that the noise benefit of the Ridge during calm weather is virtually nullified during adverse weather. Notwithstanding, the EIS noise and vibration study provides predicted noise levels during calm and adverse weather for pre and post removal of the ridge. All calm weather predictions are well below noise criteria for Bulga locations even with the ridge removed. The predicted noise during adverse weather post removal of the Ridge is also presented and impacts identified in accordance with the INP.

The reference to the Drayton South application and its purpose designed mine plan that deliberately "...sits behind the natural landscape..." is not relevant to the specific landforms and mine plans for the proposal. The Ridge has very limited noise barrier benefits. The contributing noise sources from Warkworth Mine at Bulga are from numerous plant across the entire site.

v Low frequency noise

BMPA contends that the low frequency noise criteria and INP penalty have not been appropriately adopted (pg 53).

As demonstrated in Section 4.3.1i, the LFN criteria were appropriately applied. The INP penalty is not applicable to the proposal.

As discussed in Section 9.7.1 and 10.9.1 of the noise and vibration study the INP method was considered in the assessment of LFN. The EPA's submission on the current EISs acknowledges the limitations in the INP's LFN method.

To assist in understanding the potential for LFN impacts, the noise model developed as part of the EIS was used to quantify the L_{eq} dB(C) minus L_{eq} dB(A) levels as per the INP requirement. This was done for a representative set of residential locations in and around Bulga. The results are shown earlier in Table 4.3 of this report. Predicted L_{eq} dB(C) minus L_{eq} dB(A) are less than 15dB and therefore demonstrate the INP penalty does not apply during times when mine noise is predicted to be at its highest (ie worst case weather). This was done for a representative set of assessment locations within, east, west, north and south of Bulga village and therefore covering a wide expanse of that community. This reaffirms the predicted noise levels in the EIS for these areas in accordance with the INP.

Other considerations in assessing LFN are that measurements need to quantify dB(C) levels from the mine only in order to assess potential impacts. That is, the mine is not responsible for LFN outside its control. This is often very difficult in practice, particularly at large distances because of influences from the ambient environment (for example wind or road vehicles), leading to the C minus A INP approach being impractical and unrepresentative of the mine's contribution. This is also a reason for not using unattended real time noise monitors for dB(C) quantification for the purposes of assessing impacts (for example under the INP's method).

As stated earlier, the EPA acknowledged the limitations of the INP LFN method and this is well documented (for example Broner 2010 and SKM Independent Review 2012).

Furthermore, LFN is a consideration of the 'in-service' target noise levels presented in the EIS (Table 10.3 of the noise and vibration study). The targets include both a linear (dB(L)) as well as a weighted (dB(A)) target to ensure attenuation does address LFN. Having these two targets means the attenuation cannot focus on the dB(A) while ignoring dB(L), which is important in reducing LFN. To demonstrate this, the 'work-in-progress' attenuation package used on trucks for example have been tested to show the improvement (at source) of the differential between dB(C) and dB(A). This is shown earlier in Table 4.4 of this report for one such tested truck at site. This test data shows that attenuated trucks have a smaller differential between C and A weighted noise. This at source improvement will also hold true at distance and means a better outcome for the community with respect to LFN.

vi Cost of reducing noise

BMPPA contends that the cost of reducing noise to achieve PSNLs has been discounted by the proponent (pg 53).

Contrary to BMPPA's contention, the cost of reducing noise to achieve PSNLs was not discounted by WML.

The marginal (1-2dB) increase predicted for Bulga residences was reviewed with respect to additional noise mitigation measures as described in the noise and vibration study. In accordance with the EPA's INP, all reasonable and feasible noise mitigation has been considered and will be adopted. These include a significant investment in providing best practice noise suppression to equipment fleet (see details in Section 10.2.1 of the noise and vibration study) and limiting some plant and equipment operation during worst case meteorological conditions.

The only remaining option was to further limit plant operations at Warkworth Mine. However, to achieve a further 1-2dB reduction in predicted levels (ie to achieve PSNL at all Bulga residences), further plant would need to be disengaged. The expected frequency and duration required to achieve this reduction under adverse meteorological conditions, would result in a cost exceeding \$100million in NPV over the life of the proposal.

Measures proposed in combination with the established real-time noise monitoring and management system will assist in keeping noise levels to within or below 1-2dB of PSNL for approximately 90 percent of the assessment locations considered - this is a reasonable and feasible outcome for the viability of the proposal. It is noted that in its submission, the EPA states: *"The EPA's view of the proposed noise mitigation measures is that they reasonably represent current best practices at similar mines. The EPA considers it unlikely that there are further feasible and reasonable measures that would provide significant additional noise mitigation"*.

As described in Section 6.4.6ii(a) of this report, the PMI that is currently being developed will utilise predictive meteorological forecast data coupled with detailed mine plans and equipment sound power level information to predict noise levels at residences. The PMI will further improve compliance management through proactive planning.

vii **Non-compliance**

BMPA contends that the EMM report predicts non-compliances that would be exacerbated if the INP LFN penalty were applied.

This matter is considered in Section 4.3.1 of this report which provides an INP LFN assessment of the proposal and demonstrates that the INP penalty would not apply to the project.

viii **9.7 Low frequency noise**

BMPA requires that any assessment of LFN must be based on the INP.

An assessment of LFN from the proposal has been undertaken as part of this report using the noise model developed for the EIS to quantify the L_{eq} dB(C) minus L_{eq} dB(A) levels. This was done for a representative set of residential locations in and around Bulga as shown in Figure 4.3 and therefore covering a wide expanse of that community.

Predicted L_{eq} dB(C) minus L_{eq} dB(A) are less than 15dB and, therefore, demonstrate the INP penalty is not expected to apply during times when mine noise is predicted to be at its highest (ie worst case weather). The results reaffirm the predicted noise levels in the EIS for these areas in accordance with the INP and that the LFN penalty does not apply to the proposal. Since the results satisfy the strict INP LFN criteria, criteria for other methods of assessing LFN such as Broner and DEFRA would also be met.

This matter is considered further in Section 4.3.1 of this report.

ix **9.7 NSW Ombudsman and the NSW Industrial Noise Policy**

BMPA contends the community loses faith in government departments and requires that any assessment of LFN must be based on the INP.

Section 10.4.4 of the EIS specifically addresses LFN and despite the INP standard for LFN not being applied to existing operations, the EPA has advised in its submission that it will apply to the proposal, unless further information is provided. Section 4.3.1 of this report provides an INP LFN assessment of the proposal and demonstrates that the INP penalty would not apply to the project.

x **Separate reports**

BMPA put forward noise reviews by Day Design and a resident of the area.

The Day Design review is addressed in detail in Appendix G of this report, while the resident's review matters are addressed in various areas within Section 4.3 of this report.

7.2.8 Social impact

i Generally

BMPA notes that Bulga has a Church, Community Hall, Police Station, Scout Hall, Rural Fire Service, NPWS Office & Depot, Sports Ground, Hotel and Service Station/Café with approximately 500 residents living in the locality.

The applicant notes the variety of services and facilities located in Bulga. With respect to population, it should be noted that the latest available data from the Australia Bureau of Statistics 2011 Census shows that Bulga has a population of 358 people. The applicant notes that Council refers to a population of 400 people in its submission.

BMPA queries the independence of the assessment.

The SIA was prepared by EMM, which included the engagement of stakeholders, issues identification and analysis, and impact assessment. The proposed management, mitigation and enhancement measures included within the SIA were prepared in collaboration with Coal & Allied as per normal SIA practice.

BMPA contends that the Secretary's requirements have not been addressed. The perceived social impacts are not explored or illustrated in the detail required as part of a typical SIA practice.

The SIA meets the Secretary's requirements and, as required, pays particular attention to any impacts on Bulga village.

As detailed in Section 6.7.10 of this report, the SIA defines near neighbours as stakeholders who reside in the neighbouring villages of Bulga, Warkworth, Long Point and Gouldsville and those stakeholders who reside on properties in close proximity to the MTW operation, as stated in Section 2.4.1 of the SIA.

Table 5.4 of the SIA presents the analysis of the potential impacts and opportunities as identified through consultation and quantitative analysis. The table provides a summary of perceived impacts and opportunities and the technical assessment of the impacts and opportunities. It focuses particular attention to the views of near neighbours as near neighbours represented 44 per cent of those who participated in the survey. The related outcomes of technical assessments are also focussed on near neighbours.

The SIA goes beyond what is required by the Secretary's requirements as it also considers the social impacts on employees should the proposal not proceed. It is perhaps this further analysis that has been identified as not within the Secretary's requirements by focusing exclusively on Bulga.

It is noted that Table 5.4 of the SIA has been updated to include an 'assessment of impact' to ensure that par. 408 and 430 of the L&E Court judgment are addressed. The revised table is attached as Appendix E of this document.

BMPA states that the surveys used and questionnaires should be included in the SIA.

As stated in Section 2.4.2 of the SIA, stakeholder engagement was conducted using one-one consultation, community information sessions and the provision of information via factsheets, media releases etc. In terms of the one-on-one consultation, semi-structured interviews were conducted with 151 stakeholders from the local area and region, either as one-on-one interviews or in small group settings (see Table 2.1 of the SIA for proportional representation of stakeholder groups). The interviews discussed key themes including: perceptions of social impacts associated with the proposal; potential for management and mitigation of these impacts; opportunities associated with the proposal and potential enhancement strategies; perceptions of existing operational impacts and management strategies; costs and benefits of mining in the region; needs and aspirations in the community; preferred forms of information and engagement. The interview guide is contained in Appendix K of this report.

Thematic coding and analysis of the interviews was undertaken to identify key social impacts and opportunities stakeholders associated with the proposal. These are listed in the figure in question (Figure 5.6 of the SIA). As explained in the figure notes, the percentages represent the number of times a particular social impact/opportunity is identified by stakeholders divided by the total number of identified social impacts and opportunities (ie 1673 impacts/opportunities)—thereby providing an illustration of those social impacts and opportunities most frequently identified by stakeholders.

BMPA is critical of EMM's use of Stubbs material which were discredited in the L&E Court, particularly of the social impact on the village of Bulga and surrounds.

Dr Judith Stubbs' affidavit prepared in 2012 was used to address concerns raised by near neighbours regarding the impact on property values and the ability to sell their properties as a result of the proposals. Stubbs (2012) presented real data on the actual purchase price of properties within Bulga. The real data used by Dr Stubbs was not contested by Preston CJ in the L&E Court. This real data was used in the SIA of the proposal to provide some historical context to the housing market in Bulga and surrounds. An extract from the Stubbs (2012) affidavit is provided in Appendix F of this report.

ii [Key points](#)

a. [Section 1 and 2](#)

BMPA queries whether the Secretary's requirements could be properly addressed in the SIA or in any other part of the EIS between when the requirements were received and the EIS was submitted.

As noted in Section 6.16.6 of this report, a request for environmental assessment requirements was submitted to the Director-General of the DP&E on 1 April 2014. The Secretary's requirements were issued on 22 May 2014. Public exhibition commenced on 25 June 2014.

As with the broader EIS (and the Mount Thorley Operations EIS), the SIA was commenced well in advance of the Secretary's requirements being issued on the basis of contemporary environmental assessment requirements for open cut mining projects in the Hunter Valley, environmental assessment requirements issued for the Warkworth Extension 2010, and contemporary government policies. In particular, the 'socio-economic' Director-General's/Secretary's requirements of recent similar proposals, such as the Glencore Bulga Coal Complex BOP and Drayton South Project were reviewed in the scoping of the SIA. Prior to its finalisation, the SIA was considered against the proposal specific Secretary's requirements. This approach is not at all unusual for applicants.

BMPA contends that perceived social impacts are not explored or illustrated in the detail required as part of typical SIA practice.

The perceived social impacts and opportunities of the proposals following stakeholder engagement were documented in Section 5.4 of the SIA (EIS Appendix P). They were categorised into seven groups and themes. Each of these perceived impacts and opportunities were then objectively addressed using evidentiary material and the outcomes of technical studies. The level of detail provided in the SIA to objectively address each perceived impact and opportunity is considered appropriate.

BMPA question why the consultants who undertook the consultation for the SIA are not named in the report.

The consultants who principally undertook the one-on-one consultation were Dr Louise Askew and Dr Michael Askew. They were acknowledged as being members of the study team within Appendix B of both EISs.

BMPA questions use of legal precedents.

A review of the outcomes of judgments in the NSW L&E Court was undertaken when preparing the SIA, including the *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Limited* [2013] L&E Court par. 408 and 430. In the absence of NSW government policy on the issue, these judgments provide clear guidance on matters to be considered in assessing social impacts for developments. These judgments clearly state that the foundation or rationale for concerns held and expressed in relation to a development need to be considered, not just the concerns themselves.

b. Section 3

BMPA's submission makes a number of points in regards to the employee and supplier survey, including a request for questionnaire details. These points are addressed below.

The outcomes of the online survey are provided in Appendix A of the SIA (EIS Appendix O). This includes the answers to all of the questions, illustrated in figures and/or tables where appropriate. This survey was undertaken as a tool for the SIA to better understand the linkages between the operation and the local and regional economy. As such, the survey did not ask questions about the proposal. Separate consultation was held with a sample of MTW employees who live in the local area as part of the SIA consultation. As shown in Table 2.1 of the SIA, MTW employees and suppliers accounted for 15 per cent (23 individuals) of stakeholders consulted. These employees were asked the same array of questions regarding the proposal as other stakeholders engaged through the SIA process.

BMPA queries the workforce data provided in the SIA.

The workforce data reported in the EIS are provided by the RTCA Human Resources department and are based on the postcode provided by employees for their payroll address. These postcodes are assigned to the local government areas where the majority of the postcode boundary is located (given that postcode and LGA boundaries mostly do not align). This found that almost three quarters of MTW employees and long-term contractors live in the Mid and Upper Hunter region: Singleton LGA (35 per cent, 455 people), Cessnock (19 per cent, 247 people) and Maitland LGA (17 per cent, 221 people).

The applicant has identified that workforce data in one postcode was incorrectly attributed to Cessnock and Newcastle instead of Maitland. The latest data from MTW, with the correctly attributed post code data is provided in the Table 7.1.

A more detailed analysis of the data based on suburbs rather than postcodes has provided a slightly greater alignment with LGA boundaries, this is also more closely aligned with the findings of the employee survey undertaken for the SIA.

Table 7.1 MTW employees' residing LGAs

| Local government area | Percentage of workforce reported in EIS | Percentage of workforce |
|-------------------------------|---|-------------------------|
| Singleton | 35% | 33.4% |
| Maitland | 17% | 27.1% |
| Upper Hunter and Muswellbrook | - | 3.4% |
| Cessnock | 19% | 18.1% |
| Newcastle | - | 5.2% |
| Lake Macquarie | - | 6.0% |
| Other | 29% (location not specified) | 6.8% |
| Total | 100% | 100% |

This updated data does not significantly change the findings of the social or economic studies, and if anything leads to a greater benefit to the Singleton LGA and Mid-Upper Hunter than originally assessed, with 82 per cent of the workforce residing in the five LGAs of the Mid-Upper Hunter. Furthermore, of the 390 people hired at MTW between January 2011 and June 2014, 137, or 35 per cent were from the Singleton LGA which is consistent with the operations preference to hire locally.

BMPA contends that the employee survey data demonstrates the 'short-term residency of the workforce'.

The employee survey asked respondents how long they had resided in their current suburb, not how long they have resided in the local area or region, and it is possible, and likely that individuals have moved suburbs, within the Hunter during this period. In addition to length of residence, the survey also asked employees about their housing status, with 77.4 per cent of respondents answering that they either owned their home outright or had a mortgage. This data refutes the assertion that the workforce is of a short-term nature, given the significant commitment associated with purchasing property.

BMPA contends that the high number of complaints received by the existing MTW operation is indicative of a problem.

Coal & Allied recognises the concerns raised by the BMPA regarding complaints, particularly around noise. It is important to note however that notwithstanding these complaints, an assessment of monitoring data (publically available via the Rio Tinto Coal Australia website) demonstrates predominant compliance with noise criteria has been achieved throughout the life of the mine. Non-compliant noise measurements account for a small percentage of the monitoring dataset at 0.36 per cent (10 non-compliances measured from 2,791 individual assessments undertaken). The results also demonstrate that there are no sustained exceedances from Warkworth Mine.

When considering the impact of the Warkworth Mine on the area of Bulga village, the level of non-compliant measurements is relatively lower and accounts for 0.12 per cent of the monitoring dataset (two non-compliances measured from 1,699 individual assessments undertaken). The data also demonstrate that there are no sustained exceedances from Warkworth Mine. This matter is addressed in detail earlier in the table in response to matters raised regarding Section 7.2.1i.

BMPA queries how community investment figures have changed over time with the Rio Tinto efficiency drive.

To date there has been no reduction in the fund since its establishment despite overall reductions in business expenditure to sustain viability. In 2011, Coal & Allied announced the continuation of the Community Development Fund (CDF) and committed \$4.5million to distribute to eligible projects between January 2012 and December 2014. The aim of the fund is to support projects and programmes that would create opportunities that would provide a lasting benefit to the wider community. The CDF board, made up of Rio Tinto employees and community members assessed applications at least three times per year. The annual amounts spent by the funds are driven by the applications received, rather than an annual set amount.

c. [Section 4](#)

BMPA contends that population growth of 37 and 96 persons in Broke and Bulga cannot be considered 'significant growth'.

Table 21.1 in the EIS provides a summary of population statistics for the ABS 'state suburbs' of Bulga, Broke and Singleton as well as the Singleton, Maitland, Cessnock and Upper Hunter LGAs and NSW. This information is presented to show that *comparative* to the suburb of Singleton, LGAs of Singleton, Muswellbrook and Upper Hunter and NSW, Broke and Bulga experienced significant growth of 11.5 per cent and 17.7 percent, respectively.

Although obviously lower absolute increases than the larger suburb of Singleton and local government areas, the increase proportionate to the population size in 2006 was significant.

BMPA notes that some information included in the detailed Social Impact Assessment (Appendix O) were not included in the chapter.

EMM agrees that not all information provided in Appendix O has been included in the chapter. This is because the chapter seeks to provide a higher level summary of the detailed report. This approach was consistently applied for all technical studies. All of the information included in the detailed SIA was used in the evaluation of potential impacts and opportunities associated with the proposal.

d. [Section 5](#)

Social Impact Assessment methodology

The methodology for the SIA was derived to address the requirements outlined by Preston CJ in par. 408 of the Warkworth Extension 2010 L&E Court judgment, namely that "consideration of both the objective data for the broader community (ie the socio-economic environment' and 'community services') and the experiential evidence from residents of the impacts at the local level is required to have the complete picture of the likely social impacts of the Project". While not provided verbatim, the experiential evidence from residents of the impacts at the local level and the wider level was provided as a basis for consideration with technical environmental data.

Consideration of a reference case (ie closure of MTW) against the proposal case is considered appropriate in any impact assessment, whether social, economic or environmental. This provides for impacts to be effectively weighed up and compared. Consideration of alternatives (such as a reference case) has been a central tenant of assessment requirements for major projects in NSW for over twenty years.

BMPA contends that there is an over-reliance on economic assessment rather than social analysis.

The economic study provides important data that contributes to the understanding of the proposal in the socio-economic context in which it sits. It is inaccurate to state that there is an over-reliance on the economic study in the SIA. The SIA considers the outcomes of each of the technical studies, including the economic study. This information, in combination with outcomes of community consultation was used to assess the potential impacts and opportunities associated with the proposal. This is further detailed in Appendix E of this report.

BMPA contends that volunteering rates for the MTW workforce are lower than Australian averages.

As illustrated in Section 4.1.3v of the SIA and in more detail in Table B.4 (reproduced as Table 7.2 of this report), the MTW employee volunteering rates have been compared against self-reported rates of volunteering in the 2011 census. This shows the reported rate of 33 per cent of MTW employees who volunteer their time for community organisation and activities. This compares favourably against all geographic areas analysed in the SIA.

Table 7.2 Percentage of people who undertook voluntary work in 2011 by location

| Location | Proportion (per cent) who did voluntary work through an organisation or group (last 12 months) 2011, persons aged 15 yrs and over |
|------------------------|---|
| Bulga SSC | 23.3 |
| Broke SSC | 21.8 |
| Singleton SSC | 17.6 |
| Cessnock LGA | 12.5 |
| Maitland LGA | 14.8 |
| Singleton LGA | 19.0 |
| Muswellbrook LGA | 17.0 |
| Upper Hunter Shire LGA | 22.9 |
| NSW | 16.9 |

Notes: Adapted from HVRF (2013b) Hunter Valley Socio-economic Baseline. Data sourced from: ABS Census Community Profile 2011.

It is acknowledged that the census data is rarely perfect; however this is the only data that enables comparison of local communities and broader LGAs against the state. Even if one were to use the Australia wide Volunteering Report (where the latest data is from 2010) from the ABS, the MTW employee volunteering rates of 33 per cent remain comparable.

BMPA contends that the impact and opportunity analysis does not incorporate stakeholder perception or qualitative analysis, particularly as it pertains to noise and visual amenity.

The impact and opportunity analysis does incorporate stakeholder perception and qualitative analysis, including as it pertains to noise and visual amenity.

The topic areas identified through consultation were used to guide the identification of impacts and opportunities, the analysis of which is presented in Table 21.5 of the EIS and Appendix E of this report. The table provides an overview of community consultation findings in Column B and Technical Assessment in Column A. This demonstrates that the assessment clearly took into consideration the outcomes of the consultation with all stakeholders who were engaged through the process and the assessment was based upon both experiential information provided by those consulted and technical data from the broader EIS, particularly as it relates to amenity. An example from the table as it relates to the potential impacts on visual amenity is provided as Table 7.3 below.

Table 7.3 **Example of consideration of perceived impacts/opportunities from EIS Table 21.5**

| Category | Impact/opportunities |
|----------------|--|
| | Perceived |
| Visual amenity | <p>Visual amenity impacts</p> <p>Near neighbours expressed concern that the proposal is very likely to contribute to visual amenity impacts on residents of Bulga, Milbrodale, areas of Broke, Long Point and Gouldsville.</p> <p>It is perceived that visual amenity would deteriorate due to the increasing proximity of the mine to Bulga and given the surrounding landforms. Some stakeholders expressed concern that that this would particularly be experienced at properties in Bulga on the western side of Inlet Road and nearby roads/streets, the western side of Putty Road and nearby roads/streets, and the elevated sections of the western side of Wambo Road.</p> |

To further clarify stakeholder feedback and the assessment outcomes, Table 5.4 of the SIA has been updated to include an ‘assessment of impact’ to ensure that par. 408 and 430 of the L&E Court judgment are addressed. The revised table is attached as Appendix E to this document.

BMPA contends that there is insufficient information regarding stakeholder experiences of noise.

The assessment of impacts and opportunities associated with the proposal provided in Table 5.4 of the SIA and as updated in Appendix E of this report acknowledges that noise is of significant concern to the local community. This is also shown in Figure 21.6 of the EIS which illustrates the frequency of which issues were raised through consultation. It is important to also recognise that modelling undertaken for the EIS demonstrates that against the criteria established by government to regulate noise impacts, only one residence in this area, north of Bulga, would be significantly impacted, and hence, afforded acquisition rights should the proposal be approved.

Noise generated by industrial sources such as mines is regulated under the INP (EPA 2000). The overall aim of the INP is to allow the need for industrial activity to be balanced with the desire for quiet in the community. One of its specific objectives is to establish noise criteria to protect the community from excessive intrusive noise and preserve amenity for specific land uses.

The INP discusses that within the community, there is a very large range of human reaction to noise, including those who are very sensitive to noise. This noise-sensitive sector of the population will react to intruding noises that are barely audible within the overall noise environment, or will have an expectation of very low environmental noise levels. On the other hand, there are those within the community who find living in noisy environments, such as near major industry, on main roads or under aircraft flight paths, an acceptable situation. The bulk of the population lies within these two spectrums, being unaffected by low levels of noise and being prepared to accept levels of noise commensurate with their surroundings.

The criteria in the INP have been developed to protect at least 90 per cent of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90 per cent of the time.

All residences in Bulga are also predicted to satisfy the Mining SEPP's cumulative noise limit from all industrial noise sources. Compliance with the Mining SEPP's cumulative noise limit is accepted as providing significant protection against noise impacts. This means that the total impact from all mines in the locality would achieve amenity level recommendations of the INP.

Furthermore, given that the cumulative noise levels have been met at the majority of assessment locations, and it is unlikely there would be additional noise sources nearby in the future; the residences at Bulga generally have a rural level of amenity as defined in the INP.

On this basis, and subject to the implementation of all reasonable and feasible mitigation through the proposal, the assessment concluded that social impacts from noise on amenity, health and well-being are acceptable and meet government guidelines.

BMPA contends that MTW employees will not experience a loss of sense of place if the proposal does not go ahead as they demonstrate high rates of fluctuation.

Although there are a high number of new employees at MTW who have been employed for less than 5 years, there are also a large number of employees (420 excluding full-time contractors) who have been employed for more than 5 years. Indeed, almost a quarter of the MTW workforce (325 people) has been employed at the operation for more than 10 years. These employees are long-term members of the local community who would be greatly impacted if they were to lose their employment and unable to find alternative employment locally.

Furthermore, the employee survey asked employees about their housing status, with 77.4 per cent of respondents answering that they either owned their home outright or had a mortgage. This data refutes the assertion that the workforce is of a short-term nature, given the significant commitment associated with purchasing property.

BMPA contends that a health impact assessment should be conducted for the proposal.

In its submission, the NSW Department of Health raised no objection to the current proposal. Responses to the matters raised in its submission can be found in Section 4.6 of this report. This matter is addressed in Section 6.5.4 of this report in response to matters raised on air quality.

BMPA notes that MTW is below industry averages regarding the employment of women and Aboriginal and Torres Strait Islands.

Presently MTW has diversity targets for Indigenous (5 per cent) and female (15 per cent) employment based upon population proportions and industry averages respectively. The operation is still working to achieve these targets with respect to the direct workforce, however the contractor workforce has achieved a significantly higher proportion of female employees than the target and industry average, with 24 per cent female employees in January 2014. Overall, current figures indicate that 12 per cent of the workforce is female and 2 per cent identify as an Indigenous employee.

In addressing this issue, MTW is implementing a Diversity Action Plan under the Rio Tinto Coal Australia Diversity Strategy. Continuation of mining through the proposal will provide a high likelihood of improving representation of women and Indigenous persons in the workforce through implementation of the diversity action plan and funding projects that support Indigenous training and employment opportunities. Approval of the proposal will enable a continued focus on diversity in the workforce.

e. [Section 6](#)

BMPA contends that the management, mitigation and enhancement strategies presented in the SIA are insufficient to respond the perceived impacts.

As stated in Section 6.1 of the SIA, management and mitigation measures related to environmental amenity impacts such as noise and air quality were not reported in the commitments section of the SIA. As described in the relevant sections of the EIS, a suite of industry best practice commitments are proposed to manage potential noise, dust, visual and other impacts raised by stakeholders during consultation. This comprehensive range of measures were not reported in Chapter 6 of the SIA as they already form commitments documented in the respective sections of the EIS.

The strategies related specifically to the SIA which have been proposed as part of the proposal were developed based on the level of impact or opportunity identified through the SIA. In particular they respond to the key issues identified through consultation, namely amenity impacts and information and communication provision.

As noted in Table 21.5 of the EIS, since the Warkworth Extension 2010 proposal, based on feedback received from a range of stakeholders, ongoing and proposal specific strategies have been developed by Coal & Allied to improve communications generally and to manage/ mitigate or enhance proposal-related impacts and opportunities.

In particular, a social impact management plan would be developed for the proposal to further develop these management and mitigation measures and detail a plan of implementation including responsibilities, timing, performance indicators/targets and monitoring measures. The social impact management plan would be prepared in consultation with key stakeholders.

Coal & Allied is committed to continuous improvement across all aspects of its business, including stakeholder engagement. An example of this commitment is to contribute to a Near Neighbour Amenity Resource to provide support to residents surrounding the operation. Coal & Allied will continue to work closely with the residents of Bulga, the broader community and other stakeholders, to promote effective environmental management and maximise proposal-related opportunities.

iii [Land and Environment Court Judgment – social impact assessment excerpts](#)

This section of BMPA's reproduces sections of the L&E Court judgment. However, no other commentary is provided. These excerpts are noted.

7.2.9 Economics

i Warkworth Mine not economically viable

BMPA states that the economic assessment of the proposal overstates the benefits and understates the costs of the project.

The submission contends that the mine is not financially viable. BMPA states that the economic model uses a coal extraction cost of \$70.50 which is below what it is costing Rio Tinto. Also the Australian average extraction cost is between \$80 to \$85 per tonne of saleable coal. The submission asserts that the study assumes the price achievable by this project for the sale of the coal is A\$100 per tonne compared with the current price of A\$83 per tonne.

The BMPA submission states that it is of no concern to the community of Bulga that Rio Tinto will lose money on this project but it is of concern that should the project gain approval but does not continue then the long term devastation which will be incurred on the environment and on the village of Bulga will be for no benefit.

In comparison provided by TAI (Appendix 5 of the BMPA submission), the economics study states there will be surplus of \$1,507million whereas TAI state a loss of \$815million.

The financial viability of the proposal is a risk assumed by the private owners of Warkworth Mine and MTO, and related assumptions concerning the expectations of the owners as to the future financial performance of the mine are commercial in confidence. Mines like Warkworth (and MTO), which have been operating for over 30 years, are large scale businesses built on billions of dollars in capital investment. The owners have already invested significant time and resources on planning applications to secure the future of this mine, and have done so in the belief that using long-term economic assumptions, the mine is valuable to its owners.

A detailed response to the submission by The Australia Institute is provided in Appendix H of this report.

The purpose of the cost benefit analysis in the economic study was to identify the public benefits of the proposal to NSW, rather than assessing the private benefits of the proposals to Rio Tinto, which is the focus of TAI (Appendix 5 of the BMPA submission). Whether or not a proposal is privately profitable and worth pursuing in the first place is a matter for the applicant.

However, the assertion that the proposal has a negative net value is based on two key incorrect assumptions:

- that it is appropriate to use *today's* coal prices and exchange rates to evaluate future revenues and the economics of a long-term project; and
- the decision to substitute the operating costs of a *different* mine for those of MTW.

The effect of making these incorrect material changes to the calculations are:

- by substituting long-term coal prices and exchange rates with today's coal prices and exchange rates reduces the net present value of MTW over the life of the mine by \$1,295million; and
- by substituting MTW's operating costs with those of its neighbouring mine, the net present value of MTW's operating costs over the life of the mine is increased by \$1,017million.

The coal price and exchange rates used in the economic study reflect long-term consensus forecasts by independent brokers of early 2014. For the purpose of an economic valuation of an infrastructure project with an approval length of 21 years, it is entirely appropriate to apply coal price and exchange rate expectations over the term of the investment, that is, long-term forecasts.

It should be noted that the NSW Government budget estimates are based on a thermal coal price of US\$90 per tonne, which is higher than the long-term figure of \$85 per tonne assumed in the economic study.

ii Employment

BMPA state that the economic study is incorrect to assume, contrary to statements made to their customers and shareholders that staffing levels will be maintained throughout the life of the project and that no effort will be made to increase the productivity of the workforce.

Future employment projections at MTW reflect MTW's planned production profile, which in turn reflects the long-term mine plan, and were provided to the economics specialists by the applicant. In addition, productivity improvements in mining typically arise from a combination of factor inputs. For instance, 'multifactor productivity', an indicator used by the Productivity Commission is the ratio of output to a combination of inputs, such as labour and capital or capital, labour, energy, materials, and intermediate inputs (Topp et al. 2008). Staffing levels provide only a limited indication of the productivity mining enterprise.

BMPA contend that the assumption that MTW employees are unlikely to obtain other jobs either in the coal industry or elsewhere in the Hunter economy, whereas data shows that MTW employees will be able to find employment either within the industry or other businesses that they have come from to a degree that few workers in other industries can achieve.

The economic study for the proposal referred to a Reserve Bank of Australia (RBA) publication to derive the labour market assumptions, which, TAI suggests, are inappropriate:

- the mining sector has a high rate of worker turnover, suggesting that workers who have been made redundant would have no trouble finding new employment; and
- the RBA statistics referenced by BAEconomics relate to 'involuntary separations', which, TAI suggests, is not appropriate since MTW workers would have plenty of notice of the need to find new employment.

First, the MTW labour force has some characteristics that would suggest that MTW workers would be less likely to seek new employment, either elsewhere in NSW or interstate. Specifically:

- more than a quarter of MTW employees are 50 years old and older; and
- almost a quarter (23 per cent) of MTW employees have been employed by MTW for 10 years or more, and 16 per cent of employees for 20 years or more.

For the purpose of the economic impact analysis, MTW workers who are made redundant and who move interstate no longer contribute to NSW gross state product (GSP). The assumption that 30 per cent of MTW workers made redundant leave the NSW labour force means just that: they may either retire or they may move interstate.

Second, BAEconomics undertook a complete literature review of employment outcomes in circumstances where workers are made redundant. As is stated in discussion of these assumptions in Appendix A of the economic study, there is very little information about the eventual labour market outcomes relating to workers who are made redundant at some stage during their working lives. To our knowledge, the only study of these labour market outcomes undertaken during the past ten years is the RBA (2012) study referenced by BAEconomics.

Third, the RBA study groups unemployment situations into three types – involuntary unemployment, voluntary unemployment in the form of ‘job sorting’ and voluntary unemployment for life-cycle and personal reasons. It would be very difficult to argue that the closure of MTW and subsequent redundancy of MTW workers constitutes any form of voluntary unemployment.

These workers would receive a redundancy benefit when the mine closes, and may be less likely to move or take other measures to find alternative employment in the mining industry.

iii Impact on the community and property values

BMPA states that it is of great concern that the economics study concludes there will be no change to property values or general wellbeing should the proposal be approved.

The economic study makes no comment on the change to property values or general wellbeing in the area should the proposal be approved.

The study does provide commentary on property acquisition noting that properties predicted to be significantly affected due to the proposal (that is, above government-prescribed criteria) by air and noise outcomes, will be offered acquisition of their properties, generally at prices that are above market values. The study states that in these cases it could be argued that the valuation of the corresponding external effects on that basis overestimates the impacts, although the affected landowners may have a (subjective) perspective of these impacts that may be lower or higher and irrespective of the criteria that may be set down in statutes or regulations.

The study concluded by stating that while these variations in perceived impacts should be acknowledged, there is no way in which they could be measured or assessed in a reliable manner, and the study has not attempted to do so.

iv Impact on the ecology

BMPA asserts that the economic study has assumed that the offset package will perfectly compensate for this impact and it is valued at the cost of the planting the new woodland.

A cost benefit analysis relies on the ‘opportunity cost’ principle (NSW Treasury 2007; Commonwealth 2006). Opportunity costs are determined with reference to the next best option. In the case of the WSW, the next best option available is to re-establish and preserve these ecological communities in a different suitable location. This is the approach adopted in the economic study and is consistent with the Secretary’s requirements.

v Noise, vibration, air quality and visual amenity

BMPA state that BAEconomics have measured the impacts of noise, vibration, air quality and visual amenity through 'financial instruments with the basis being 'observed behaviour of households or individuals of incurring financial outlays to insulate themselves against a non-market bad'. BMPA contend this is wrong and assert that the study uses Rio Tinto's estimates of expenditure required to mitigate noise, vibration etc to comply with government guidelines.

The economic study used market-based (also referred to as direct revealed preference) valuation techniques which refer to consumer behaviour and/or prices in a similar or related market (Department of Treasury and Finance 2013). These valuation approaches include:

- defensive expenditures: the costs incurred by individuals to mitigate the impact of changes and/or to recreate a situation that existed before a change, for instance by investing in noise insulation; and
- replacement costs: the cost of replacing or repairing a damage, for instance, to restore the environment to its previous condition.

BAEconomics used defensive and replacement expenditures – a form of market-based valuation - to value the noise, air quality and visual amenity impacts of the proposals.

Further, the economic study is explicit in saying that government guidelines as they relate to noise, dust or other impacts represent a 'line in the sand', which may be acceptable to some affected parties but not to others. Nonetheless, and imperfect as they may be viewed by some, government guidelines in respect of these effects reflect a common, agreed standard as to what constitutes a permissible degree of disturbance from economic activity and therefore an appropriate means on which to base the economic study. For example, page 24 of the study states:

Irrespective of the criteria that may be set down in statutes or regulations, peoples' personal preferences may also vary, so that what may be an acceptable disturbance to some, may be considered distressing by others. While these variations in perceived impacts should be acknowledged, there is no way in which they could be measured or assessed in a reliable manner, and we have not attempted to do so here.

7.2.10 Employment

BMPA asserts that the threat of job losses should the proposal not be approved is not presented in the context that 5 per cent of jobs in the Hunter Valley are in the mining sector. The Hunter Expressway would provide improved access to work in Maitland and Newcastle for displaced workers.

As described in Section 7.2.9.ii, the re-employment options of the MTW workforce were analysed in the economics study. The assumptions used were based on information specific to MTW and a detailed literature review of the latest information prepared by the RBA (2012) regarding employment outcomes in circumstances where workers are made redundant.

BMPA asserts that the non-mining sector in the Hunter Valley is in good shape but that the township of Bulga and industries such as the horse breeding industry would be significantly affected should the proposal be approved.

The EIS and this report describe predicted impacts to the surrounding area including the township of Bulga. This matter is addressed further sections 7.2.3, 7.2.7, 7.2.8 and 7.2.11 of this report.

Similarly, an analysis of CICs (ie viticulture and equine industries) in proximity to the proposal were assessed and described in the EIS. Section 7.2.1xviii of this report states that the nearest CIC to the proposal is approximately 5km to the south, outside the 2km barrier nominated in the SRLUP Guidelines for CICs. The proposal will not adversely impact agriculture including these industries. Further, as demonstrated in Section 4.7 of this report, Agriculture NSW confirmed that an agricultural impact assessment was not required for the proposal.

BMPA asserts that the EIS incorrectly states that the mining sector represents 21 per cent of the workforce in Bulga. BMPA contend that the figure is closer to 5 per cent (or 20 people).

Section 21.3.3iii of the EIS actually states that the mining sector represents 'up to 21 per cent' of the workforce in Bulga. This information was sourced from 2011 Census data from the ABS and is also presented in Table 4.2 of the SIA (EIS Appendix P). Notwithstanding, it should be noted that BMPA's contention that Bulga's workforce participation in the mining sector is closer to 5 percent, still places it well above the NSW average of 1.6 per cent.

7.2.11 Land values

BPMA asserts that property values are negatively affected by the expansion plans for a mine.

As described in Section 6.7.2 of this report, based on publically available data, there is no evidence of substantial decline in property prices due to the previous application for the Warkworth Extensions 2010 or the current proposal.

There are a number of factors which determine the value of properties, including supply and demand, interest rates, the state of the economy, demographics and the property's location. While an individual property's value is influenced by its location, it is also influenced by these other factors.

Intuitively, the strength of the mining sector, which provides the highest levels of employment in the region, would be an influencing factor in property sale and rental markets in the Singleton LGA. Therefore, it is not surprising that this matter was commonly raised in submissions in support of the proposal. It would be a reasonable assumption to make that when the mining sector is robust in the Singleton LGA and surrounding regions, property values and rental returns increase in response to increased demand.

Concurrent with the recent mining slowdown and increased rate of unemployment across the Singleton LGA described in Section 2.3.3 of this report, house prices have decreased.

Median house prices in regional areas other than Singleton LGA increased by 6.2 per cent from June 2012 to June 2013. Median house prices in NSW and Sydney also increased, by 5 per cent and 15.6 per cent respectively, from December 2012 to December 2013 (ABS 2014a).

In stark contrast, house prices and rental returns have fallen sharply in the Singleton LGA where median house prices fell by 9 per cent and rental returns by approximately 25 per cent in 2013. A major factor for this downturn may have been unemployment rates, which increased significantly over this time in the Hunter region from 2 per cent to 5.5 per cent (see Figure 7.1). This was against the general trend across other regional centres, the Sydney metropolitan region and NSW (Montoya 2013). The downturn in both employment and housing prices in the Hunter region is likely to have been influenced by the decrease in coal investment and the mining slowdown that was experienced during this period.

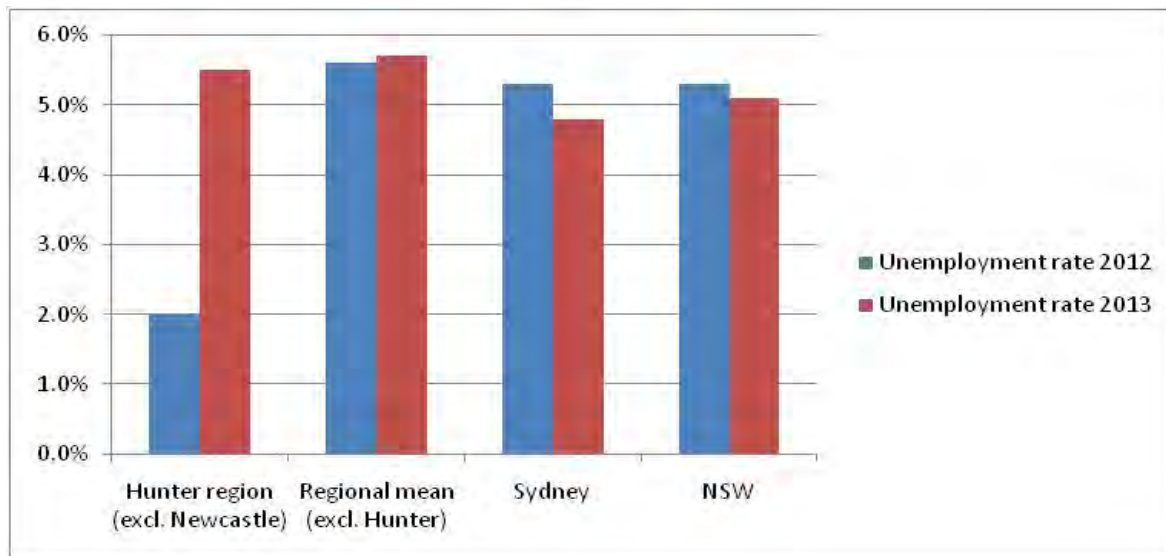


Figure 7.1 Comparison of unemployment rates between 2012 and 2013

The proposal would aim to maintain current workforce levels across MTW operations, which would also enable the substantial flow-on effects for suppliers and local businesses and the community more broadly, should contribute to maintain the current population levels in the Singleton LGA (with over 35 per cent of MTW employees residing in Singleton LGA).

Specifically related to Bulga, the issue of devaluation of properties was considered by Stubbs (2012) who examined the purchase price of properties within Bulga during the lodgement and determination of the application for the Warkworth Extension Project in 2010, 2011 and early 2012. Stakeholder engagement regarding the Warkworth Extension 2010 commenced in August 2009. The application was lodged on 1 March 2010 and the EA was placed on exhibition from 30 April to 15 June 2010. The matter was considered by the PAC and an approval granted on 3 February 2012. The approval was subsequently appealed in the L&E Court with the appeal upheld on 15 April 2013.

Stubbs (2012) examined the sale price of all properties sold in Bulga between 1 April 2008 and 23 May 2012. She noted that the purchase price of properties in Bulga did not appear to have been affected by the lodgement and assessment of Warkworth Extension 2010. An extract of this material is provided in Appendix F.

Recent analysis undertaken for the Bulga Optimisation Project, identified that capital growth for houses in Bulga was at least 97 per cent above other similar NSW regional areas analysed for the 2012 and 2013 period (Umwelt 2013). The growth in the area, despite the downward trend of house prices and increase of unemployment in the Hunter region during this time, may represent the importance of coal mining activities in the region on property values generally.

Further analysis of property sales in Bulga since the Stubbs analysis and Umwelt (2013) assessment, sourced from the NSW Government Land and Property Information Division, shows there has not been a marked decrease in median sales prices, nor the average number of sales from January 2008 and August 2014, shown in Figure 7.2.

With respect to sales, over this period the average annual number of property sales was five, demonstrating that since the announcement of the proposal in August 2009 sales have been at or above average. The median sales price has also remained consistently above pre Warkworth Extension 2010 application levels. It is noted that to calculate median sales price, large property holdings and land only sales have been excluded based upon concern raised in some submissions regarding skewing of the data. There are currently 16 properties for sale in Bulga (www.domain.com.au), however of these, only four have existing dwellings, with the rest being potential development sites.



Source: NSW Government Land and Property Information Division data request 2014.

Figure 7.2 Median sales price and number of properties sold - January 2008 to August 2014

WML acknowledges the importance of retaining value in property in areas surrounding the Warkworth Mine. In this regard, Coal & Allied will continue to manage residential properties it owns via the open market. Coal & Allied utilises the services of local real estate agents to manage its properties to a high standard of maintenance and management.

7.2.12 Mining

BMPA raise the issue of why underground mining methods cannot be used in preference to the proposed open cut mining.

A viable, operating underground mine cannot be considered an alternative given the time, effort, and investment that is required, in addition to requisite studies demonstrating feasibility.

Underground resources are known to occur at Warkworth Mine and MTO. These seams are deeper than the seams targeted under the proposal (see Chapter 2 of the EIS).

Eight of the seams targeted by the proposal are not suited to underground extraction because they are either:

- too thin;
- too narrow with high risk of splitting; or
- too close to an adjacent seam sterilising the other should one be extracted.

The remaining seams would also be constrained due to the footprint and the method of extraction. These limitations would include required buffers to current highwalls of the open cut operation for stability reasons and sterilisation of reserves within any curved footprint boundaries due to the straight-lined longwall panels. As reported in the Warkworth Extension 2010 EA, investigations into underground mining the proposal's targeted seams would result in approximately 20 per cent of the available reserves extracted, a significant underutilisation of an economic resource.

Consideration was given to underground mining the seams deeper than those targeted by the proposal. As stated in Chapter 2 of the EIS, potential underground mining is in its early stages of exploration drilling and resource definition with feasibility studies yet to be undertaken.

Therefore, much more work needs to be undertaken prior to developing a mine plan and optimising it before carrying out the requisite environmental studies in order to prepare and lodge a development application if this approach was determined as feasible.

This would rely on investment of significant capital which is unlikely to be feasible in prevailing economic conditions and would require further feasibility studies before mining could commence. The current status of the operation, as described in Chapters 1 and 2 of the EIS, requires a proposal design capable of being realised in the short-term allowing for a continuation in the viability of the operation, particularly with current market conditions and competition for capital investment in the mining sector.

Given the uncertainty regarding the potential for underground mining and the current viability of the operation, pursuing underground mining instead of the proposal is not an option to retain ongoing operations. A continuation of open cut operations at Warkworth Mine is the most effective and feasible option for extraction of the identified target coal seams compared to underground mining.

Notwithstanding this, the proposal recognises the potential for future underground mining at MTW with South Pit left open as a potential future access point.

Using South Pit as an overburden emplacement area and rehabilitating the area represented potential double-handling of overburden, increasing dust and noise generation, and was discounted as part of the proposal. It should be noted that if during the life of the proposal, the foreshadowed underground access at South Pit is not required, the final landform of South Pit will be considered further and updated in the MOP (see Chapter 13 of the EIS).

7.2.13 Blasting and road closures

i Road closures

BMPA contends that the blast study was undertaken without consultation and without reference to the site management plan and is inconsistent with contemporary limits. BMPA also contends that road closures are random in nature.

The blast study was completed in accordance with the relevant guidelines for blasting impact assessment; namely, the ANZECC guidelines (*Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*, ANZECC 1990). Blasting was considered during consultation with the matter raised during implementation of the community engagement programme for the proposal and was considered by the EPA in its review of the noise and vibration study.

The blast study fully considered the MTW blast management plan (referred to as 'site management plan' in BMPA submission). The management plan, which most recently updated in September 2014, is consistent with contemporary limits and commits WML to industry best practice blast management.

Road closures associated with blasting are not random in nature.

A road closure management plan is contained within the current MTW blast management plan (see Appendix B) and outlines:

- the requirements for blasting within 500m of Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway;
- Singleton Council's requirements for closing a public road for blasting activities;
- responsibilities for road closure;
- remedial action measures;
- flyrock management; and
- major hazards before controls are implemented.

Road closures are scheduled, where practicable, for outside peak traffic flow periods. Roads are temporarily closed for a period of less than 15 minutes and at strategic locations along the road that are highly visible to ongoing traffic and seek to minimise potential impacts on road users accessing alternate routes.

Notice of temporary road closures is provided via posting of signs on the affected roads, where practical, two days prior to blasting. The signs display the date and time of the next blast and a contact telephone number for public enquiries. Notices of forthcoming road closures are also provided to the local community through advertisements in the Singleton Argus; Tuesday edition for closures on Wednesday through to Saturday and the Friday edition for closures on Monday and Tuesday.

ii Vibration and damage from blasting

BMPA contends vibration and damage from blasting will increase with the proposal.

Impacts from blasting are not predicted to increase under the proposal.

A blast noise and vibration impact assessment is provided in Chapter 12 of the noise and vibration study. This includes impacts on sensitive structures. WML is managing blasting at the Site in accordance with the development consent (DA-300-9-2002), Schedule 3, Condition 27c to operate a suitable system to enable the public to get up-to-date and accurate information on the proposed blasting schedule on site.

The current blast management plan (September 2014) for MTW provides up-to-date information regarding the proposed blasting schedule via the process outlined below:

- notify neighbouring mining operations;
- advertisement in the Singleton Argus when a public road is to be closed, as well as identifying proposed blasting times on road signage established in the vicinity of MTW;
- providing an overview of the blasting practices on the Rio Tinto Coal Australia website which also includes a contact number for any community enquiries; and
- providing up-to-date information to the blasting hotline 1800 099 669.

This plan would continue to be used for the proposal. WML is committed to ongoing improvements to the system to reflect community feedback, for example, investigation of an SMS based notification system.

7.2.14 Saddle Ridge

i Visual effect

BMPA contend that Saddle Ridge (referred to as Saddleback Ridge in the EIS) is the last of the original landscape to the east of Bulga and removing this ridge will give a view of nothing but overburden.

As described in Section 2.3.2 of this report, mining of Saddleback is required to enable the long-term viability of operations at Warkworth Mine.

As described in Sections 15.3 and 15.4 of the EIS, the removal of Saddleback Ridge and progression of mining westward would generally be concealed to most viewers to a varying extent by the intervening vegetation and topography, particularly in lower lying areas where views are mostly of trees along Wollombi Brook. Overburden emplacement at the operation will continue to be visible to some properties in Bulga village for the duration of the existing development consent, and current onsite mitigation measures will continue under the proposal. These include:

- structure design to minimise visual impacts, consistent with engineering principles and practice, and any site constraints;
- direction of lighting away from offsite areas to the greatest degree possible, and the use of sensor lighting where permanent lighting unnecessary;

- community response officers who visually check the perimeter of the operation for lighting impacts;
- construction of bunds, vegetated and built screens at appropriate locations along the Site boundary; and
- establishment of planting patterns of trees and grasses in rehabilitation areas to create a high level of visual integration with the surrounding landscape.

In order to determine mitigation for any viewpoint with high sensitivity, a site specific visual assessment (SSVA) would be undertaken on request for properties in Bulga village. As a site visit to each individual property to assess potential visual impacts from the proposal is not feasible, the VIMP would outline a process to undertake these assessments. A landowner affected by visual impacts from the proposal may request a SSVA, which may result in the application of appropriate screening treatments at the affected property or between the property and the source for impacts assessed as high.

For the small number of individual residences within the primary visual catchment, which may have high visual impacts at some stage of the proposal, suitable mitigation measures would be implemented, subject to agreement with the landowner. This is likely to constitute vegetation screening; however, all mitigation measures would be guided by an SSVA and associated consultation with the affected property owners.

ii Noise protection by Saddle Ridge

BMPA contends that Saddle Ridge (Saddleback Ridge) provides an important barrier for Bulga.

As demonstrated in Sections 4.11.1, 6.4.5i and 7.2.7iv of this report, Saddleback Ridge does not provide an important acoustic barrier for Bulga.

7.2.15 Wallaby Scrub Road

i State significance

BMPA states that Wallaby Scrub Road forms part of the Great North Road running from Sydney to the north beyond Warkworth village. The submission asserts that there has been no attempted interference with the original location of the road until now. The road holds both State and Federal Heritage Status and warranted establishment of a protection and preservation organisation funded by both State and Federal Governments and named "Convict Trail Project" (CTP). The assertion that Wallaby Scrub Road is a branch from the Great North Road and was not constructed by convict labour is incorrect. Records indicate that convict road parties worked on both Wallaby Scrub Road and the bridge over Cockfighter Creek at Warkworth.

At no place in the EIS is it suggested that the Wallaby Scrub Road section of the Great North Road was not constructed by convict labour.

The applicant recognises that Wallaby Scrub Road exists on a section of the alignment of the historically significant convict built former Great North Road as is clearly stated in Chapter 19 of the EIS and detailed in the historic heritage study (EIS Appendix N).

BMPA contend that the EIS Assessment of Heritage Significance (Vol 1 Table 19.2 Item 2 Page 324) statement that "this section retains much of the original alignment and is historically significant at State level" should be sufficient evidence to refuse destruction of Wallaby Scrub Road and retain it as part of the longest road constructed at that time in Australia.

The EIS assessment recognises the alignment of the Great North Road as being a contributory factor to its significance. However, in the context of the entirety of the Great North Road alignment, the impact assessment determined that the disturbance of a 5.4km section of its total length of alignment of approximately 240kms (between Sydney and the village of Warkworth) is considered a minor impact. This assessment is based upon several considerations, including:

- the results of an archaeological survey conducted along an 8.8km section of the Great North Road alignment located within the MTW mining leases;
- the level of previous disturbance resulting from 20th century road upgrades and maintenance activities (particularly over the last c40 years); and
- the general lack of integrity and intactness of this section of road as compared to other surviving sections of the road elsewhere along its total alignment, particularly those sections which are listed on the World- National- State- and local heritage registers/lists.

The archaeological assessment survey undertaken for the preparation of the Mt Thorley Warkworth Great North Road Conservation Management Plan (see Annexure C of the historic heritage study), and as detailed in the study itself, identified that the Wallaby Scrub Road section of the Great North Road alignment had been subject to major construction and maintenance works over the last c40 years. Consequently, the integrity of the road in this area was assessed as being low. Within the 5.4km section of the road that would be subject to development disturbance of only a few small areas of archaeological potential were identified, being associated with remnants of potential pavement (three areas), drainage (one) and quarrying (one) activities. Furthermore, the only section of the roadway and alignment with viable and demonstrable integrity and intactness is located outside of the development impact area and, as stated in the assessment, it is proposed that this surviving section be incorporated within the adjoining Wollombi Brook Aboriginal Cultural Heritage Conservation Area to ensure that section's long-term protection and conservation.

Finally, in considering the significance of the alignment of the Great North Road, Coal & Allied has made the commitment in the EIS to develop an interpretation programme for the alignment which will include the provision of landscape features marking the original road alignment within the final landform design as an element of the mine rehabilitation plan at the completion of mining activities.

BMPA state that cultural heritage consultation was made with CTP and OEH, who fund CTP, and RMS who have no jurisdiction over this Council owned road. Widespread consultation was not offered to other interested parties such as the RAHS, State Archives, Singleton Historical Society, State and Federal Museums and historians. Instead the mining company has selected a small organisation, CTP, as being representative of the wider community.

Contrary to BMPA's assertion, widespread consultation was completed as part of the historic heritage study.

In response to community feedback on providing more opportunities for community consultation with respect to the identification, significance assessment and management of historic heritage, Coal & Allied established the CHAG in April 2012. The CHAG is an informal consultation group with representation from Singleton Council, the Singleton Historical Society and Museum, the Convict Trail Project (CTP) and a number of other organisations and individuals who have a particular interest in historic heritage places located within Coal & Allied owned and managed lands including MTW. The CHAG participants have been engaged in consultation with respect to the significance assessment, impact assessment and management of the Great North Road since 2012 and most recently for the historic heritage study for the EIS.

Representatives from the CHAG were invited to participate in the archaeological survey conducted along an 8.8km section of the Great North Road (Wallaby Scrub and Charlton Roads) alignment situated on Coal & Allied owned lands within the MTW's mining leases. A representative from the CTP attended the archaeological survey as the CTP have specialist technical and historical knowledge about the Great North Road relevant to the heritage significance and impact assessment for the proposal. The outcomes of the archaeological survey, proposed management measures developed for the CMP and the significance and impact assessment for the EIS were reviewed by the CHAG and their input incorporated into the assessment and management recommendations and commitments.

RMS were consulted by the historic heritage consultants, ERM, for any records they might hold with respect to the history and modern road construction activities associated with the Wallaby Scrub and Charlton Roads section of the Great North Road.

BMPA contend that the former CEO of CTP Ms E Roberts forcefully objected to interference with the road in 2012 however the BMPA is now told that since then lengthy discussion has taken place between Rio Tinto and the CTP to fund projects outside of the subject area to the tune of \$200,000. The CTP is fearful of losing Government funding and obviously has no alternative other than to accept the lucrative offer in order to survive. This financial inducement is seen as no more than a bribe to release Wallaby Scrub Road for ultimate destruction.

The BMPA's claim that Coal & Allied has offered the CTP a \$200,000 'financial inducement' as a 'bribe to release Wallaby Scrub Road for ultimate destruction' is ill-informed, incorrect and unjustifiable.

The CTP does not own or control the Wallaby Scrub Road section of the Great North Road nor does the CTP have any statutory rights with respect to consenting of the closure and disturbance of Wallaby Scrub Road.

The CTP participate in the CHAG as a party for consultation along with representatives from Singleton Council, the Singleton Historical Society and Museum, and a number of other organisations and individuals who have a particular interest in historic heritage places located within Coal & Allied owned and managed lands. The CTP has specific technical and historical knowledge about the Great North Road relevant to heritage significance and impact assessment for the proposal.

As an outcome of consultation with the CHAG on the impact assessment and appropriate management of historic heritage associated with the proposal and the Mount Thorley Operations 2014 proposal, Coal & Allied committed to establishing two historic heritage conservation funds as a community benefit offset measure for the disturbance of historic heritage values associated with the proposals including the remnants of the Great North Road.

Recognising the local and state significance of the Great North Road, Coal & Allied committed to establishing a community benefit fund to provide resources for priority heritage conservation works on significant surviving sections of the Great North Road located within the Singleton local government area and/or other areas such as the Great North Road World Heritage Area. It is proposed that the MTW Great North Road Conservation Fund would be administered by Coal & Allied in consultation with Singleton Council, the CHAG, which includes the Convict Trail Project, and the Heritage Division of the Office of Environment and Heritage. The governance of the fund, funding criteria and allocation decisions will be determined by Coal & Allied, Singleton Council and the Heritage Division of the OEH.

Coal & Allied will provide an initial commitment to this fund of \$100,000 within 12 months of the approval of the proposal and then an additional \$100,000 in 2018 or upon commencing development disturbance works that impact the Wallaby Scrub Road section of the Great North Road (total commitment of \$200,000). It is intended that the fund will be open to funding applications from any community organisations for conservation projects with a focus within the Singleton LGA but will also consider the merits of funding conservation projects for other sections of the Great North Road.

BMPA state that a similar project by neighbouring Bulga Coal Mine considered the relocation of Charlton Road, a section of the Great North Road, however as a result of community objection changed their proposal to retain the road extant and preserve the integrity of the Great North Road. This heritage consideration must be commended and should also be respected by Rio Tinto.

The Bulga Optimisation Project, and the mine plan BCC has chosen to pursue, is irrelevant to any consideration of the proposal.

Despite this, it is Coal & Allied's understanding that the Bulga Optimisation Project proposal development footprint was revised for a variety of reasons leading to the project not needing to develop across Charlton Road. As is noted in the Bulga Optimisation Project Response to Submissions & Revised & Amended Project Application (August 2013) the project area was revised 'largely based on operational costs and effective use of capital' (Executive Summary, p1). As a consequence of this economic review the '...the Revised Project will no longer result in a realignment of the [Charlton] road, the heritage significance of the road will be unaffected by the Revised Project' (s4.11, p.134).

With respect to this proposal it is not geographically, geologically nor economically viable or feasible to avoid mining through the Wallaby Scrub Road alignment.

BMPA assert that the fact that Rio Tinto is prepared to spend money to preserve a small section at the northern end of Wallaby Scrub Road, outside of the proposed mining area, is inconsistent and hypocritical and merely a token effort to convince the approving authority that they really care about the future of Wallaby Scrub Road. Destruction of the road for the sole purpose of mining coal for the export market must not be allowed. A previous PAC refused relocation of the road as an option.

The archaeological assessment of the Wallaby Scrub Road section of the Great North Road found that the only significant portion of the roadway and alignment with viable and demonstrable integrity and intactness is located outside of the proposed 2014 disturbance area.

As stated in the EIS, Coal & Allied has made the commitment to incorporate this historically significant and relatively intact section of the road into the WBACHCA for its long-term protection and conservation. This will require the consent of Singleton Council which is the owner of the road, but is entirely consistent with the establishment of the Great North Road Conservation Fund which in the future could be used to fund projects such as this.

ii Road closure

BMPA notes that Singleton Shire Council has on six separate occasions refused to hand over Wallaby Scrub Road for mining purposes.

Council's are elected bodies and their position on issues may change over time. Accordingly, in terms of the closing of the road by Singleton Shire Council WML will engage with them in respect of this after the application for the proposal is determined.

For MTW to secure its future, it needs to continue mining to the west and through Wallaby Scrub Road. By Year 2 (nominally 2016/17) mining would be within 500m of the road and it would be necessary to close it. There are alternative routes to local areas, including Bulga, already in place (for example, Golden Highway). These alternative routes add time to journeys, for example, approximately 6 minutes to a trip to/from Bulga village.

This matter is addressed further in Section 4.11.6 of this report.

iii Traffic

BMPA notes that the EIS includes results of traffic flow surveys with a mixture of daily and 12 hour statistics leaving no direct comparison of results and that there is no indication of when the 12 hour survey was taken.

The date and time of the Origin-Destination (OD) survey and tube traffic count surveys are provided with the results in Appendices A and D of the traffic and transport study, respectively.

An OD traffic survey was conducted during a 12 hour period on Tuesday 4 March 2014 (between the hours of 05:00 and 17:00), which identified the current volumes and proportions of all traffic entering or leaving the area via the northern end of Wallaby Scrub Road. In addition, a 24 hour tube traffic count was undertaken on Wallaby Scrub Road and at two locations on the Golden Highway, from 4 March to 10 March 2014, to confirm existing daily traffic volumes on these routes.

The surveys were undertaken to enable comparison with the previous traffic assessment (Parsons Brinkerhoff 2010), as described in Section 20.3.2.iii of the EIS.

BMPA notes that the average 800 vehicles currently using Wallaby Scrub Road daily will be required to travel an additional 9 km as a result of the proposed closure. At a conservative running cost of 25 cents per kilometre the cost of the additional travel amounts to \$12million over 20 years. BMPA contend that it isn't fair and reasonable to expect the travelling public to meet this additional cost for the benefit of the mining company.

The traffic and transport study (Appendix O of the EIS) stated that Putty Road and Charlton Road originating vehicle movements would be subject to increased travel distances of approximately 8.8km and 6.2km respectively. An OD survey was undertaken as part of the traffic study which confirmed the results from a similar survey undertaken as part of the Warkworth Extension 2010. Approximately 20 to 25 per cent of traffic originated from Putty Road with the majority using Charlton Road (60 to 70 per cent).

The economic study (Appendix E of the EIS) included a CBA, using an approach recommended by Austroads, of the road user costs of the closure of Wallaby Scrub Road (refer to Sections 3.2.3 and B.6.2 of that report) as part of the overall assessment of the proposal. The CBA included analysis of three categories: operator costs, road user costs and non-user costs. The vehicle operating costs were estimated to be a conservative \$0.27 per km. In total, the estimated net impacts of the closure of Wallaby Scrub Road were a total of \$12.7million. These costs are an externality of the proposal and need to be considered by the decision-maker in the context of the proposal.

BMPA contends that the statement that Wallaby Scrub Road is of inferior standard to other roads and dangerous is incorrect. Further noting that the accident rate is well below average.

As discussed previously in Section 7.2.1 of this report, the EIS does not state that Wallaby Scrub Road is of inferior standard to other roads and dangerous.

Wallaby Scrub Road is a local road with less stringent design specifications than a state road, such as the Golden Highway. Wallaby Scrub Road is a two lane rural road with generally a 100km/hr speed limit and variable road pavement width and conditions, such that the edge and centre lines are not typically marked, while Golden Highway is generally constructed to a 'major rural highway' design standard, with marked centre and edge lines and sealed shoulders (that typically have a minimum width of 1-2m).

The potential impacts of the Wallaby Scrub Road detour are discussed in Section 20.3.2iii(d) of the EIS. In this discussion it is noted that the detour would result in safer travelling conditions for detoured traffic (and lower accident rates per kilometre travelled) when travelling via the Golden Highway. This is, in part, due to the higher road construction standards along this route, including improved intersection sight distances.

iv Fire control

BMPA contends that the proposal to provide the Rural Fire Service (RFS) fire trail access adjacent to mining operations is solely for the purpose of protecting Warkworth Mine in the event of a bushfire and will create significantly more ground disturbance and become redundant as operations move west.

BMPA's assertion is incorrect. The sole purpose of the fire trail access being adjacent to mining operations is not to protect Warkworth Mine in the event of a bushfire. The fire trail would be constructed prior to the proposed closure of Wallaby Scrub Road, to maintain emergency vehicle access.

As described in Section 20.3.2iii(c) of the EIS, the current local property access functions for traffic using Wallaby Scrub Road were reviewed as part of the traffic and transport study. All affected properties on Wallaby Scrub Road, to the south of the rail bridge, are owned by MTW, however, the fire trail will provide access for emergency services to all properties along the route.

The fire trail would be constructed in accordance with the RFS's access standards prescribed in *Planning for Bush Fire Protection* (Rural Fire Service 2006) and NSW Bushfire Coordinating Committee Policy No. 2/2007, in consultation with emergency services. Construction would involve considerably less ground disturbance than the relocation of Wallaby Scrub Road. Section 23.2.4 of the EIS describes considerations for the permanent relocation and temporary relocation of Wallaby Scrub Road.

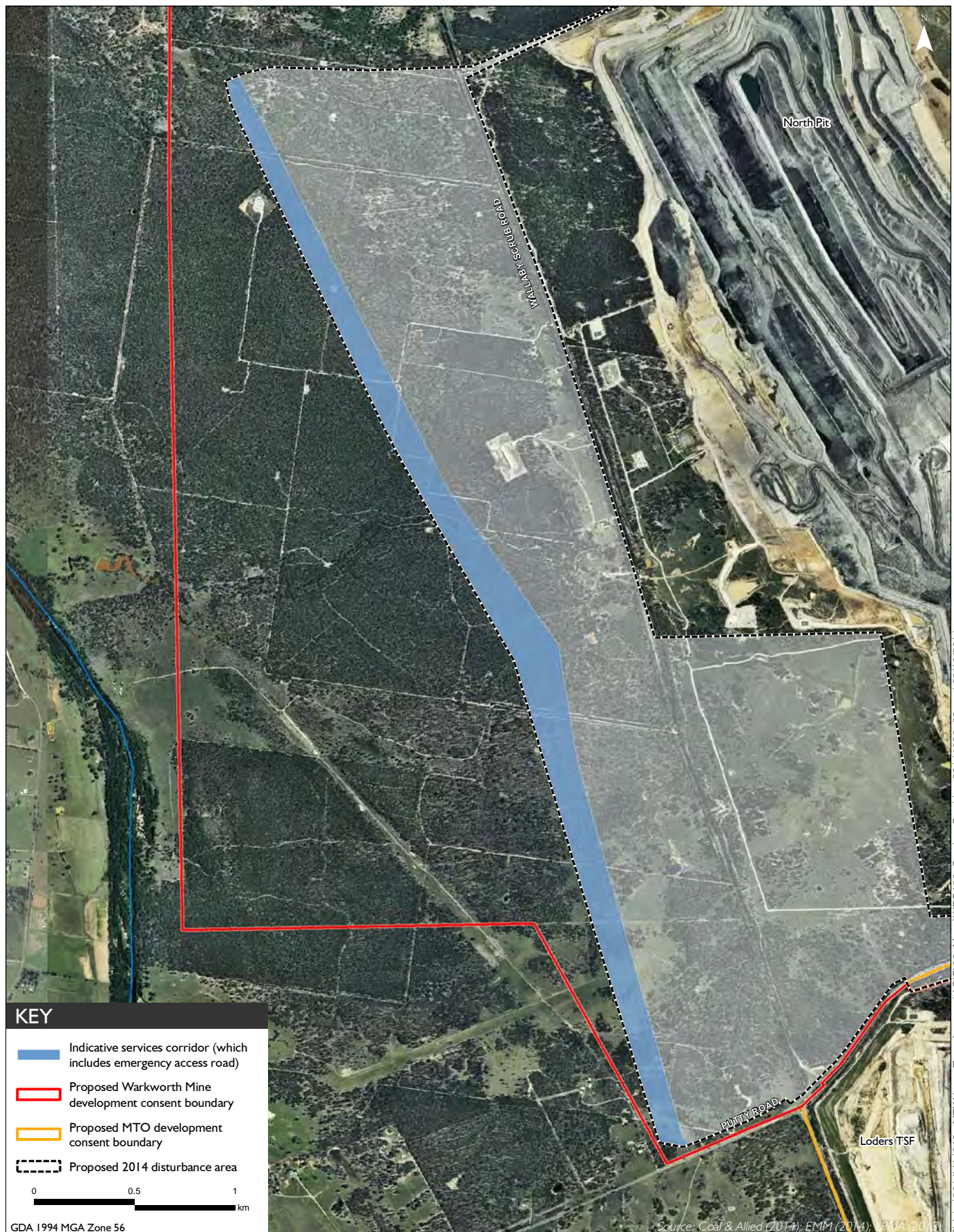
As detailed in Section 2.4.2iv of the EIS, the fire trail would be constructed in the proposed services corridor (shown in Figure 7.3 of this report) to the west of the highwall, and, therefore, would not become redundant as mining progresses westward. In addition, construction in the services corridor would be located entirely in the proposed disturbance area, as shown in Figure 7.3, and it was assumed, for the purpose of the EIS, that the full width of the corridor would require clearing and potential impacts were assessed accordingly.

In its letter dated 19 May 2014 (see Appendix O of the EIS), the RFS advises that “whilst its preferred option would be the relocation of Wallaby Scrub Road to maintain access for emergency services, an acceptable second option is the construction of a suitable fire trail on the perimeter of the proposed extension area.”

v **Broke Road**

BMPA notes that the Rio Tinto offer to spend \$2million to upgrade the Golden Highway/Broke Road intersection no longer applies.

WML notes that no such offer was made as part of the proposal, however, BMPA is correct to note, as discussed in Section 20.3.2 of the EIS, the recent RMS intersection improvement works that have taken place at this intersection. These works have substantially improved the peak hour traffic delays and level of service, such that this intersection no longer represents a capacity constraint on the local road network.



7.2.16 Aboriginal cultural heritage

BMPA asserts that Rio Tinto has chosen to use the same data provided in the now disallowed 2010 EA.

As stated earlier, this is a misleading assertion. The data utilised in the Aboriginal Cultural Heritage impact assessment for the EIS is an extensive and comprehensive knowledgebase drawn from the compilation of all Aboriginal cultural heritage and archaeological assessments and associated management activities (for example excavations and mitigation) conducted within the MTW mining leases from the early 1980s through to as recently as January 2014. Since the Warkworth Extension 2010 there have been an additional five Aboriginal cultural heritage assessments and/or mitigation programmes from which data has been incorporated within the 2014 EIS. A detailed examination of these studies, including the currency and adequacy of data sets, are presented and addressed in Section 5 of the Aboriginal cultural heritage study.

BMPA asserts that MTW (ref: EA Vol 1 para. 2 page 311 and minutes of ACHWG meetings in 2010 EA) has chosen to ignore the pleas of the Aboriginal groups requesting that their heritage be not disturbed. To date all 110 sites within the mined area have been destroyed and a further 104 in this proposal area are to meet the same fate. Examples from the minutes of ACHWG meeting (page 220 — EA 2010) were:

a) the chairman told the meeting that the site M grinding groove heritage site could not be preserved if the extension proceeded.

b) A number of concerns were raised by community representatives including (Item 2) there is a constant process of destroying cultural sites for mining — Aboriginal people's interests are not being fully considered — we continue to lose our culture.

The chairman's response was "open-cut mining development creates significant ground disturbance and unfortunately many cultural sites are destroyed to make way for mining which provides great economic benefit to the district".

Again, these are incorrect assertions made by the BMPA.

The BMPA make reference to previous consultation undertaken with the Coal & Allied CHWG for the 2010 EA to make the assertion that Coal & Allied 'has chosen to ignore the pleas of the Aboriginal groups requesting that their heritage be not disturbed', this is simply incorrect.

As stated in the Chapter 18 of the EIS, while the RAPs have expressed a view that they would prefer that no additional disturbance to Aboriginal cultural heritage occur as a general principle, the RAPs have raised no objections to the measures proposed for managing and mitigating the impacts to Aboriginal cultural heritage associated with the proposal. One of the key mitigation measures endorsed by the CHWG RAPs is the establishment of the WBACHCA an offset for the 110 cultural heritage sites that will be disturbed over the 21 year life of the proposal. The WBACHCA incorporates approximately 698ha of land to permanently protect and conserve 265 significant Aboriginal cultural heritage sites and landscape areas including the highly culturally significant Bulga Bora Ground.

Coal & Allied notes that the OEH, as the key regulator with accountability for protection and management of Aboriginal cultural heritage, made a submission on the EIS stating the OEH supported the Aboriginal community consultation approach undertaken by Coal & Allied for this assessment, specifically noting that that no formal or informal opposition to the management measures proposed in the assessment had been received by OEH from any RAP prior to the Public Exhibition. Furthermore, OEH acknowledges and supports Coal & Allied's approach in affording the CHWG the opportunity to consider the impacts and management of Aboriginal cultural heritage at a landscape level leading to a focus on the long-term management of a range of significant Aboriginal cultural heritage places and areas of high cultural significance within the broader regional context. It is also noted that OEH states that it "strongly supports all the management commitments proposed with respect to Aboriginal cultural heritage for the proposed Warkworth Continuation Project 2014" and that it had "no further comments or requirements for Aboriginal cultural heritage within the extension footprint".

BMPA notes that in the small Modification 6 area recently approved by a PAC of the seven cultural heritage sites recorded three have been destroyed under NPW Act permit and four have not been located leaving the area totally devoid of cultural sites. The submission asserts that to remove artefacts such as grinding groove rocks and scarred trees from their original location destroys the heritage value of the site and the artefact, which is inconsistent with Government Law applying to other Aboriginal heritage sites.

With respect to the Warkworth Mine Modification 6 proposal area there were eight Aboriginal cultural heritage sites located within the development area. In consultation with the CHWG RAPs an Aboriginal Cultural Heritage Assessment Report was developed in support of an Aboriginal Heritage Impact Permit (AHIP) application submitted to the OEH. This AHIP was subsequently granted (#C0000201) and the agreed impact mitigation measures implemented in early February 2014. Two of these Aboriginal cultural heritage places straddled the western boundary of the Warkworth Modification 6 boundary and were only partially disturbed. The consultation with RAPs, development of the assessment report and AHIP consent process were conducted and approved by OEH in compliance with the legal requirements under s90 of the *National Parks and Wildlife Act 1974*.

BMPA states that a recently discovered second section of "History of Bulga" notes written by local anthropologist, Alex Eather in 1921 describes a much larger area of Bora Ground than previously thought extending approximately 400m further to the east into the proposed mining area. The submission states that no effort by Rio Tinto has been made to further investigate this revelation. The submission also states that Rio Tinto's methodology whereby historians, academics, anthropologists and legal representatives have not been included in the ACHWG can only cast suspicion on the possibility of the Aboriginal Community being disadvantaged in negotiations.

The submission contends that these above issues were publicised at the Modification 6 PAC meeting but not given serious consideration.

The submissions states that it suits the mining company to set aside the Bulga Bora Ground which is outside of the proposed mining area whilst seeking destruction of ancillary and related items in the surrounding area. The overall entourage attending the last Bora Ceremony in 1952 would have approached 2,000 persons. ("600 warriors were in attendance" — Elizabeth Collins Memoirs — 1914). The various tribes were camped over a wide area including that area proposed to be mined. That extended area should be included in the conservation zone. The whole locality should be protected in perpetuity as a unique sacred cultural place of national Aboriginal and Non-Aboriginal significance.

The location of the Bulga Bora Ground as referred to in Chapter 18 of the EIS and Aboriginal cultural heritage study as is recorded in the OEH AHIMS database as site #37-6-56 and is described as carved trees with a ceremonial ground. A detailed examination of the historical record and other sources pertaining to the location of the Bulga Bora Ground is presented in Section 3.6 of the Aboriginal cultural heritage study.

Substantial research efforts have been made to accurately determine the location of this culturally and historically significant site. Based on the exhaustive work of Dr Helen Brayshaw and subsequent research undertaken by Coal & Allied and others, which includes consideration of the information contained in Alex Eather's notes, the most informed estimate of the site's location is provided in the EIS. It should be noted that this area includes a significant management buffer as agreed with the CHWG. This location has been delineated based on Brayshaw's detailed examination of all the evidence to hand, and confirmed by a number of visits to the area undertaken by CHWG RAP representatives from 2009 and as recently as January 2014.

In the absence of a new body of historical evidence that makes a compelling case that all other substantiated assessments of its location are incorrect, Coal & Allied (and the CHWG and OEH) continues to view the currently accepted location of the Bulga Bora Ground as correct. This location lies well within the WBACHA boundaries. Indeed, even increasing the extent of the Bulga Bora Ground area 400m to the east, as suggested by the BMPA, the Bora Ground would still be situated within the WBACHA and at a minimum 600m from the westernmost extent of the proposed 2014 disturbance area.

Coal & Allied's approach to conducting Aboriginal cultural heritage assessments developed in consultation with the CHWG is based upon these assessments being conducted by the CHWG RAPs themselves with the assistance of a technical advisor (for example, an archaeologist) engaged by Coal & Allied on their behalf. The technical advisor's role is to provide technical advice on the archaeological aspects of the Aboriginal cultural heritage identified by the RAP field officers. Coal & Allied has adopted a broad definition of Aboriginal cultural heritage beyond that limited to material objects as defined under the *National Parks & Wildlife Act*. This definition is as interpreted by the RAPs themselves and includes objects, places and values of archaeological, traditional, spiritual, historical or contemporary significance are deemed to constitute cultural heritage. Based upon the findings of the RAPs, the technical advisor provides a report on the outcomes of these investigations which are reviewed by the CHWG. All assessment and management reports, along with all CHWG presentations, project information, meeting minutes and other relevant documentation are provided to all RAPs for their consideration and comment to ensure they are fully informed and the process transparent to all parties.

7.2.17 Built heritage

BMPA states that to date all white settler built heritage within the mined area has been destroyed — no attempt had been made to preserve or relocate those structures which included McGregor's historic woolshed and yards, Harborne's residence, a slab wall and shingle roofed residence beside the old Jerrys Plains Road, Soholes' residence on North Charlton Ridge, Bates' 150 year old residence at Saddle Ridge (erroneously referred to as Saddleback Ridge in the EIS) and the similar aged Martin's wineshop at Charlton Road — not a good track record.

Two important sites are now the subject of this mine expansion. The WW2 RAAF Base at Bulga has been relinquished by the Federal Government. Consultation in this regard was totally inadequate as Air Force historians and heritage museums were not offered stakeholder input. It is unclear in the Historic heritage section (Part 9.2.1 page 319 2nd last para.) as to which base is described in the text. Bulga RAAF Base included 2 intersecting runways — the larger being capable of handling fully laden bombers and was strategically located for protection of both Newcastle and Sydney. Rio Tinto has downplayed the importance of the base during WW2.

The property has been owned by MTW for approximately 30 years during which time structures on site have been allowed to fall into disrepair. Field infrastructure remains in excellent condition and should be set aside as a cultural heritage conservation site as is proposed for the adjoining ACHCA.

The brief description provided in Chapter 18 of the EIS is referring to the RAAF Bulga complex located on the western side of Wallaby Scrub Road. RAAF Bulga was the parent aerodrome for three satellite airstrips located at Warkworth (Hunter Valley Gliding Club landing ground), Broke and Strowan. The location of the RAAF Bulga complex is shown in Chapter 18 of the EIS with additional detailed descriptions and locational information provided in Section 3.4, Figure 4.2 and Table 4.3, and Annexure B - RAAF Bulga Conservation Management Plan (see p4 and Figure 5.2) of the historic heritage study.

The relative significance of the RAAF Bulga complex is addressed in Section 6 of Annexure B - RAAF Bulga Conservation Management Plan. The complex is recognised as having State heritage significance. Personnel from both the RAAF Museum Point Cook and Fighterworld Museum, RAAF Williamtown, were consulted on the history and significance of RAAF Bulga as noted in Sections 4.3 and 4.4 of Annexure B - RAAF Bulga Conservation Management Plan.

There is only one substantial built structure (building) associated with the site that was extant after the disposal of assets by DCA during the early 1950s. The Mess Hall building was partially demolished after it was sold by the DCA to a private landowner for demolition or removal in 1953, well prior to Rio Tinto through Coal & Allied assuming ownership of the land in 2001. The Mess Building has been subject to vandalism and structural damage due to an adjacent tree collapsing on the building.

Only a very small portion of the RAAF Bulga complex, approximately 4.8ha at the very eastern end of the east-west runway, will be affected by the development. This is an area of cleared ground situated beyond the end of the constructed runway. The affected area is to be largely incorporated within a 200m management buffer zone extending eastwards from the western boundary of the proposed 2014 extension area. This buffer area will not be mined and will be used for fencing off the mining area and for the provision of services such as an access road, water pipelines, power and drainage and, therefore, the anticipated impacts will be minor. The greater part of the RAAF Bulga complex will not be affected by the proposal and the historic heritage features will continue to be managed for their conservation. *BMPA also asserts that Wallaby Scrub Road has been deliberately downgraded in value by Rio Tinto, with an offer of \$200,000 to the Convict Trail Project to relinquish any interest in this portion of the Great North Road. Singleton Shire Council has rejected the mine extension proposal and any offer from Rio Tinto to acquire the road. Again, widespread consultation was not made available to other potential stakeholders. MTW has belatedly established a CHWG with a diverse selection of members to focus on preserving remaining heritage structures which happens to be located outside of the proposed mining areas. This effort is too little too late.*

Coal & Allied will continue to conduct ongoing community engagement and consultation on the assessment and management of historic heritage places associated with the proposal through the Coal & Allied CHAG and welcomes the participation of community representatives with particular knowledge and interests in historic heritage of the region, including representatives from historical groups, interested individuals and local government.

7.2.18 News media coverage

BMPA references the media coverage on the extension of mining at Warkworth Mine.

BMPA's comments on news media coverage regarding the proposed extension of mining at Warkworth Mine are noted.

7.2.19 Performance and consent breaches

MTW has breached government guidelines in honesty and transparency by showing total disrespect to CCC members and the community in failing to disclose details of this proposal prior to public announcement.

MTW has consistently publicly stated that MTW was considering its long-term future. Once this decision was finalised the CCC was notified as appropriate. As described in Section 7.5.7 of the EIS, individual members of the MTW CCC were personally contacted by Coal & Allied on 19 March 2014, prior to a media release announcing its intention to lodge a development application for the proposal.

MTW has been fined for breaches in noise levels and dust exceedances.

MTW has received three Penalty Infringement Notices (PIN) for air quality and noise management in 2012 and 2013 as follows - it is noted that although PINs were issued, exceedance of air quality criteria was not measured by the MTW air quality monitoring network:

- 18 May 2012 – in relation to dust management on 13 May 2012;
 - On 13 May 2012 Singleton DP&I witnessed instances of dust emanating from Warkworth Mine between approximately 2:00pm to 3:30pm. The citation from DP&I stated that best practice to minimise dust generation was not being implemented as required under Condition 25 of Schedule 3 of Project Approval 09_0202. A penalty infringement notice and fine of \$3,000 were issued. The DP&I stated methods identified in the Statement of Commitments for PA 09_0202 were not being implemented including adequate maintenance of coal handling areas, watering of ROM stockpiles, and watering of trafficked areas. Exceedance of air quality criteria was not measured at MTW air quality monitoring locations, and Upper Hunter Air Quality Monitoring Network (UHAQMN) air quality index values at locations in the vicinity of Warkworth Mine were consistent with regional UHAQMN locations.
- 18 October 2012 – in relation to dust management on 12 October 2012;
 - On 10 October 2012 Singleton DP&I witnessed dust blowing offsite from the Warkworth Mine under north-westerly winds. Dust emissions were observed in the south-eastern area of Warkworth Mine in the vicinity of the Putty Road. Citation from DP&I stated that best practice to minimise dust generation was not being implemented as required under Condition 25 of Schedule 3 of Project Approval 09_0202. A penalty infringement notice and fine of \$3,000 were issued. Citation from DP&I stated observations identified that dust generating activities should have been modified or suspended to minimise visible offsite dust. Exceedance of air quality criteria was not measured at MTW air quality monitoring locations, and UHAQMN air quality index values at locations in the vicinity of Warkworth Mine were consistent with regional UHAQMN locations.

- 10 April 2013 – in relation to instances of noise non-compliance on the night of 13 March 2013.
 - On 13 March 2013 at the Wollemi Peak Road (formerly Noses Peak Road) monitoring location, the LAeq, 15 minute Impact Assessment Criterion was exceeded twice. The initial measurement commenced at 01:16 and exceeded the criterion by 5dB. A continuum of exhaust, engine and fan noise along with dozer tracking was responsible for the exceedance. Actions taken to reduce noise were implemented and included:
 - shutdown of Front End Loader 648 (WML area);
 - shutdown of two haul trucks(WML area);
 - shutdown of two dozers (WML area);
 - shutdown of Excavator 392 (MTO area);
 - shutdown of six haul trucks; and
 - Shutdown of an additional dozer.
 - A follow up measurement was undertaken commencing at 02:27 and exceeded the criterion by 3dB. A continuum of exhaust, engine and fan noise along with dozer tracking was responsible for the exceedance. Actions taken to reduce noise were implemented and included:
 - shutdown of 102 Dragline.
 - At the time of the assessment, the noise monitoring contractor provided incorrect advice to MTW regarding the severity of the non-compliance, stating that the initial exceedance was 1dB over the statutory limit (rather than 5dB). Following the modifications to operations, the monitoring contractor advised MTW that the noise levels were compliant (equal to the criteria), and thus no further significant changes were introduced.

Each of these incidents is further described in the relevant years' Mount Thorley Warkworth Annual Review (formerly the AEMR) and can be viewed on the Rio Tinto Coal Australia website. Regarding the PINs received in relation to dust management in 2012, it is important to note that in each instance MTW did not record particulate measurements in excess of the relevant short-term PM₁₀ criteria.

Notwithstanding the PINs described above, as discussed in Sections 10.5.3 and 11.2.3 of the EIS, reporting of noise and air quality monitoring results respectively show that MTW has a very high level of compliance with criteria.

MTW has made false statements to the CCC meeting regarding reasons for disallowing the use of Wallaby Scrub Road as a gas pipeline route.

It is difficult to respond to this claim without further detail; however, any gas pipeline route is not part of this consent and is not a proposal by WML.

MTW was dishonest in not disclosing their intentions for future use of Newport Farm.

Newport Farm is owned by MTW and is not subject to any performance criteria or consent and, therefore, there is no requirement for public disclosure.

MTW refrained from pursuing Singleton Council for rezoning of EEC's to Conservation Areas for current mining operation. This was part of their obligation under conditions of consent and the Ministerial Deed of Agreement.

Under the Deed there is no obligation to rezone the NDAs until the last day of 2015. At all times, WML has complied with the requirements to rezone the NDAs and to date has not been in breach of any requirement regarding the timing of any rezoning.

The original Deed was acknowledged by the DP&E to be an early attempt at offsetting and one that does not achieve the biodiversity goals of current government policy. The Deed was considered by the DP&E before it recommended the Warkworth Extension 2010 should be approved. It was also considered by the independent PAC before it approved the Warkworth Extension 2010. In its report, the PAC noted the 'questionable condition and ecological value of much of the offset area; contained in the area covered by the Deed.

The Deed has since been amended. The amended Deed makes provision for mining of the NDAs or HMAs subject to a relevant planning approval issued under the EP&A Act. The PAC assessment report for the recent Warkworth Modification 6 stated that they had been advised by the DP&E that the amended Deed allows for the land that was previously secured to be considered on its merits for mining and for a better conservation outcome to be found. The DP&E also advised the PAC that the Deed was created solely for biodiversity purposes. As described in detail in the EIS, offset areas for mining in this area are provided as part of the proposal.

MTW exhibited tardiness in establishment of four habitat ponds for the endangered Green and Golden Bell Frog. This was part of their obligation under conditions of consent. GDP no.239 for the habitat ponds expired prior to commencement of work in 2008. GDP no.266 was issued for exploration of bore holes, drill pads and access roads in NDA1 (reference AEMR 2008 page 107).

No timing was specified for the construction of habitat ponds for the Green and Golden Bell frog. The habitat ponds were not constructed in 2008 hence why GDP 239 expired. The habitat ponds were constructed in 2009 under a separate GDP. Exploration activities are not exempt in the NDA only open cut mining.

Chapter 8

Conclusion



Chapter 8 — Conclusion

8 Conclusion

Warkworth Mine and the adjoining MTO are long standing members of the community having commenced operations over 30 years ago. An average workforce of approximately 1,300 people including full-time contractors is employed at MTW. Development consent for the proposal is required to enable the long-term viability of operations at Warkworth Mine.

This report responds to submissions received on the EIS for the proposal which was publically exhibited from 25 June to 6 August 2014.

A total of 1,967 special interest group and community submissions were received: 1,670 or approximately 85 per cent were in support; and 297 or approximately 15 per cent were in objection.

Submissions were also received from Singleton Council and nine government agencies. Of note, there were no objections to the proposal, only proposed conditions of consent from these agencies.

The mine has demonstrated its ability to coexist with neighbouring communities since its inception in 1981. The applicant, however, acknowledges and respects the concerns held by aspects of the community raised in submissions regarding the proposal. Coal & Allied is committed to co-existence with the local community, and ensuring Bulga village is sustainable in the future.

WML is committed to industry best practice environmental management and continual improvement over the life of the proposal to manage potential impacts. Extensive ongoing engagement with near neighbours will be implemented with feedback received continuing to be an important consideration in the operational management of the mine.

The proposed BOS fully satisfies contemporary policies and provides a significant ecological benefit in the long-term. The BOS has been certified by OEH in accordance with clause 14(3) of the Mining SEPP as adequate for the impacts of the proposal.

In consideration of submissions made following the EIS's public exhibition, the conclusion as presented in the EIS remains - while the proposal has some residual social and environmental impacts some of which would be experienced by near neighbours, it should be approved as:

- the resource within the footprint of the proposal is significant (enabling the long-term employment of approximately 1,187 people, \$5.7billion in expenditure and \$567million in royalties in NPV terms – attributable to Warkworth Mine);
- direct and indirect benefits from the disposable income earned by MTW employees living in Singleton LGA are substantial;
- all of the Mining SEPP's non-discretionary standards are met with the exception of air quality where the cumulative annual average criteria is exceeded for two properties already afforded acquisition rights by neighbouring mines, although this standard is met for all privately-owned properties;
- impacts on near neighbours have been minimised to the greatest extent possible using all reasonable and feasible measures while maintaining an economically viable mine plan;
- it is consistent with all government policies;

- Warkworth Mine has a long history of minimal non-compliances with government approvals;
- it ensures maximum return on the substantial capital invested in the mine since it commenced in the 1981 and has access to existing infrastructure such as road, rail and port;
- the applicant is committed to industry best practice mitigation and continual improvement to manage potential impacts from the mine's operations. This includes contribution to a Near Neighbour Amenity Resource which would provide services such as property maintenance to residents surrounding the operation; and
- it provides a state significant economic benefit to the local, regional, state and national economies.

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Abbreviations

| | |
|--------------------|---|
| µg/m ³ | micrograms per cubic metre |
| µm | Micrometre |
| ABS | Australian Bureau of Statistics |
| ACHCRP | Aboriginal Cultural Heritage Consultation Requirements for Proponents |
| ACHMP | Archaeology and Cultural Heritage Management Plan |
| AGE | Australasian Groundwater and Environmental Consultants Pty Ltd |
| AHIMS | Aboriginal Heritage Information Management System |
| AIP | NSW Aquifer Interference Policy 2012 |
| ANTSO | Australian Nuclear Research and development Organisation |
| ANZECC | Australian and New Zealand Environment and Conservation Council |
| BAA | Biodiversity Assessment Area |
| BBAM | Biobanking Assessment Methodology |
| BCAM | biodiversity certification assessment methodology |
| BCCC | Bio Certification Credit Calculator |
| BCM | Bulga Coal Management |
| BMP | blast management plan |
| BMPA | Bulga Milbrodale Progress Association |
| BOP | Bulga Optimisation Project |
| CBA | cost benefit analysis |
| CCC | community consultative committee |
| CCL | consolidated coal lease |
| CFMEU | Construction, Forestry, Mining & Energy Union |
| CHAG | Community Heritage Advisory Group |
| CHMS | cultural heritage management system |
| CHWG | Coal & Allied Aboriginal Cultural Heritage Working Group |
| CIC | critical industry cluster |
| CMP | conservation management plans |
| CO | carbon monoxide |
| CO ₂ -e | carbon dioxide equivalent |

| | |
|----------|---|
| CPP | coal preparation plant |
| CSIRO | <i>Commonwealth Scientific and Industrial Research Organisation</i> |
| CTP | Convict Trail Project |
| DA | development application |
| dB | decibels |
| dB(A) | sound intensity with an 'A' contour filter |
| DCA | Defence of Civil Aviation |
| DEC | NSW Department of Environment and Conservation |
| DECCW | NSW Department of Environment, Climate Change and Water |
| DEFRA | UK Department of Environment, Food and Rural Affairs |
| DP&E | Department of Planning and Environment |
| DP&I | NSW Department of Planning and Infrastructure |
| DRE | Division of Resources and Energy |
| EDO | Environmental Defenders Office |
| EEC | endangered ecological community |
| EIS | environmental impact statement |
| EMM | EMGA Mitchell McLennan Pty Limited |
| ENC | environmental noise compass |
| ENM | environmental noise model |
| EP&A Act | <i>NSW Environmental Planning and Assessment Act 1979</i> |
| EPA | NSW Environment Protection Authority |
| EPBC Act | <i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i> |
| EPL | environment protection licence |
| ERM | Environmental Resources Management Limited |
| EWU | early warning unit |
| FBA | Framework for Biodiversity Assessment |
| FTE | Full time equivalent |
| g | grams |
| GCE | General computable equilibrium |
| GE | General Electric |
| GSP | gross state product |
| ha | hectares |

| | |
|-----------------------|---|
| Heritage Act | NSW <i>Heritage Act 1977</i> |
| HMA | habitat management areas |
| HME | Heavy mining equipment |
| HMP | heritage management plan |
| HRSTS | Hunter River Salinity Trading Scheme |
| HVAS | high volume air samplers |
| HVRF | Hunter Valley Research Foundation |
| Hz | hertz |
| IARC | International Agency for Research on Cancer |
| ICAC | Independent Commission Against Corruption |
| INP | NSW Industrial Noise Policy |
| kg | kilograms |
| km | kilometres |
| L&E Court | NSW Land and Environment Court |
| L ₁₀ | The noise level which is exceeded 10% of the time. It is roughly equivalent to the average of maximum noise level. |
| L ₉₀ | The noise level that is exceeded 90% of the time. Commonly referred to as the background noise level. |
| L _{eq} | The energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. |
| L _{eq,15min} | 15-minute A-weighted equivalent continuous sound pressure level |
| LFN | Low Frequency Noise |
| LGA | Local government area |
| LOMP | Local Offset Management Plan |
| m | metre |
| m ² | meter squared |
| Mining Act | NSW <i>Mining Act 1992</i> |
| Mining SEPP | State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 |
| ML | mega litres |
| mm/s | peak particle velocity measured in millimetres per second |
| MOP | mining operations plan |
| Mt | million tonnes |
| MTIE | Mount Thorley Industrial Estate |

| | |
|-------------------|--|
| MTO | Mount Thorley Operations |
| Mtpa | million tonnes per annum |
| MTW | Mount Thorley Warkworth |
| NBA | Northern Biodiversity Area |
| NDA | non-disturbance area |
| NEPC | National Environment Pollution Committee |
| NEPM | national environment pollution measure |
| NES | national environmental significance |
| NO ₂ | nitrogen dioxide |
| NOW | NSW Office of Water |
| NPV | net present value |
| OD | origin-destination |
| OEH | NSW Office of Environment and Heritage |
| PAC | NSW Planning Assessment Commission |
| PAD | potential archaeological deposit |
| PM ₁₀ | particulates which are 10 millimetres in diameter |
| PM _{2.5} | particulates which are 2.5 millimetres in diameter |
| PMF | Probable maximum flood |
| PMI | Predictive modelling interface |
| POEO Act | <i>NSW Protection of the Environment Operations Act 1997</i> |
| PSNL | project specific noise levels |
| RAPs | registered Aboriginal parties |
| RBLs | Rating background levels |
| REIA | regional economic impact assessment/analysis |
| RFS | Rural Fire Service |
| RMS | NSW Roads and Maritime Services |
| ROM | run of mine |
| RTS | Response to Submissions |
| SBA | Southern Biodiversity Area |
| SCADA | supervisory control and data acquisition |
| SEPP | State environmental planning policy |
| SIA | Social Impact Assessment |

| | |
|-----------------|---|
| SIMP | Social Impact Management Plan |
| SO ₂ | Sulphur dioxide |
| SOS | Save Our Species |
| SRLUP | Strategic Regional Land Use Policy |
| SSHEG | Singleton Shire Health Environment Group |
| SSVA | site-specific visual assessment |
| SWL | Sound power level |
| t | tonne |
| TARP | trigger action response plan |
| TEC | threatened ecological communities |
| TEOM | tapered element oscillating microbalance |
| TSC Act | <i>NSW Threatened Species Conservation Act 1995</i> |
| TSF | tailings storage facility |
| TSP | total suspended particulate matter |
| UHSA | Upper Hunter Strategic Assessment |
| UNE | University of New England |
| VIMP | visual impact management plan |
| VPA | voluntary planning agreement |
| WAL | water access license |
| Water Act | <i>NSW Water Act 1912</i> |
| WBACHCA | Wollombi Brook Aboriginal Cultural Heritage Conservation Area |
| WM Act | <i>NSW Water Management Act 2000</i> |
| WML | Warkworth Mining Limited |
| WMP | water management plan |
| WMS | water management system |
| WSW | Warkworth Sands Woodland |



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