Mount Thorley Operations 2014

1

Response to Submissions

Prepared for Mt Thorley Operations Pty Limited | November 2014

VOLUME 1 — Main Report













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MAIN REPORT

Mount Thorley Operations 2014

Response to submissions

Prepared for Mt Thorley Operations Pty Limited | 10 November 2014

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Mount Thorley Operations 2014

Final

Report J14013RP2 | Prepared for Mt Thorley Operations Pty Limited | 10 November 2014

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Chapter 1

Context

Chapter 1 — Context

1 Context

1.1 Context of the proposal

Development consent for the Mount Thorley Operations 2014 (the proposal) is required to prevent the sterilisation of coal resource that is approved for extraction but cannot be mined during the current consent period. It would also enable the ongoing provision of services to the adjacent Warkworth Mine which is critical to the viability of both mines.

The Mount Thorley Operations (MTO) development consent No. DA 34/95 (the development consent) was issued by the then Minister for Urban Affairs and Planning on 22 June 1996 and expires on 22 June 2017. The proposal seeks to extend the time for approved mining that has occurred slower than anticipated beyond 2017, due to mining in Loders Pit (the primary focus of extraction at MTO) being delayed for approximately three years due to a significant rain event in June 2007.

On the completion of mining, MTO would continue to provide valuable services to Warkworth Mine including emplacement of overburden material to enable an improved final landform at MTO (including filling of the Loders Pit void, thereby preventing a post-closure final void) and the processing of coal in the MTO coal preparation plant (CPP). The continuation of MTO is needed to enable the continued operational integration of MTO and Warkworth Mine which is critical to operations and environmental management of respective mines.

The economic significance of the resource was a consideration in the granting of the development consent in 1996. The proposal would prevent the sterilisation of approximately 28.6 million tonnes (Mt) of run-of-mine (ROM) coal. Notwithstanding the volume of coal to be extracted under the proposal, MTO continues to provide social and economic benefits by enabling more time to extract the economic resource, while providing services critical to the viability of Warkworth Mine. Hundreds of millions of dollars have been invested in MTO 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 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 MTO alone includes:

- the continuation of approximately 121 jobs on average in the long term;
- the payment of $50million in royalties in NPV terms to the state; and
- indirectly, the making of approximately $9million in additional income in NPV terms and additional annual employment of 4 full-time people in the Singleton local government area (LGA).

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

1.2 Purpose of this report

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

It is noted that the *Warkworth Continuation 2014 Environmental Impact Statement* (Warkworth EIS) was publically exhibited concurrent with the MTO 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 MTO under three alternative approaches.

The first column represents the number of submissions that are found on the Mount Thorley Operations 2014 application web page. The second column comprises those on the Mount Thorley Operations 2014 application web page together with those on the Warkworth Continuation 2014 web page that reference the MTO proposal application number (SSD 6465). The third column comprises all submissions made on the Mount Thorley Operations 2014 application web page and submissions made on the web page for the Warkworth EIS that referenced the below:

- MTO, its project elements or application number;
- MTW, complex, proposals, applications, mines or projects; and/or
- 1,300 employees in general terms (without explicit reference to the Warkworth Continuation 2014).

The latter and most conservative approach was adopted for this RTS with aim of ensuring that all submissions relating to the MTO 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 MTO web page	Application number	Conservative approach
Individual – support	219	248	1,099
Individual – object	58	179	198
Special interest group – support	7	7	7
Special interest group – object	8	13	13
Total	292	447	1,317

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 Warkworth Mine and/or its proposal are not considered in the MTO RTS. A separate report, *Warkworth Continuation 2014 Response to Submissions* (Warkworth RTS), has been prepared which responds to submissions received on *the Warkworth Continuation 2014 Environmental Impact Statement* (Warkworth EIS).

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 afforded 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 21 of the EIS, as documented in the proceeding chapters of this RTS report. The revised Statement of Commitments is presented in Appendix I.

Chapter 2

The proposal

Chapter 2 — The proposal

2 The proposal

2.1 Overview

2.1.1 Objectives

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

The objectives of the proposal are to:

- enable the extraction of coal resource approved for mining;
- enable an improved final landform, including the infilling of Loders Pit void;
- enable the continued operational integration of MTO and Warkworth Mine which is critical to the viability of both operations;
- maintain the current workforce at MTW of 1,300 jobs on average (of which approximately 121 would be attributed to MTO);
- maximise return on the substantial capital invested in the mine since it commenced in the 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 objectives to be met, the key components of the proposal comprise:

- maintain existing extraction rate of approximately 10 million tonnes per year (Mtpa) of ROM coal;
- completion of mining in Loders Pit and Abbey Green North Pit (AGN);
- maintaining integrated MTW water management and tailings management systems;
- approved interactions with Bulga Coal Complex; and
- continuation of coal transfer between Warkworth Mine and MTO and transportation of coal via the Mount Thorley Coal Loader (MTCL) to Port of Newcastle.

Minor alterations to approved operations are also proposed, comprising:

- transfer of overburden between MTO and Warkworth Mine to assist in rehabilitation and development of the final landform including the filling of Loders Pit void;

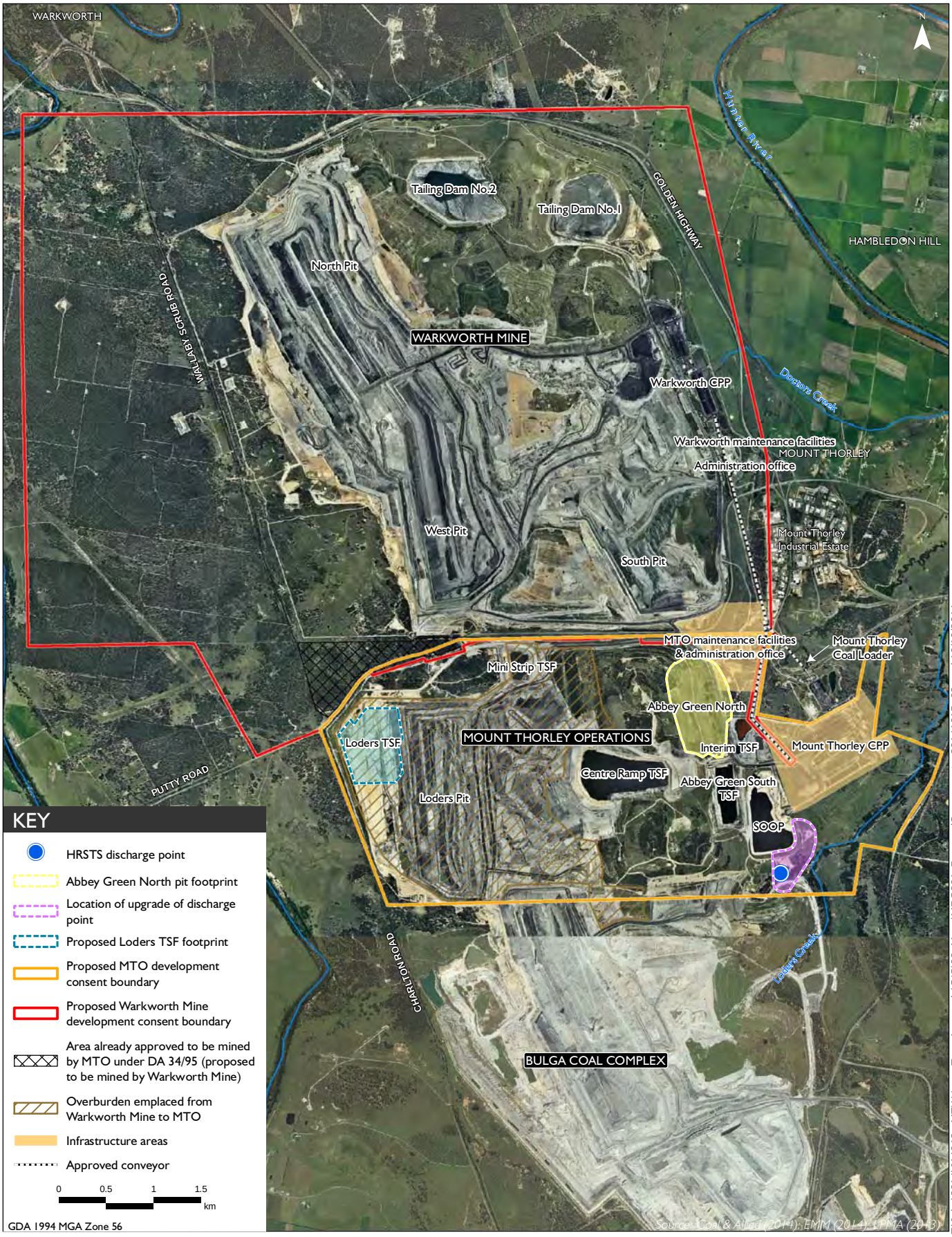
- upgrade to the integrated MTW water management system (WMS), including:
    - upgrade to the approved discharge point and rate of discharge into Loders Creek from 100ML/d to 300ML/d via the Hunter River Salinity Trading Scheme (HRSTS);
    - ability to transfer and accept mine water from neighbouring operations (ie Bulga Coal Complex, Wambo Mine, Warkworth Mine and Hunter Valley Operations);
    - increase in the storage capacity of the southern out-of-pit (SOOP) dam from 1.6 giga litres (GL) to 2.2GL;
- upgrade to the integrated MTW tailings management:
    - including use of the northern part of Loders Pit as a tailings storage facility (TSF) after completion of mining;
    - wall lift to Centre Ramp TSF; and
- upgrade to the MTO CPP to facilitate an increase in maximum annual throughput to 18Mtpa of ROM coal.

Mining in Loders Pit is expected to be completed in approximately 2020. Mining in AGN is yet to commence; however, it is anticipated to take approximately two years and be completed before 2022.

All activities, including coal extraction would be within disturbance areas approved under the existing development consent.

The proposal would enable the provision of a fully contemporised development consent for MTO. Mining activities are approved at MTO until 22 June 2017 under its development consent. The proposal seeks a 21 year development consent period from the date of any approval. If approval is granted in 2014, operations at MTO are forecast to continue to end of 2035, an 18 year extension over the current approval. The extension in timeframe is to facilitate the continued integration of operations with Warkworth Mine.

Figure 2.1 shows the proposal.



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The proposal
Mount Thorley Operations 2014
Response to Submissions
Figure 2.1

2.2 Proposal need

2.2.1 Overview

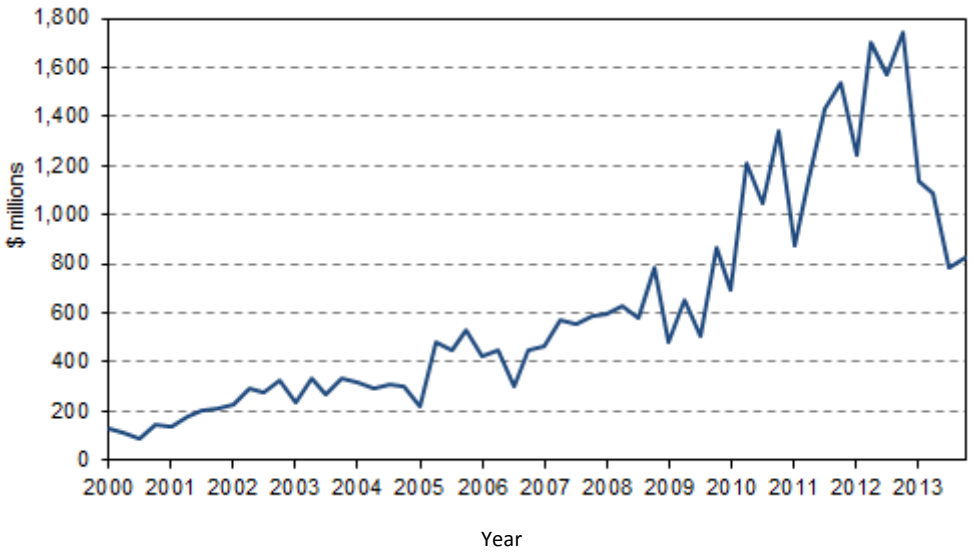
The MTO is a large-scale business built on hundreds of millions of dollars of investment, which requires long-term regulatory certainty to remain financially viable. Currently 1,300 full time equivalent persons are employed on average, across MTW.

The proposal is needed to:

- enable the continued operational integration of MTO and Warkworth Mine which is critical to operations and environmental management at the respective mines;
- provide MTW with its best opportunity of maintaining its current workforce of approximately 1,300 people; and
- prevent the potential sterilisation of coal resource that is approved for extraction but cannot be mined during the current consent period and enable an improved final landform.

2.2.2 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 2.2. 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 2.2 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 (ABS). 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.

2.2.3 Operational integration of MTO and Warkworth Mine

The operational integration of MTO and Warkworth Mine is critical to operations and environmental management at the respective mines.

Examples of operational integration include:

- emplacement of overburden from Warkworth Mine at MTO assisting in the final landform development at MTO obviating issues with limitations in overburden emplacement capacity at Warkworth Mine and filling the Loders Pit final void leading to an improved environmental outcome;
- the MTW WMS that controls the flow and storage of water of different qualities across the operations and balanced to minimise the risk of uncontrolled releases from mine site storages;
- tailings management including the receipt of tailings from Warkworth Mine at MTO TSFs; and
- shared use of equipment and workforce between MTO and Warkworth Mine.

The proposal would enable the continued use of the MTO CPP to meet the production demands across MTW. The ability to increase throughput at MTO CPP provides operational flexibility to support MTW as the existing CPP infrastructure at both mines ages.

i Completion of mining

As noted in Section 1.1, approved mining in Loders Pit was expected to be completed in 2017, however was delayed due to a significant rain event in June 2007 which saw Loders Pit flooded. The proposal would enable the continued mining of Loders Pit which would conclude in approximately 2020. The proposal also enables approved but yet to commence mining in AGN which would take approximately two years and be completed before 2022. This would enable extraction of approximately 28.6Mt of ROM coal.

ii Other benefits

The approved final landform at MTO, incorporated into the 1995 EIS, consists of a narrow valley leading to a final void. On either side of this valley is an elevated ridge that grades into the surrounding landform. Design of this final landform was constrained by the amount of overburden available within MTO. The ability to transfer overburden from Warkworth Mine to MTO avoids the need for a final void and allows for the design of a more natural looking final landform which would integrate better with the final landform of Warkworth Mine and the Bulga Coal Complex.

Subject to the approval of Warkworth Continuation 2014, the subject proposal would avoid the relocation of Putty Road which is currently approved under DA34/95 (subject to the feasibility of continued mining at MTO alone).

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

iii Summary

In summary, the proposal would enable the continued operational integration of MTO and Warkworth Mine which is critical to operations and environmental management at the respective mines. Therefore, the proposal is integral to the continued direct employment of an average of approximately 1,300 people across MTW (of which approximately 121 persons on average would be attributable to this proposal) and indirect employment or flow-on-effects of around 206 and 214 full-time equivalent workers per annum in NSW and in the Mid and Upper Hunter region, respectively. The estimated indirect employment or flow-on effects of the proposals in Singleton LGA would be around 61 full-time equivalent works per annum over the life of the mines. The proposal would also enable the continued provision of the mines' local, State and National benefits to continue.

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.

The proposal also prevents the potential sterilisation of coal resource that is approved for extraction but cannot be mined during the current consent period and would result in an improved final landform amongst other benefits.

Chapter 3

Submissions analysis

Chapter 3 — Submissions analysis

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=6465

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;
  - 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; and
  - Environment Protection Authority (EPA);
- local government – Singleton Council;
- special interest groups (20 submissions received); and
- individuals (1,297 submissions received).

MTO 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 addressed 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 considered 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. It is noted that there are several submissions in Appendix A have the same ID as a result of the process outlined in Section 1.2.

i Analysis of submissions in support and opposing the proposal

Of the 1,317 submissions received from individuals and special interest groups, 1,106 submissions were in support of the proposal. This represents approximately 84 per cent of all submissions received. The remaining 211 submissions or approximately 16 per cent objected to the proposal. One special interest group neither supported nor objected to the proposal, but provided notes for consideration.

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

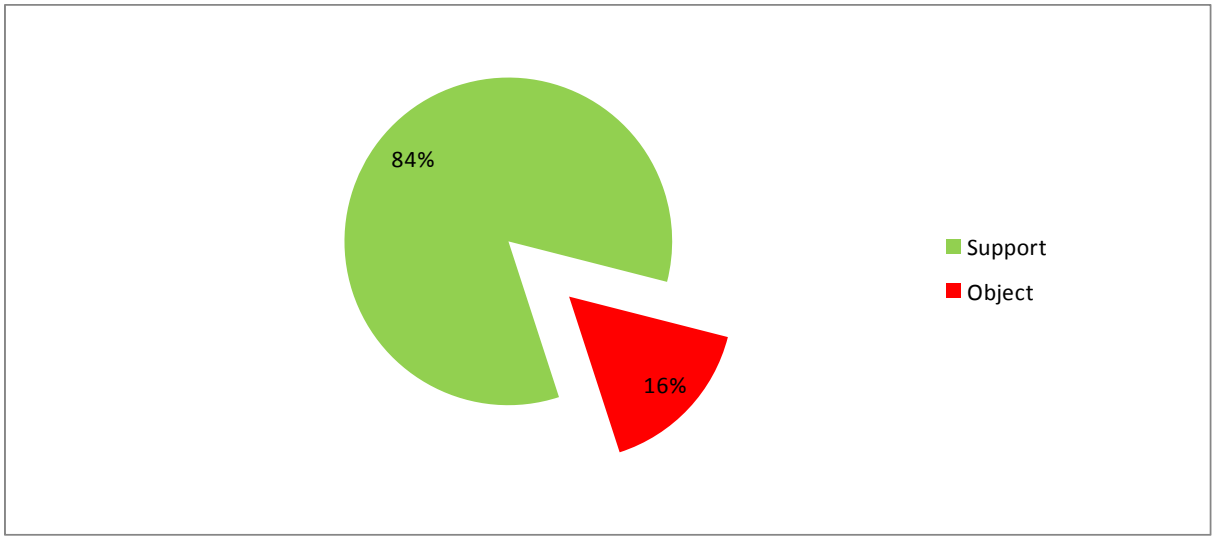


Figure 3.1 Percentage of submissions in support and objecting to the proposal

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 148 form letters were received (approximately 11 per cent of total submissions received). Of these, 122 objected to the proposal. This represents approximately 58 per cent of the objections received. Twenty-six 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.

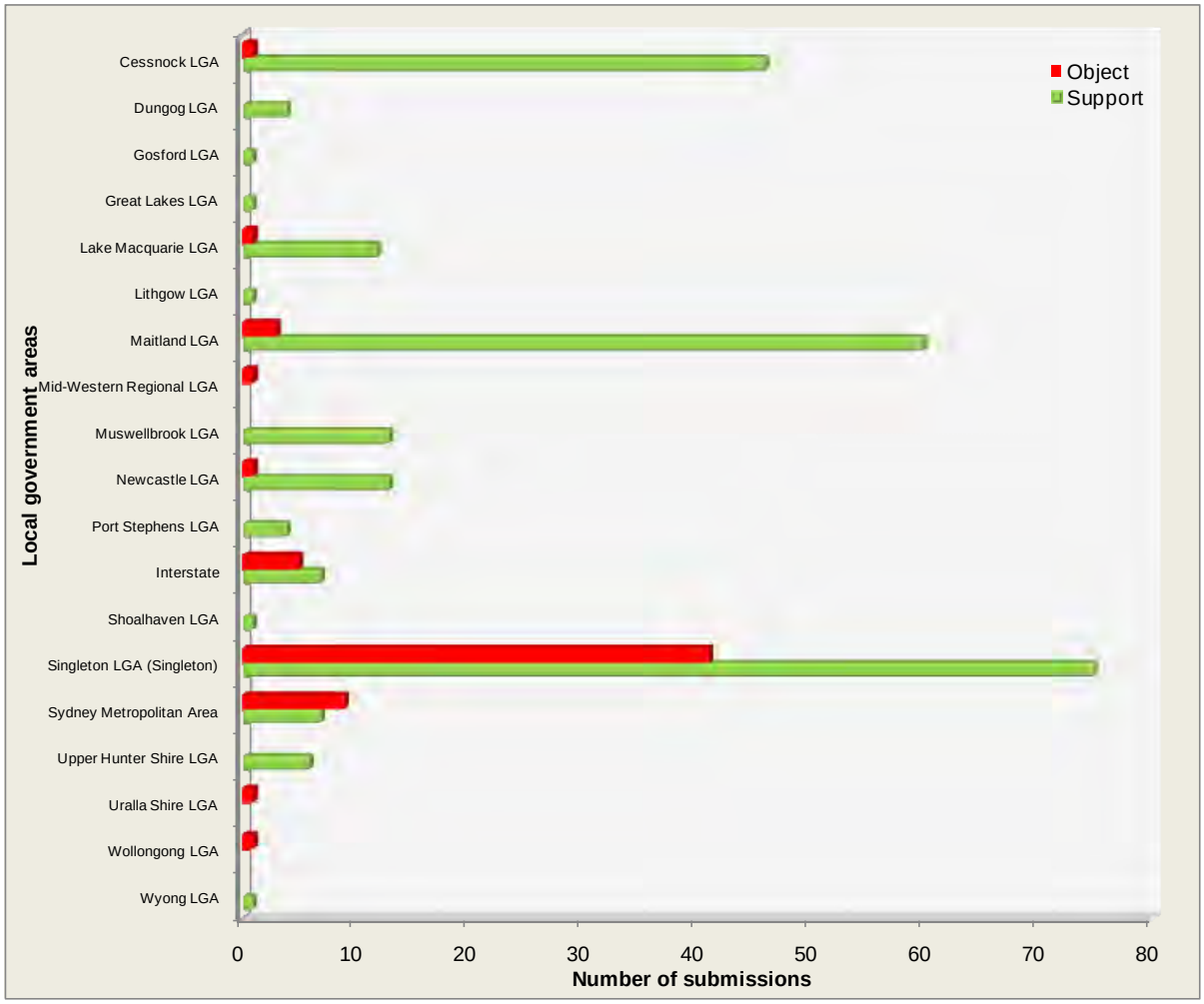
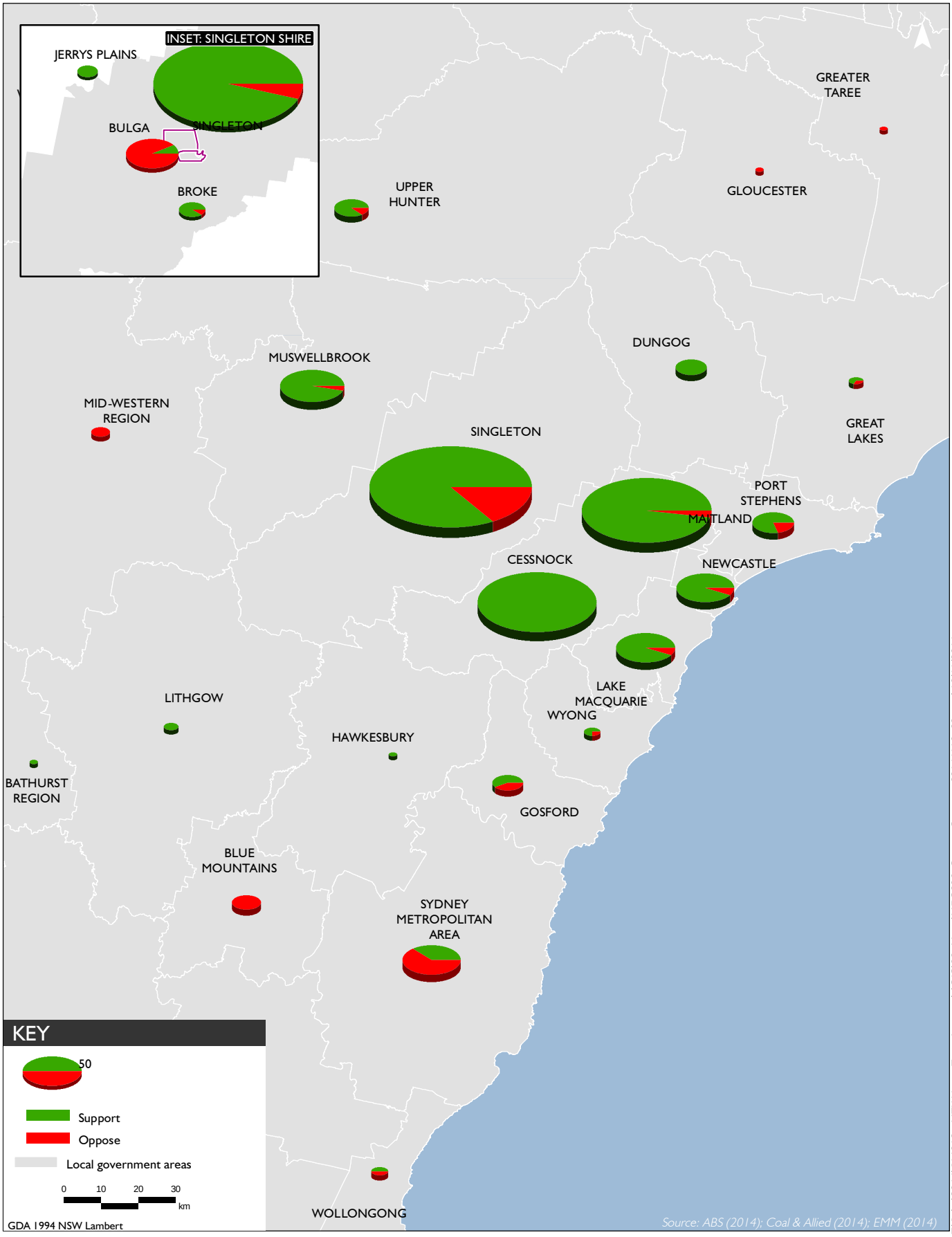


Figure 3.2 Supporting and objecting by locality



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Support/objection by locality
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Figure 3.3

As shown in Figure 3.2, the majority of submissions in support originated from Singleton, Maitland and Cessnock LGAs (30 per cent, 21 per cent and 18 per cent of total submissions in support, respectively). Of the submissions from Singleton LGA, 98 per cent were from Singleton, with the remaining two per cent received from the villages of Bulga, Broke and Jerrys Plains.

The highest number of objecting submissions originated from the Singleton LGA (25 per cent), the Sydney Metropolitan Area (14 per cent) and from interstate (18 per cent). Of the objecting submissions originating from Singleton LGA, 18 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 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 and Mid-Western Region LGAs.

A total of 379 submissions originated from the Singleton LGA in which MTO is located; 327 supporting and 52 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, 84 per cent of total submissions were in support of the proposal. This comprised 1,099 submissions from individuals and seven 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 1,106. Where a submission raised several different aspects within the same matter, the matter was counted once per submission for analysis purposes. 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.

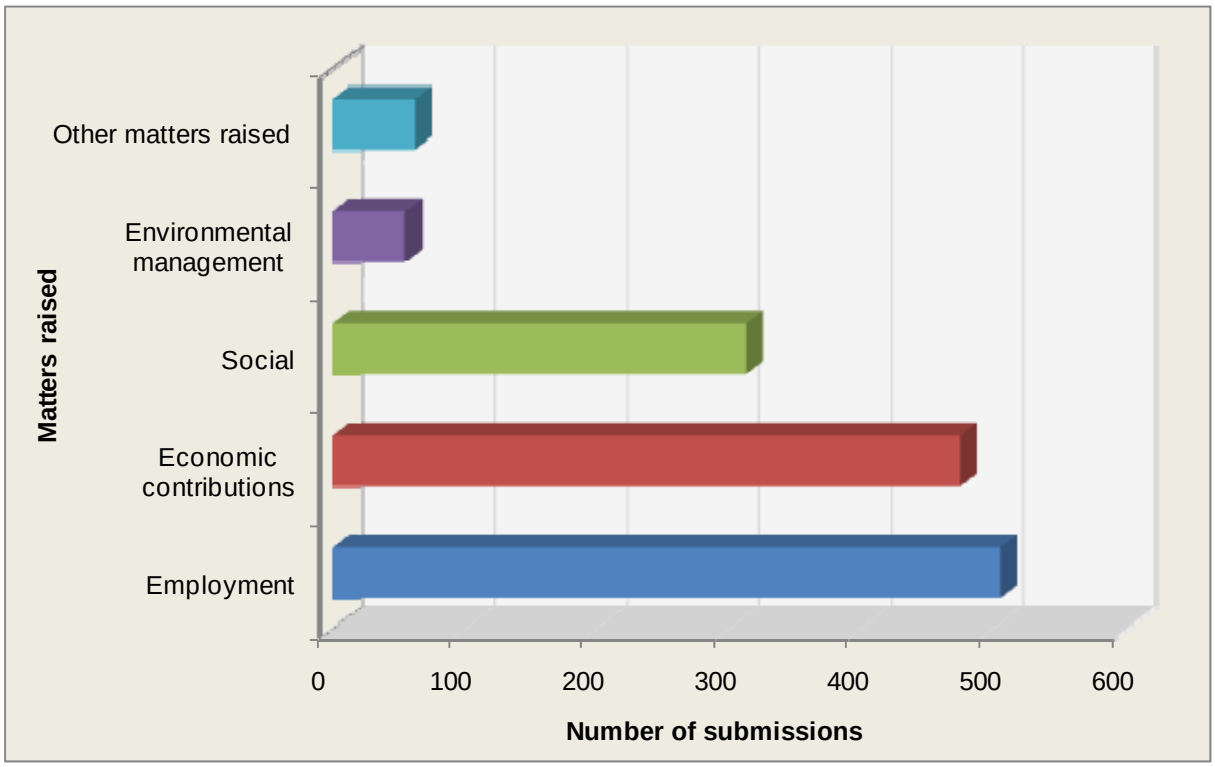


Figure 3.4 Matters raised in support

It is noted that more than one matter was often raised in a submission. As shown, employment (505 submissions) impacts were most commonly raised, followed by economic contributions (475 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 where relevant in Chapter 5.

3.3.3 Analysis of submissions in objection

As noted above, approximately 16 per cent of total submissions objected to the proposal. This is comprised of 198 submissions from individuals and 13 submissions from special interest groups. As noted in Section 3.3.1ii, approximately 58 per cent of objecting submissions were form letters.

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

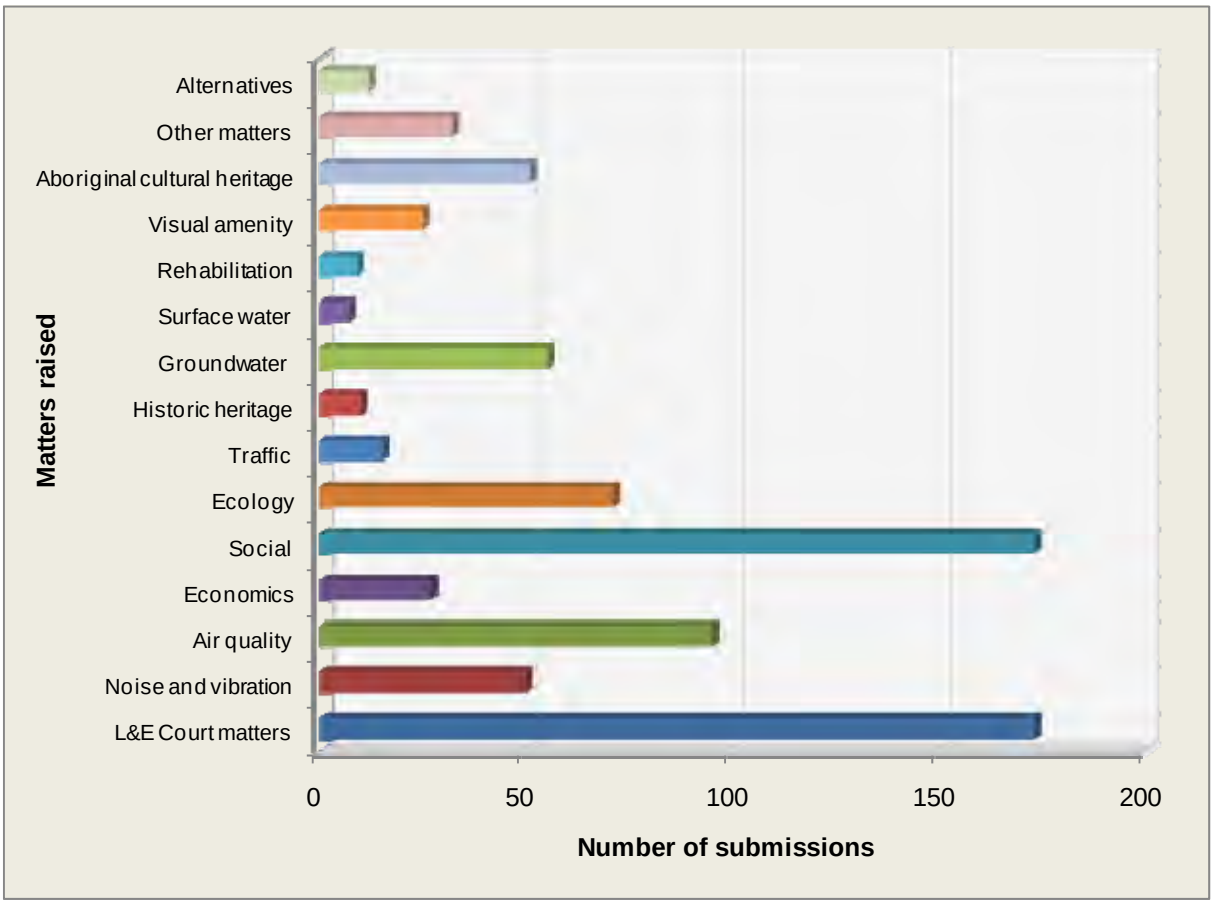


Figure 3.5 Matters raised in objection

As shown, social matters (173 submissions), L&E Court matters (173 submissions), air quality (95 submissions) and ecology (71 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.

It should be noted that several submissions raised matters that specifically related to the Warkworth Continuation 2014 proposal rather than the subject proposal. As previously stated, these matters are not considered in this report and are addressed in the Warkworth RTS.

Chapter 4

Government submissions

Chapter 4 — Government submissions

4 Government submissions

4.1 Introduction

Government agency and local government submissions 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.

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
Division of Resources and Energy	No objection Conditions recommended
Agriculture NSW	No objection
Department of Health	No objection
Heritage Council of NSW	No objection
Singleton Council	No objection

4.2 Office of Environment and Heritage

The OEH submission raised no objections to the proposal. The submission noted that the footprint of the development comprises land that has been previously disturbed or is covered by existing development activities and, as such, there will be no additional impacts on biodiversity, flooding or Aboriginal heritage. No further comments are made and no recommended conditions of approval are provided.

4.3 Environment Protection Authority

The EPA submission raised no objections to the proposal and recommended general conditions of approval. The submission considered the EIS with respect to noise, air quality and surface water. Matters raised in the submission are summarised and considered in the sections below.

4.3.1 Noise and vibration

The submission noted that the EPA can support the proposal based on predicted noise levels in the noise and vibration study and the recommended conditions of approval, as specified in Section 4.3.4.

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 dB(A) 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 MTO 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.

The INP's LFN criteria 15dB threshold is being reviewed in light of challenges in its practical application at large distances from sources. For example, sounds that do not pose low frequency dominated spectra at close range, would by virtue of enough distance loss factors, inappropriately attract the INP penalty for low frequency as higher frequencies in their spectra are considerably more abated than the lower frequencies. The INP LFN criteria were originally intended for testing sources at relatively close range. In comparison, the German standard DIN45680 (1997) uses a differential of 20dB as a screening tool for LFN.

The proposal will enable the extraction of a resource already approved for mining that is unable to be extracted under the current consent timeframe due to pit inundation in 2007. The proposal does not seek to extend the spatial limits of currently approved operations. Noise emissions associated with the proposal are likely to be similar to current approved activities with improvement over time as fleet attenuation progresses and mitigation measures are applied.

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 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.

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 the rural residence category with a 40dB(A) night criterion).

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. Similarly, the cumulative noise assessment findings do not change, ie location 77 in Warkworth village is the only property above criteria.

iii Amenity

The EPA noted that the noise and vibration study suggested that the 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 Mt Thorley'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 MTO'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 MTO'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, IS09613) 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 Pasquil 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:

> Mount Thorley Operations (MTO) propose to increase the throughput at the coal preparation plant (CPP) from 10 Mtpa to 18 Mtpa... The proposed maximum capacity of 18 Mtpa has not been modelled in any of the scenarios present.

Detailed modelling of the proposed mine plans for MTO was undertaken in the EIS. A proposed scenario of 18Mtpa throughput of the MTO CPP was not undertaken. As plant and stockpiles are in fixed locations, emissions associated with the CPP itself can be effectively managed through appropriate dust control practices and strategies. However, in response to the EPA submission, an additional assessment of the proposed maximum throughput of the MTO CPP of 18Mtpa was undertaken, and is provided in Appendix B1.

Table 4.2 provides a comparison on dust emissions for each mine snapshot for a 10Mtpa and 18Mtpa CPP throughput.

Table 4.2 Comparison of estimated emissions for the proposal (kg of TSP)

Indicative mine plan year	10 Mtpa CPP throughput scenario	18 Mtpa CPP throughput scenario
Year 3	3,533,619	3,811,462
Year 9	3,525,498	3,827,105
Year 14	501,011	801,712

The results of modelling indicate that there is potential for additional dust effects associated with the additional throughput of the CPP. As Figures 4.1a, b and c indicate, the additional effects would be confined to the area immediately around the CPP and generally have negligible affects at other locations.

Overall, the additional modelling undertaken for each indicative mine plan year indicates that no additional privately-owned assessment location is predicted to experience levels above the relevant prescribed criterion.

In addition, as the plant and stockpiles are in fixed locations, it is considered that emissions associated with the CPP itself can be effectively managed through existing dust control practices.

> It is also noted that the quantity of ROM coal extracted from the MTO active pits in Year 3 is only 3.6Mtpa, well below the approved capacity of 10Mtpa. The EIS states that mining will be undertaken at a maximum rate of 10Mtpa until 2022.

Section 2.2 of the EIS seeks to maintain existing, approved activities at MTO, including an extraction rate of 10Mtpa of ROM coal. The indicative mine plans were chosen as representative mining snapshots which show activities occurring concurrently at MTO and Warkworth Mine. Based on current MTW mine plans, an extraction rate of 3.65Mtpa of ROM coal was used at MTO, as acknowledged by the EPA.

> 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.

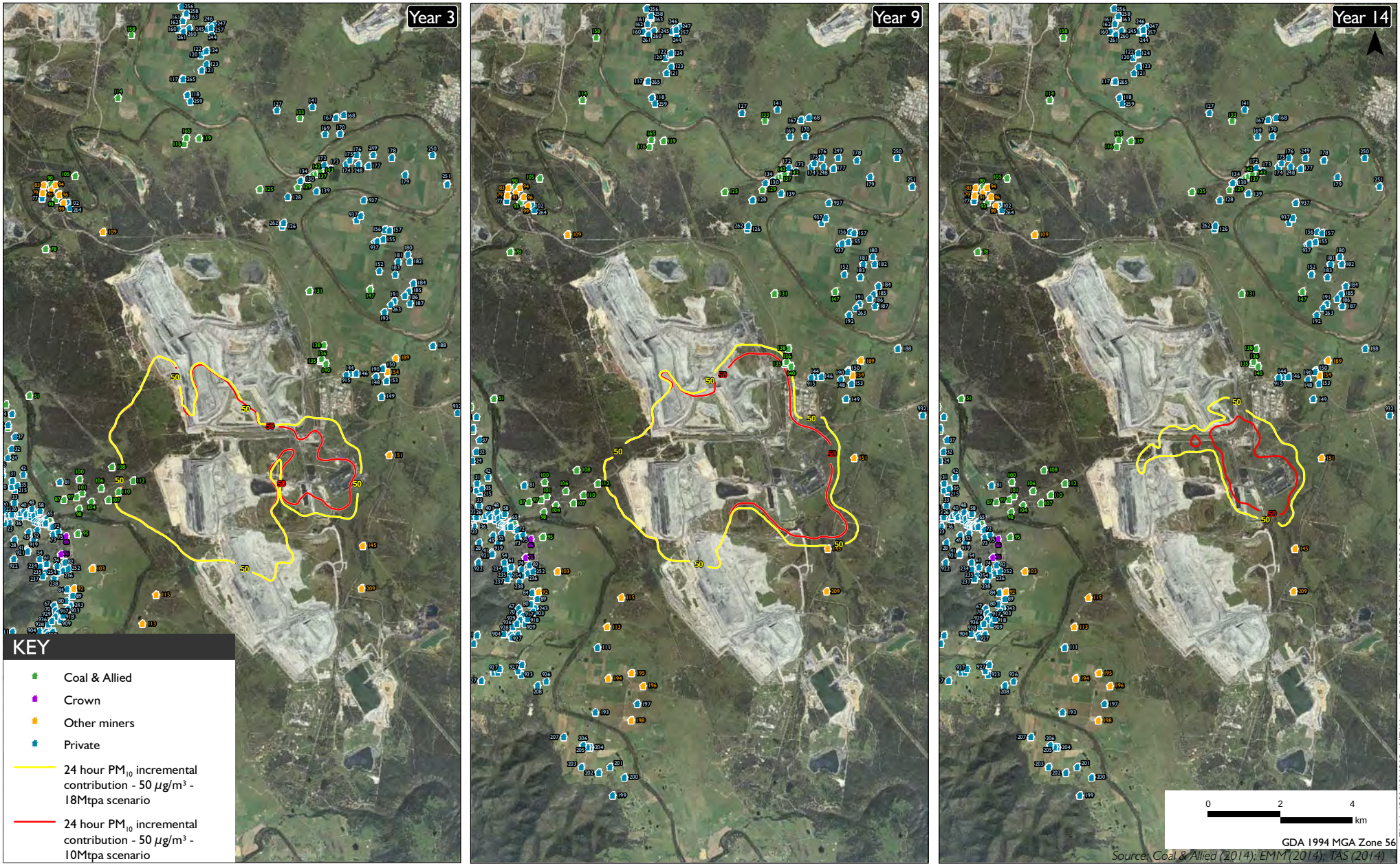
Section 2.4.2 of the EIS provides the justification of which years were chosen for modelling. The modelled indicative mine plan scenarios were selected to show the progression of the mine over time and to ensure that the maximum likely impacts at the receivers to the north-east, east and west were captured in the assessment.

To achieve these objectives, the study considered three indicative mine plan years; namely, Year 3, 9 and 14. The indicative Year 3 mine plan represents the initial stage of the proposal with mining occurring in Loders Pit only. At this point, mining in Loders Pit is at its shallowest, western most point as the operations would continue within the same approved footprint (already cleared) mining the deeper seams. The approved emplacement and subsequent rehabilitation at the Common Boundary Landform development along the southern boundary of MTO with the Bulga Coal Complex will be undertaken and completed, and rehabilitation works would continue to progress east to west as the landform is completed.

The indicative Year 9 mine plan represents the completion of mining at MTO and the ongoing emplacement of overburden material from Warkworth Mine into Loders Pit. The MTO emplacement areas would be progressively rehabilitated with the advancement of the completed landform from east to west. For modelling purposes, and to ensure a worst case scenario is captured, the assessment has conservatively assumed that mining in AGN is still taking place in 2023, which as previously noted, is more likely to have been completed and being used as a TSF before 2023.

The indicative Year 14 mine plan shows almost complete rehabilitation of MTO with the remaining activities consisting of the operation of the MTO CPP and a section of the backfilled final void being used for tailings storage.

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 (EIS Appendix G).



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Comparison of MTO CPP throughput scenarios - predicted maximum 24-hour average PM10 concentrations

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Figure 4.1

ii 24-hour PM_{10} cumulative assessment

Several matters regarding the 24-hour PM_{10} 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 PM_{10} 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 B 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 PM_{10} 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 Warkworth, 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 4.2, on that date the winds predominately blew from the east-southeast to the south-southwest (ie from the MTO area and locations further south towards the monitor).

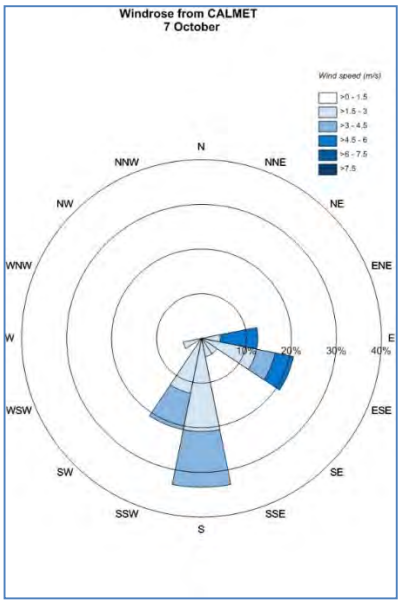


Figure 4.2 Windrose for 7 October 2012

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 (EIS Appendix G).

It is incorrect to expect that the predicted impact will be consistently higher than that experienced in 2012 during events such as occurred on 7 October 2012. Wind patterns do vary and the location of potential dust generating activities within site may also vary within the tenement according to the activity. Some of these sources may be in locations that are not upwind of sensitive receivers), or due to mitigation initiatives or favourable weather patterns, dust generated may not leave the site.

Mining in Loders Pit at MTO is at its most western point and would continue within the same approved footprint (already cleared) mining the deeper seams. The mining snapshots described in the EIS considered the worst case scenarios. These are described below.

In indicative Year 3 mine plan (nominally 2017) is generally representative of the current operations as mining only occurs in Loders Pit only. Mining in Loders Pit is at its western most point and would continue within the same approved footprint (already cleared) mining the deeper seams. Rehabilitation to final landform has been competed in sections of the Site near the CRTSF and also areas in the south-east.

Indicative Year 9 mine plan (nominally 2023) is approximately the half way point of the proposal timeframe and represents when coal and overburden are being transported from Warkworth Mine to MTO for processing and emplacement, respectively. Mining has been completed in Loders Pit with the pit being used as an overburden emplacement area and receiving overburden from Warkworth Mine to fill the void and develop the final landform as proposed. Importantly, the base of the Loders TSF proposed in the northern portion of the existing Loders Pit would be emplaced to the appropriate level.

For modelling purposes, and to enable a worst case scenario to be captured, the noise and air quality studies have conservatively assumed that mining in AGN is still taking place in Year 9 (nominally 2023); however in practice it may be completed and being used as a TSF much earlier. Rehabilitation to final landform has been completed across more than half of the Site with active rehabilitation on areas of Loders Pit ongoing. Loders TSF, which is in the early stages of construction in this indicative mine plan, would start receiving tailings once AGN is full in approximately 2026.

Indicative Year 14 mine plan (nominally 2028) represents a scenario with coal and activities associated with active rehabilitation works in Loders Pit being the focus of the operations. No mining is anticipated to occur. Rehabilitation activities are anticipated to be completed to final landform across a large proportion of the Site. The AGN TSF is anticipated to be full by approximately 2026 and consolidating and drying prior to being capped at a later time. Loders Pit is receiving tailings from Warkworth Mine during this indicative Year 9 mine plan. The MTO CPP would still be receiving ROM coal from Warkworth Mine in this indicative Year 9 mine plan and for the life of the proposal.

For the remaining seven years of the development consent period, activities would be focussed on the transfer of overburden from Warkworth Mine to facilitate active rehabilitation and rehabilitation to final landform, tailings management, water management and use of MTO infrastructure, including the MTO CPP to maintain efficient operations of the integrated aspects of MTW.

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 from the direction of MTO land on which there is reduced activity and reduced dust generation in future years as described above.

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 B2 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 PM_{10} 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 PM_{10} cumulative assessment should be undertaken at the nearest existing or future off-site sensitive receptor. EPA recommends that additional 24-hour average PM_{10} cumulative analysis should be completed at the sensitive receptors close to mining operations.

The 24-hour average PM_{10} 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.

The air quality and greenhouse gas study determined that cumulative PM_{10} 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 associated with the Warkworth Continuation 2014 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 10.2 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 and 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 in Warkworth village. Both residential locations are significantly affected by a neighbouring mine (Wambo Mine).

It should be noted that the results of the detailed analysis of these listed receptors do not alter any conclusions 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, and whilst not located adjacent to a TEOM it is considered that the monitor at Mount Thorley Industrial Estate (MTIE) is most representative for this area. As can be seen in the isopleth figures they do not experience higher predicted impacts than 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-east. 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.

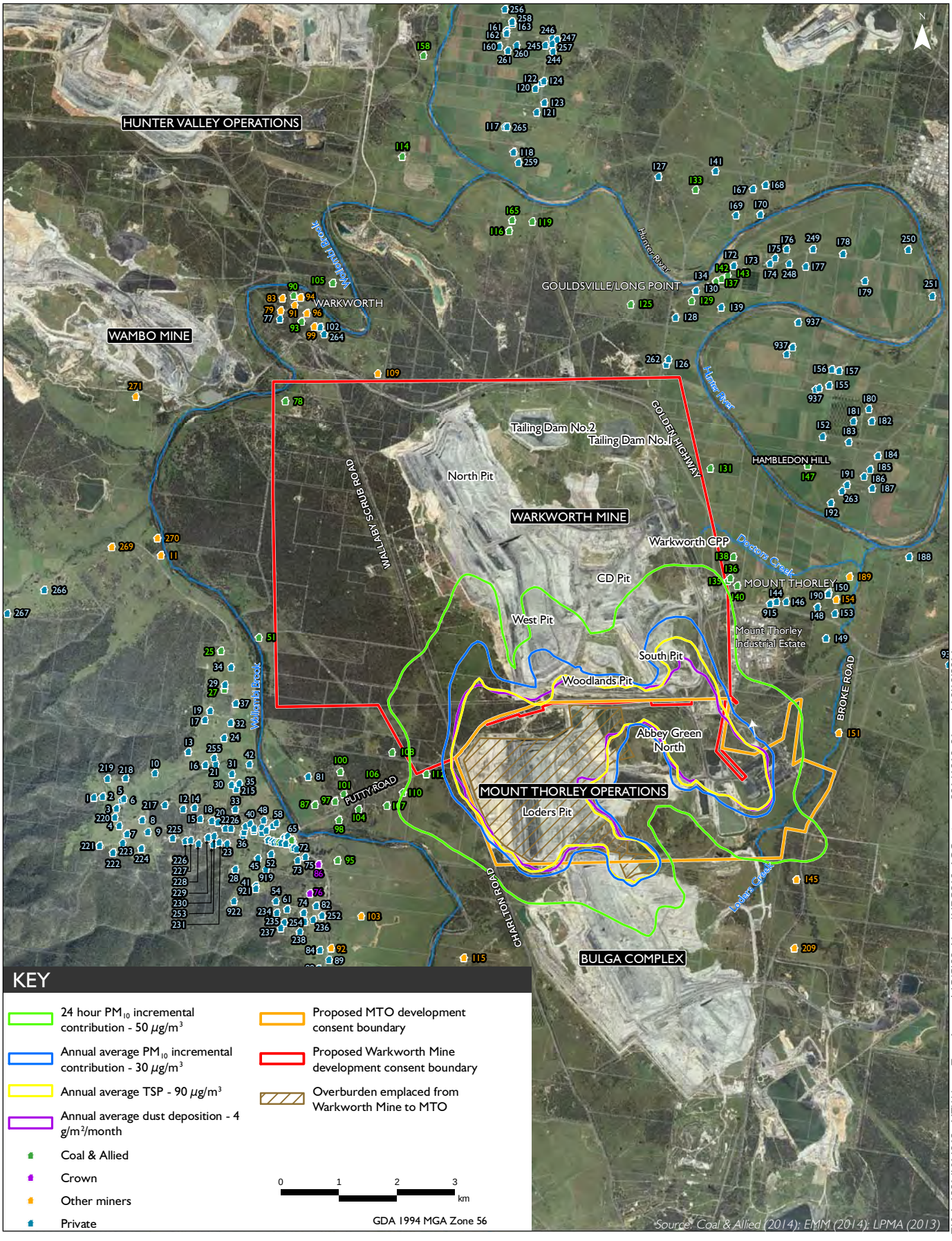
The results of the detailed analysis of these listed receptors do not alter any conclusions in the air quality and greenhouse gas study, please refer to Appendix B3 and Figure 4.3. A summary of the results is presented in Table 4.3 below for each assessment location referenced in the EPA submission.

Table 4.3 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[1])	0	0	0
264 (Warkworth village)	1	14[2]	5[2]

Notes: 1. Mount Thorley Industrial Estate.

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



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All years, worst case air quality modelling results

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Figure 4.3

c. Contemporaneous PM_{10} impact assessment

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

> ... The data shown in Table 9-8 [Table 9.6 of the MTO air quality and greenhouse gas study] 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 B3 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 B3 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 B3 of this report, Table 9.6 of the air quality and greenhouse gas study has also been updated and is presented in Table 4.4.

The analysis of the proposed increased throughput at the MTO CPP indicates that the increased activity would lead to an additional two days above criteria depending on background level at monitoring sites, above the three days reported in the EIS predicted to occur in indicative min plan Year 9. The results are generally consistent with the data in Table 9.6 of the air quality and greenhouse gas study. It is unclear how the EPA obtained the data it presents in regard to the number of days over criteria.

Table 4.4 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	4
Knodlers Lane	0	2	1
MTIE	0	5	0

iii Diesel assessment

In its submission regarding the NO_2 emissions assessment, the EPA states:

> NO_2 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 NO_2 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 $N0_2$ assessment appears to be 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 $N0_2$ cumulative assessment should include emissions from diesel from mining operations at Warkworth.
>
> Background $N0_2$ data was obtained from the Singleton monitor and the levels used for the cumulative assessment were 41.4lJg/m3 for 1-hour average and 16.91Jg/m3 for annual average. Table 10-2 of the assessment shows $N0_2$ 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 $N0_2$ 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 NO_2 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 increase in NO_2 emissions as a result of the proposal.

The NO_2 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, MTO and Warkworth Mine are one of many contributors to NO_2 emissions in the area. The NO_2 levels in the area are measured at low levels. The maximum measured 1-hour NO_2 level in the area is approximately one third of the criteria and the 70^{th} percentile level is approximately one sixth of the criteria. The annual average level is approximately one quarter of the applicable criteria.

The fraction that MTO and Warkworth Mine 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 NO_2. The reaction times vary according to atmospheric chemistry and meteorological conditions. However due to the length of time required for the maximum NO_2 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 NO_2 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 NO_2 levels in the area, the existing NO_2 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 MTO and Warkworth Mine in the emissions assessment would significantly increase cumulative NO_2 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 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 re-verified. 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 B4 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, MTO 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 continues to operate moves west, the potential for blast impacts would need to be managed more strictly, this predictive blast system would provide the means for ensuring blast impacts are acceptable. The potential for blast impacts would need to be managed more strictly. The associated blast permissions would be revised to account for this.

4.3.3 Surface water

The EPA submission noted the increased discharge proposed and acknowledged that there are sufficient statutory controls in place to monitor and regulate the proposed increases. The submission noted that the surface water study and the EIS does not provide details in relation to uncontrolled discharge frequencies. However, notwithstanding this, the submission also acknowledged that EPL 1976 has conditions relating to discharge rates, concentration limits and monitoring requirements associated with any site discharges, and any discharges from the site in breach of the conditions may result in regulatory action.

The matters raised by the EPA are noted. It is understood that EPL 1976 would be varied in accordance with the proposal, subject to its approval.

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:

    1. *Mount Thorley Operations 2014 – Environmental Impact Statement (Vols 1-5)*, prepared by EMGA Mitchell McLennan, dated 15 June 2014.

    2. 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 Coal & Allied Operations Pty 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 *Mt Thorley Operations 2014 – Noise and Vibration Study*, prepared by EMGA Mitchell McLennan, dated 2 June 2014.

	Noise limits			
	Day	Evening	Night	
Location	$L_{Aeq\ (15\ minute)}$	$L_{Aeq\ (15\ minute)}$	$L_{Aeq\ (15\ minute)}$	$L_{A1\ (1\ minute)}$
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 117, 118, 120, 121, 122, 123, 124, 127, 128, 130, 134, 139, 141, 152, 153, 155, 156, 157, 160, 161, 162, 163, 180, 181, 182, 183, 184, 185, 186, 187, 191, 192, 167, 168, 169, 170, 172, 173, 174, 175, 176, 177, 178, 179, 188, 193, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 217, 218, 219, 220, 221, 222, 223, 224, 225, 244, 245, 246, 247, 248, 249, 250, 251, 256, 257, 258, 259, 260, 261, 263, 265, 266, 267, 268, 904, 905, 911, 923, 926, 927, 932, 937	35	35	35	45
229	36	36	36	46
28, 921, 922	37	37	37	47
13, 16, 17, 19, 21, 24, 30, 31, 32, 35, 37, 52 ,54, 61, 67, 70, 74, 77 80, 84, 89, 102, 126, 215, 234, 235, 237, 238, 243, 254, 255, 262, 264, 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 should be removed from the EPA's table on the basis of its approach to only include PSNL limits in this table. It appears to be a typographical 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; and
- night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

EPS's response is noted.

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

- wind speeds greater than 3 metres/second at 10 metres above ground level;
- stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- stability category G temperature inversion conditions.

The proposed condition is a departure 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'.

It is understood that the EPA is moving towards an approach that may be considered more practical to temperature inversion measurements. The approach being contemplated, however, would be suited to greenfield developments and not brownfield extensions, such as the proposal, where long established practices and community expectations have been well developed over time.

6. For the purposes of condition 5:

- data recorded by a meteorological station installed on site must be used to determine meteorological conditions; and
- temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in PartE4 of Appendix E to the NSW Industrial Noise Policy.

EPA's response is noted.

7. To determine compliance:

(a) With the Leq(15 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 30 metres of a dwelling façade, but not closer than 3m where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable; or

- within approximately 50 metres of the boundary of a National Park or a Nature Reserve.

(b) With the LA1(1 minute) noise limited in condition 3, the noise measurement equipment must be located within 1 metre 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 be addressed by DP&E as has been the case 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. 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:

- an assessment of compliance with noise limits presented in condition 3; and
- 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:

- at each one of the locations listed in condition 3;
- occur annually in the reporting period;
- 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;
  - 1 hour during the night; and
  - 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. Surface water

For each discharge point or utilisation area specified below, the volume/mass of:

- liquids discharged to water; or
- solids or liquids to the area;

Must not exceed the volume/mass limit specified for that discharge point or area.

Point	Unit of measure	Volume/mass limit
4	Megalitres per day	300

Note: Point 4 in the table above is taken to be point 4 as shown in Condition P1.3 of EPL 1976.

EPA's response is noted.

13. Offensive blast fume must not be emitted from the premises.

Definition: Offensive blast fume means post-blast gases (whether visible or invisible, odourous 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:

- Are harmful to (or is likely to be harmful to) a person that is outside the premises from which it is emitted, or
- 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 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 proposal relates to already approved mining activities that are not able to be extracted under the current consent timeframe due to pit inundation in 2007 (refer to Section 1.1).

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) – licensing the take of surface water requires further assessment. Based on the EIS, the proposed development is likely to take water from the Lower Wollombi Brook Water Source and the Singleton Water Source.
>
> The operation has modified the course or catchments of a number of unnamed creeks. Any reductions in the water yield from these creeks should be calculated and accounted for.
>
> The EIS states that the mine will capture 3524 ML/y of surface run off. Details of the capture, harvestable rights, exemptions and licences required to account for the take from this water have not been described.
>
> The proponent must consult NOW if there are any changes to the levee currently licensed under Part 8 of the *Water Act 1912* on the Salt Pan Creek.

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.

4.4.2 Emplacement of mine spoil

The NOW submission raised the matter of emplaced mine spoil in its review, stating that:

> The information presented by the proponent to support the conclusion that the additional resource is saline and thus unlikely to be impacted by mine spoil groundwater is not supported based on the current data. Direct placement of mine spoil in contact or in very close proximity with the alluvial system may lead to a risk of lowering the beneficial use of the aquifer. It is recommended that the placement of mine spoil retain a suitable buffer from the mapped alluvial extent, or appropriate engineering works be designed to ensure a low permeability barrier exists between the two.

As described in the following sub-sections, the proposal would not lower the beneficial use of the aquifer (Wollombi Brook alluvium).

i Highly productive aquifer

The groundwater study (EIS Appendix I) used the published large-scale geological mapping to define the location of the alluvium (Hunter Coal Fields 1:100,000). At this scale mapping of alluvium can be approximate, often defining a considerably wider alluvial flood plain than is evidenced in the field mapping and ground investigations. Prior to the commencement of modelling, the alluvial boundary was checked against detailed LIDAR topographic data in the vicinity of the mine area and rectified where obvious errors were evident. For example, where topography and geology data indicated the presence of a Permian terrace.

Figure 4.4 shows the extent of the large-scale (1:100,000) mapped alluvium, as it was shown in EIS and groundwater study. It should be noted that in the vicinity of Loders Pit, this alluvial boundary crosses Charlton Road and is within the area already approved to be mined. In this regard, Section 15.2.2 of the EIS states, 'While Figure 15.1 shows the alluvium extending into the MTO mining area, this is based on 1:100,000 scale mapping and excavation within the approved mining area shows the Loders Pit would not intersect the alluvium'.

AGE supervised the drilling of four bores (PZ8S/D and PZ9S/D) adjacent to Loders Pit in 2009. The drilling results indicated the alluvium thins out and becomes more clay bound approaching Charlton Road and, therefore, does not form a productive aquifer in this area. Whilst the drilling indicated a thin, layer of alluvium may have potentially been present east of Charlton Road in the MTO mining area this is of no consequence. This is because disturbance stripping for MTO has been completed, and a levee constructed adjacent to Charlton Road that demarcates the limit of disturbance at the western margin of MTO. The levee is an engineered structure that has removed any soft alluvial soils and keyed into the underlying bedrock, forming a barrier between the alluvium and the mining area east of Charlton Road that will retard flow of groundwater post closure.

Since completion of the groundwater study, a GIS dataset of aquifer productivity has been sourced from NOW. The dataset maps the extent of 'highly productive aquifers' and is used by NOW to define the Hunter Regulated River Alluvial water source. Figure 4.4 shows this zone mapped in the vicinity of Loders Pit. As can been seen, the mapped 'highly productive aquifer zone' varies significantly from the published 1:100,000 mapped alluvium used in the EIS. The 'highly productive aquifer zone' is over 400m west of Loders Pit. This mapping correlates well with the strata intersected in bores PZ8S and PZ9S, and confirms the validity of the NOW map in the area of Loders Pit. This mapping shows that an adequate and significant buffer does exist between the Loders Pit spoil emplacement areas and the highly productive alluvium.

ii Additional considerations

There are several reasons why there no significant potential for the proposal to degrade the beneficial use of the Wollombi Brook alluvium. Firstly, as described above, a buffer exists between the mining area and the highly productive groundwater that is not evident in published mapping of the alluvium. Secondly, the MTO groundwater model was a worst case scenario that is considered to have conservatively over predicted the potential for flow of water from the spoil to the alluvium. Finally, an engineered structure being the Charlton Levee at the limit of disturbance at the western margin of MTO will reduce interconnectivity with the alluvium. The latter two points are discussed below.

When considering the matter raised, it is important to first understand the interconnectivity between the MTO and Bulga Coal Complex. The southern boundary of the MTO open cut mining area connects directly with the northern boundary of the Bulga Coal Complex. This effectively allows groundwater to move freely between the two mining areas through the spoil heaps. This is one of the reasons the numerical model for MTO also included the Bulga Coal Complex.

The flow of water from the Loders Pit spoil into the alluvial aquifer documented in the EIS is considered highly conservative. This is because during preparation of the EIS, information on the final void at Bulga Coal Complex as proposed under the BOP was not available and, therefore, no final void was simulated within the Bulga Coal Complex open cut spoils.

The MTO numerical model represented the progression of mining for the Bulga Coal Complex using publically available documents including earlier EIS and annual review reports. The EIS model simulated the gradual growth of spoil piles over time in Bulga, and for MTO and Warkworth Mine. Hydraulic parameters and recharge were also changed to represent the fractured nature of the spoil at all three mines. However, the MTO groundwater model did not include a final void within the Bulga Coal Complex pit as this data could not be obtained at that time.

The net effect of a Bulga Coal Complex void is that Bulga Coal Complex/MTO spoil is expected to behave as more of a sink in the local groundwater environment rather than a source as concluded in the EIS. This is because at closure a lake will form in the planned open void at the Bulga Coal Complex, with evaporation from the lake surface drawing in groundwater from the interconnected spoils heaps. This would reduce groundwater levels within the spoils and the potential for seepage into the alluvium as groundwater is drawn towards the Bulga void lake.

Concurrent with the development of the groundwater model for the MTO proposal, Mackie Environmental Research (MER) was developing a groundwater model for the BOP proposal. MER's model represented a final void within the Bulga Coal Complex spoil heaps at closure. Figure 4.5 shows the final water level in the MTO post-closure groundwater model, with a resulting groundwater head of approximately 100m AHD within the Bulga Coal Complex/MTO spoil. This is slightly higher than represented by MER who estimated 88m AHD when Bulga Coal Complex final void was modelled.

The MTO groundwater model predicted groundwater flow from the Bulga Coal Complex spoil to the north towards MTO, as well as toward the west and east. When MER's model represented a final void in the Bulga spoils, the water level was lower, and the flow direction was towards the void. The net effect of this is that the Bulga Coal Complex/MTO spoil behaves as more of a sink in the local groundwater environment than simulated by the MTO groundwater model, reducing the potential of the spoils to form a seepage source to the alluvium.

The post closure modelling for MTO over-predicts heads within the spoil of the Loders Pit and as a result over-predicts potential discharge off-site. The MTO groundwater model estimated a discharge rate of 4L/s, but when the Bulga Coal Complex void is represented water levels reduce significantly and the net discharge to the alluvium would be considerably less than 4L/s. The Aquifer Interference Policy requires that proposals do not increase the salinity of baseflow in highly connected streams fed by groundwater by more than 1 per cent. Given the EIS predictions indicated the change in salinity would be undetectable any further reduction in net discharge would be of little consequence.

> The proponent needs to revisit the details for the alluvial bore network and review why the data is inconsistent with other information sources. This may require adjustments to the water management plan.

As substantiated below, based on the outcomes of investigations of the alluvial bore network completed for the proposal, adjustments to the MTW water management plan are not required.

As part of the groundwater study for the proposal, all data from the PINEENA Groundwater database for bores within the Wollombi Brook alluvium extending up and downstream of MTO was reviewed. This search produced very limited information on groundwater salinity, although the general comment on the 30 bores that could be located in the vicinity of MTW and Bulga was that salinity was 'fresh' to 'good' and less than 3,000ppm.

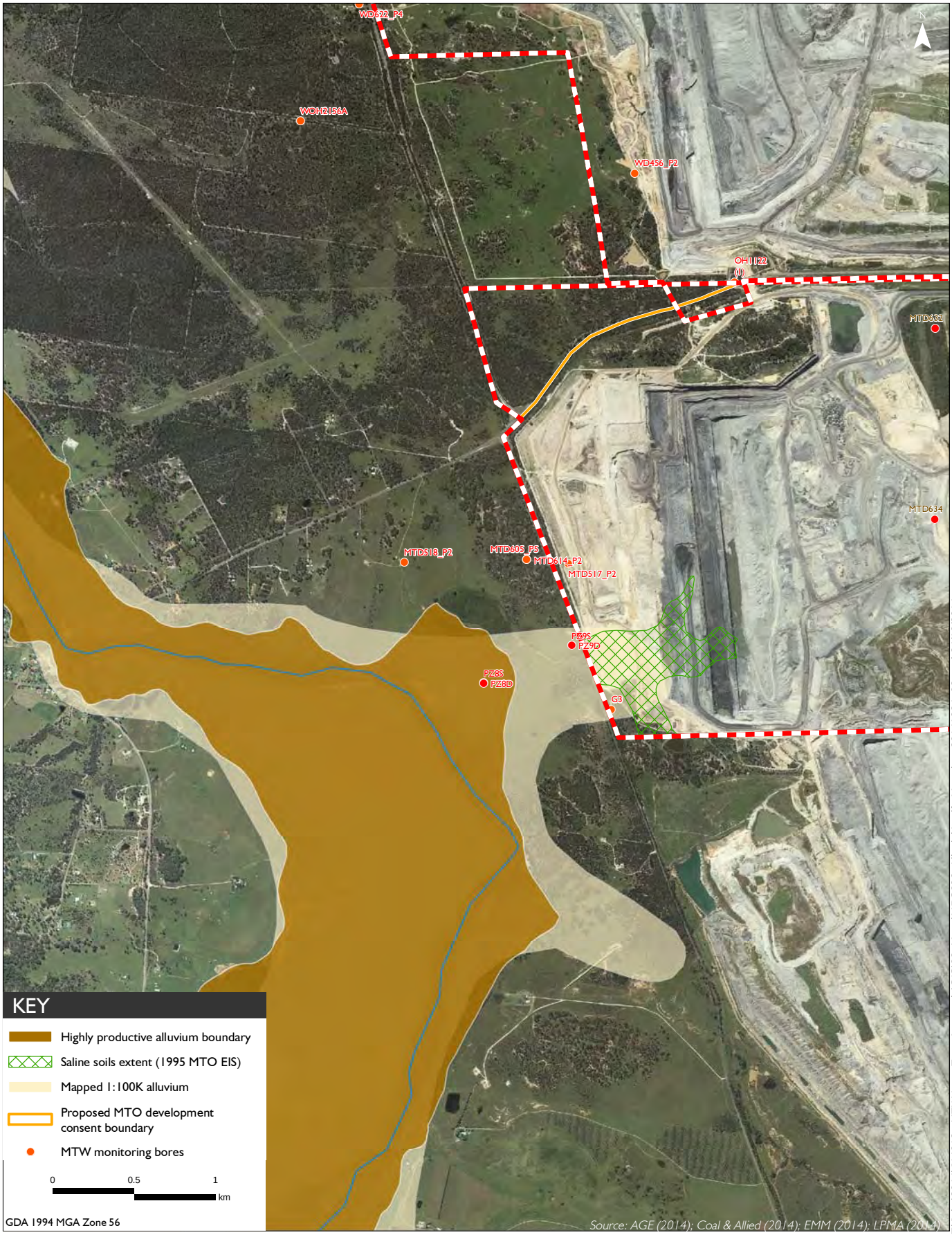
The area of most relevance to the assessment of the proposal's potential groundwater impacts, and the focus of the EIS, was between Loders Pit and Wollombi Brook. In this area the applicant has constructed three nested bore locations within and beneath this alluvium. These are PZ9S/D and PZ8S/D discussed above and shown in Figure 4.4 and PZ7S/D to the north-west of Warkworth Mine. PZ7S/D is constructed outside the mapped alluvium and is believed to be constructed in the Warkworth Sands formation, or at the boundary of the alluvium and Warkworth Sands. The median electrical conductivity of PZ9S and PZ8S is 14,335µS/cm and 15,130µS/cm, respectively. The data from these monitoring sites were checked and verified and the construction of monitoring bores themselves was carried out by a licensed water bore driller supervised by a qualified hydrogeologist.

In addition to the bores installed by the applicant, it is noted that AGL undertook pilot testing for coal seam gas in the vicinity of the Bulga village. As part of this investigation AGL installed a series of monitoring bores located upstream from MTW, within and next to the Wollombi alluvium near the town of Bulga. One of the monitoring bores constructed in Wollombi Brook alluvium confirmed that brackish to saline water quality is common in this area reporting an electrical conductivity of 17,096µS/cm.

Data from the preceding sources aligns well with other areas of the Hunter Valley where the alluvial aquifers can have widely variable salinity, with generally elevated saline groundwater on the thin edges of the alluvium with fresh, more productive groundwaters found closer to present day drainage systems where recharge rates are higher. A good example of this is the monitoring conducted by Mt Arthur Coal for the reach of Hunter River alluvium next to Mt Arthur North Mine (AGE 2013).

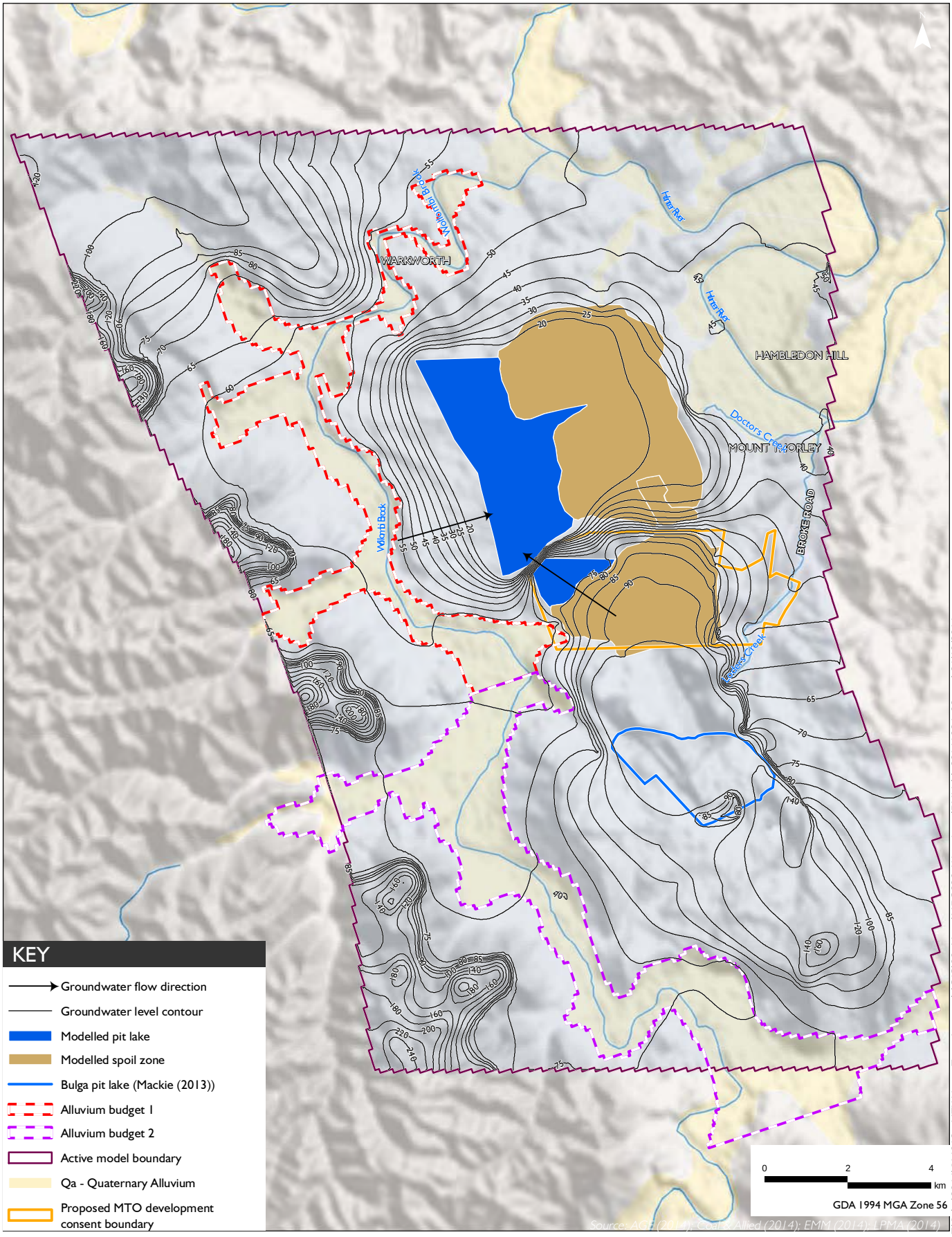
The conceptualisation suggests that the alluvium is more complex and consists of more than just highly productive zones containing fresh, low salinity groundwaters. It is well understood that Permian groundwaters do, under natural conditions, discharge to alluvium resulting in alluvium becoming more saline. Data also suggests that highly productive, low salinity alluvial zones are present near the active drainage systems, however the bores around the village Bulga also show that there are exceptions to this rule.

Whilst NOW classifies the Wollombi Brook alluvium as a highly productive aquifer for regulatory purposes, the data shows that in the area of Loders Pit the high salinity of the alluvial groundwater means it has no beneficial use. Samples of water seeping from the spoils and tailings dams at MTW typically record an electrical conductivity below 10,000µS/cm and, therefore, whilst a buffer zone and engineering structures are in place, a limited flow of groundwater from the mine to the alluvium is still possible post-mining. However, the conclusion that this will be of no consequence to the beneficial use in this area is considered well founded.



COAL & ALLIED
Managed by Rio Tinto Coal Australia

Alluvial aquifer mapping
Mount Thorley Operations 2014
Response to Submissions
Figure 4.4



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Managed by Rio Tinto Coal Australia

Water levels in post-mining void

Mount Thorley Operations 2014
Response to Submissions

Figure 4.5

4.4.3 Recommended conditions of approval

The following conditions of approval were recommended by the NOW:

1. The proponent meets with NOW to provide clarification in relation to water licensing arrangements.

2. 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.

3. The placement of mine spoil retains a suitable buffer from the mapped alluvial extent or appropriate engineering works to be designed to ensure a low permeability barrier exists between the two.

The applicant has complied with recommended conditions 1 and 2 and will continue to liaise with NOW with regard to water licensing and the water monitoring network at MTW under the proposal. A commitment to install three additional piezometers in the Wollombi Brook alluvium adjacent to Loders Pit will provide additional data by which to monitor the impact, if any, of mining.

4.5 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.

4.5.1 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 commitments refer to exceedance of the Warkworth Mine (referred to as Warkworth Mine in the extract below) air quality criteria. Warkworth Mine is specifically referenced as the consent conditions for Warkworth Mine require air quality monitoring at mine-owned residences. Both MTO and Warkworth Mine are managed under the same approved MTW air quality and greenhouse gas monitoring programme and the actions applied to Warkworth Mine also apply to MTO. It is envisaged that any new development consent for MTO will include a similar condition regarding the mine-owned land as that outlined in the existing Warkworth Mine development consent.

> 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.

4.5.2 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 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 Section 6.4.6 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.

4.5.3 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 M), 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 6.7.9 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.

4.6 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 I) 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 MTO 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.

4.7 Division of Resources and Energy

The NSW Division of Resources and Energy (DRE) raised no objections to the proposal and recommended conditions of approval. The submission discussed several matters which are summarised in the sections below.

4.7.1 Rehabilitation

The DRE submission states that specific performance objective and standards of each domain have not been sufficiently described in the EIS. As such, DRE recommended 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 Mount Thorley Operations 2014 EIS, the Statement of Commitments in Chapter 21 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.
Water quality	Water retained on site is fit for intended land use(s) for the post-mining domain(s).
	Water discharged from site is consistent with the baseline ecological, hydrological and geomorphic conditions of the creeks prior to mining disturbance.
	Water management is consistent with the regional catchment management strategy.
Surface infrastructure	To be decommissioned and removed, unless the Secretary of Department of Trade and Investment, Regional Infrastructure and Services agrees otherwise.
Biodiversity	Establish 486 ha of Woodland Communities.

Table 1 Rehabilitation objectives

Rehabilitation feature	Objective
Native flora and fauna	Size, locations and species of native tree lots and corridors are established to sustain biodiversity habitats.
	Species are selected that re-establishes and complements regional and local biodiversity.
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	Ensure public safety.
	Minimise the adverse socio-economic effects associated with mine closure.

Rehabilitation of MTO will be undertaken to the satisfaction of the Secretary of Department of Trade and Investment, Regional Infrastructure and Services via the DRE. Rehabilitation will be substantially consistent with rehabilitation objectives outlined in Chapter 12 of the EIS where appropriate.

With the exception of detail around the proposed backfilling of Loders Pit, a detailed description of the strategies and techniques utilised in the progressive rehabilitation of the disturbed areas at MTO 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. Should the proposal be approved, details regarding rehabilitation of Loders Pit, including the capping and rehabilitation of the northern section that will be used as a TSF, will be incorporated into the MOP as per the MOP Guidelines.

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 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.

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 Rio Tinto Coal Australia's website.

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

- 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 MTW MOP will be reviewed and updated as required to incorporate the proposal (and the Warkworth Continuation 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.

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

ii Size, quality and availability of the resource

DRE supports the projects reported reserve estimate of 28.6Mt ROM coal, which is suitable to produce high-grade export quality coking and thermal products.

Currently Mount Thorley Warkworth is the third largest producing mining in both NSW and the Hunter Coalfield. Separately, the Warkworth Mine produced 4.3Mtpa of saleable coal in 2012-13, making it the fourteenth largest producing mine in NSW and the tenth largest in the Hunter Valley.

DRE believes the project will not have any impact on the currently approved ROM coal production rate at Mount Thorley Operations of up to 10Mtpa, with Mount Thorley operations consistently producing well under this maximum allowable rate, ie on average around 6.5Mtpa of ROM coal.

On completion of mining the project would continue to provide valuable services to the Warkworth Mine including emplacement of overburden material to enable an improved final landform at Mount Thorley Operations and importantly the processing of cal in the Mount Thorley Operations coal preparation plant.

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 small percentage sold on the domestic thermal market), the value of the coal produced would be worth around $1.8 billion in current dollars. The net present value of this revenue stream has been estimated by DRE at approximately $1.1 billion.

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.

The coal handling and preparation facilities at Mount Thorley Operations are linked closely with the Warkworth Mine in that ROM coal from Mount Thorley Operations may be transferred for processing at Warkworth Mine CPP and, similarly, ROM coal from Warkworth Mine may be processed at Mount Thorley Operations. There are also synergies across both Mount Thorley Operations and Warkworth of sharing equipment, personnel, water and rejects. DRE considers that the Mount Thorley Operations and Warkworth Mine are tightly linked in such a manner that provides significant cost savings for both operations, if this linkage was broken by one mine ceasing operations it would seriously jeopardise the future of the other.

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

DRE notes from the EIS that the project will bring the following economic benefits to NSW over the life of the Project:

- $149million (NPV) in annual direct economic benefit;
- $39million in additional income (NPV); and
- $45million in additional Gross State Product:

DRE also notes from the EIS that the project will bring the following economic benefits to the region over the life of the Project:

- $32million in additional income; and
- 121 indirect jobs over 21 years.

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 $139million in direct revenue in dollars of the day over the life of the project. The net present value of this royalty stream has been estimated by DRE at approximately $89million.

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 AU$90 per tonne and $115 per tonne for semi-soft coking coal.

DRE has estimated that 4.3Mtpa of product coal would be mined from the project area beyond the current development consent period of 2017. Extraction of coal from the project would take place until 2022 when all available resources would have been extracted.

Using the above parameters, DRE has calculated that in a typical full production year the State will receive over $30million per annum and in dollars of the day total royalty payable from the project would be nearly $140million. The net present value of this royalty stream would be around $90million using a 7% real discount rate.

DRE's response is noted.

4.8 Heritage Council of NSW

The Heritage Council of NSW submission raised no objections to the proposal. The submission noted that the Heritage Council of NSW accepts the conclusion in the EIS that the proposal is not anticipated to impact any registered, or non-registered historic heritage items or places and that no mitigation measures specific to the proposal are warranted.

4.9 Roads and Maritime Services

The NSW Roads and Maritime Services (RMS) submission raised no objections to the proposal as it considered that the continuation of the operations at MTO will not result in any significant additional impact of the classified (State) road network.

4.10 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 considered in the sections below.

4.10.1 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's noise acquisition zone. The noise and vibration study also calculated MTO's contribution to cumulative noise at this assessment location and it was less than 1 per cent of total noise received at that location.

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.

This matter is not relevant to MTO and is addressed in the Warkworth RTS.

> 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 village), administration, substitution and elimination controls, engineering measures, and a commitment to continuous improvement. The noise management system is described in Section 6.4.6 of this report. These management practices would continue under the proposal.

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

Background levels were determined in full compliance with the required processes in 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 rating background level (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 and in the previous proposal are consistent with one another and reflect 30dB(A) and 33dB(A) depending on the monitoring locations. The data have been peer reviewed, and determined as appropriate, as part of the noise and vibration study. The peer review is provided in the noise and vibration study.

4.10.2 Ecology

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

This matter is specific to the Warkworth Mine and, therefore, has been considered in Warkworth RTS (refer to Section 4.11.2).

> 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.

This matter is specific to the Warkworth Mine and, therefore, has been considered in Warkworth RTS (refer to Section 4.11.2).

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

This matter is specific to the Warkworth Mine and, therefore, has been considered in Warkworth RTS (refer to Section 4.11.2).

> The area proposed for offsetting would appear to be less than the area that will be impacted upon by mining operations.

This matter is specific to the Warkworth Mine and, therefore, has been considered in Warkworth RTS (refer to Section 4.11.2).

4.10.3 Rehabilitation

> The adequacy of rehabilitation is an ongoing community concern which if carried out regularly minimises air quality impacts.

Council's comment is noted.

As outlined in Section 4.7.1 above, progressive rehabilitation is undertaken across MTO as soon as practicable as areas become available. In the 2013 MTW Annual Review, which reported on the activities undertaken during the 2013 calendar year, the area sown for rehabilitation at MTW (61.6ha) exceeded the target for that year (54.5ha).

The proposal is for an improved final landform that will largely remove the final void and allow the emplacement areas to integrate the operation more efficiently with the surrounding landscapes. This is illustrated in Figures 2.7 to 2.10 of the EIS.

In progressing the final landform, temporary rehabilitation of disturbed areas, through the aerial seeding programme, will continue under the proposal which will provide vegetative cover pending their full rehabilitation. This vegetative buffer will assist to reduce the entrainment of dust during wind events and contribute to alleviating the community concerns with regard to the management of air quality impacts.

Rehabilitation trials and research activities undertaken at MTO and other Coal & Allied sites in the Hunter Valley have realised techniques and processes to improve the effectiveness and efficiency of rehabilitation of mined lands. Using these strategies and improved knowledge of rehabilitation processes, rehabilitation being undertaken across all of Coal & Allied sites, including MTO, is demonstrating improved growth mediums and recruitment of native species that are representative of a wider suite of species than has been achievable in the past.

In recognition of the communities' interest in rehabilitation and mine closure, Coal & Allied will run 'Closure 101' information sessions with the community to provide an overview of the approach to mine closure planning, rehabilitation, future land use and management. These sessions will also provide an opportunity for the community to provide feedback to the mine 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.

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 at MTW in 2013 exceeded the stated target by 13 per cent.

Table 2 of the MTW MOP (EIS Appendix N) 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.

This matter is specific to the Warkworth Mine and has been addressed in Section 4.11.3 of the Warkworth RTS.

4.10.4 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 those already within, or inferred to be in, zones of affectation for mining operations (assessment locations 77, 102, 149 and 264). 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.

Coal & Allied 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 some 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. 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, Coal & Allied 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 20.6 in Chapter 20 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 20.5 of the EIS and Appendix C 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.

This matter is specific to the Warkworth Continuation 2014 application and is addressed in the Warkworth RTS. This matter is not considered any further in this report.

4.10.5 Economic

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 MTO and Warkworth) '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% 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). These local benefits are outlined above.

> 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, Coal & Allied 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 6.7.3 of this report). This property is east of MTO.

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 MTW's intention to seek approval to continue operations beyond the 2003 consent.

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 4.10.4 above, Coal & Allied 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. Coal & Allied proposes participating in this process to ensure its contribution toward facilitating the ongoing sustainability of the Bulga-Milbrodale community.

The applicant 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.

4.10.6 Traffic and transport

The Council submission raises a number of issues in relation to the closure of Wallaby Scrub Road. The closure of Wallaby Scrub Road is specific to the Warkworth Continuation 2014 application and, is considered in the Warkworth RTS. These matters are not referenced any further in this report.

4.10.7 Blasting

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

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

> An online blast schedule should be provided and updated regularly.

Council's response is noted. MTO is managing blasting at the Site in accordance with the development consent (DA 34/95), Schedule 3, Condition 18a which requires MTO 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. MTO 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 MTO is shown in Photograph 4.1.

Photograph 4.1 Blast notification signage

4.10.8 Aboriginal and historic heritage

The Council submission raises a number of issues in relation to Aboriginal and historic heritage which are specific to the Warkworth Continuation 2014 application and are addressed in the Warkworth RTS.

4.10.9 Air quality

> A PM_{10} 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.

This matter is specific to the Warkworth Continuation 2014 application and is addressed in the Warkworth RTS. This matter is not considered further in this report.

> 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 (NO_2) and sulphur dioxide (SO_2) on health. These, and $PM_{2.5}$, are discussed below:

- The monitoring data for NO_2 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 NO_2 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 NO_2 goals. Based on the NO_2 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 SO_2 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 4.10.3 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 4.10.3 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/m^2/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, 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.

> 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.

This matter is specific to the Warkworth Continuation 2014 application and is addressed in the Warkworth RTS. This matter is not considered further in this report.

4.10.10 Groundwater

> Should consent be granted best practice conditions be imposed in respect of groundwater monitoring.

Council's response is noted.

4.10.11 Surface water

> Should consent be granted best practice conditions be imposed in respect of surface water monitoring.

Council's response is noted.

4.10.12 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 14.3.2 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 4.6 of this report) are within a range of 7.5km, and the visual sensitivity of these residences where the proposal is viewed would be high or high/moderate.

The visual impact management plan (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.

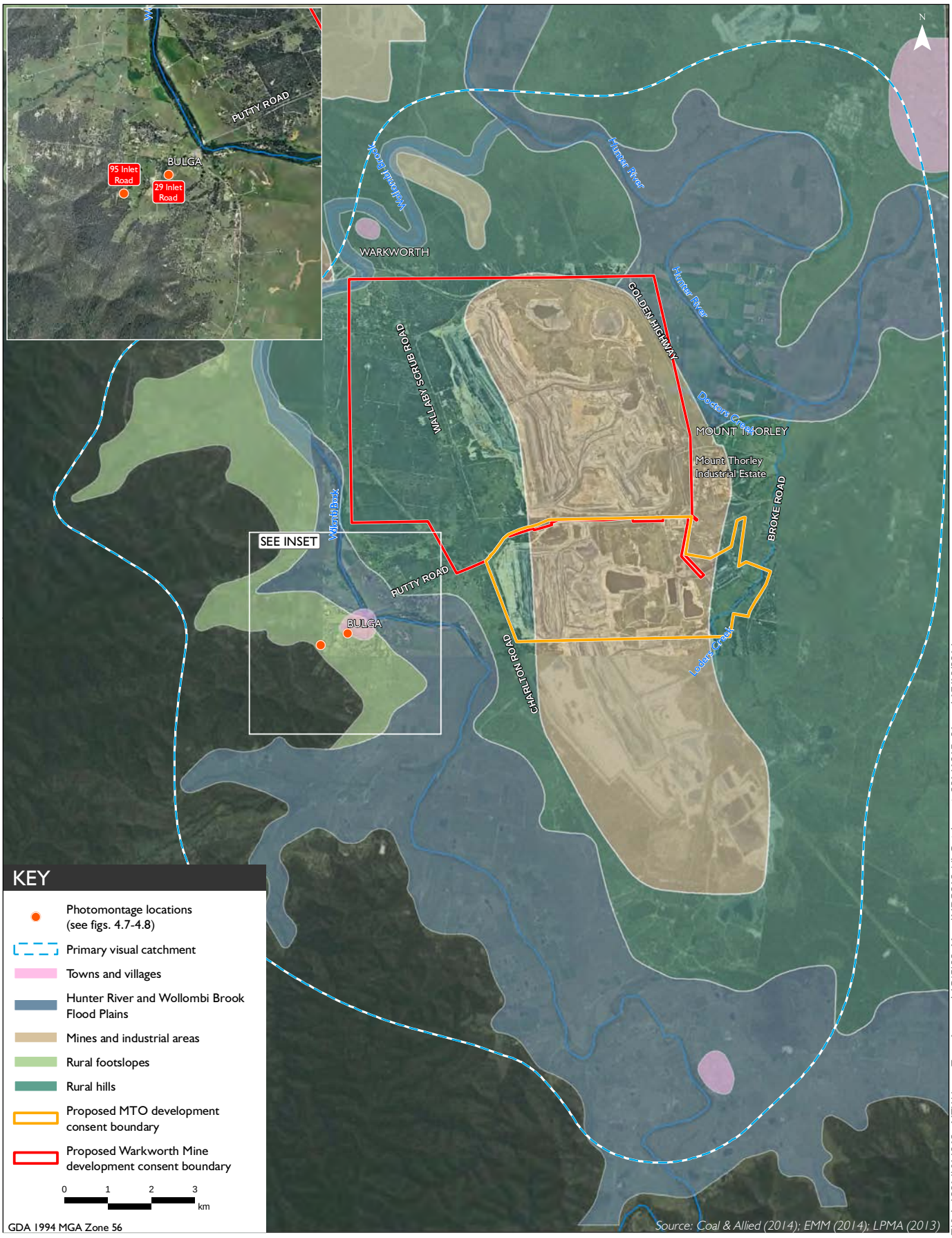
Overburden emplacement at the operation will continue to be visible to some properties in Bulga village for the duration of the existing development consent.

Photomontages were included in Section 14.3.4 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 4.7 and 4.8, illustrate the existing view (that is, where MTO 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.



COAL & ALLIED
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Primary visual catchment and visual character units

Mount Thorley Operations 2014
Response to Submissions

Figure 4.6

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Photomontage - 95 Inlet Road, Bulga

Mount Thorley Operations 2014
Response to Submissions
Figure 4.7

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COAL & ALLIED
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Photomontage - 29 Inlet Road, Bulga

Mount Thorley Operations 2014
Response to Submissions
Figure 4.8

Chapter 5

Public submissions of support

Chapter 5 — Public submissions of support

5 Public submissions of support

5.1 Introduction

This chapter provides a summary and response to the public submissions supporting the MTO proposal, including those submissions prepared by special interest groups. Submissions relating generally to MTW and specifically to the MTO proposal have been considered. Submissions of support relating specifically to the Warkworth Continuation 2014 proposal have been addressed separately in the Warkworth RTS.

Of the 1,106 submissions, 1,099 individual submissions and seven specialist interest groups supported the proposal, representing 84 per cent of the total submissions.

Matters raised include 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 505 submissions received in support of the proposal referenced matters related to employment, representing 46 per cent of supporters. These matters included the direct loss of jobs, impacts to 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.

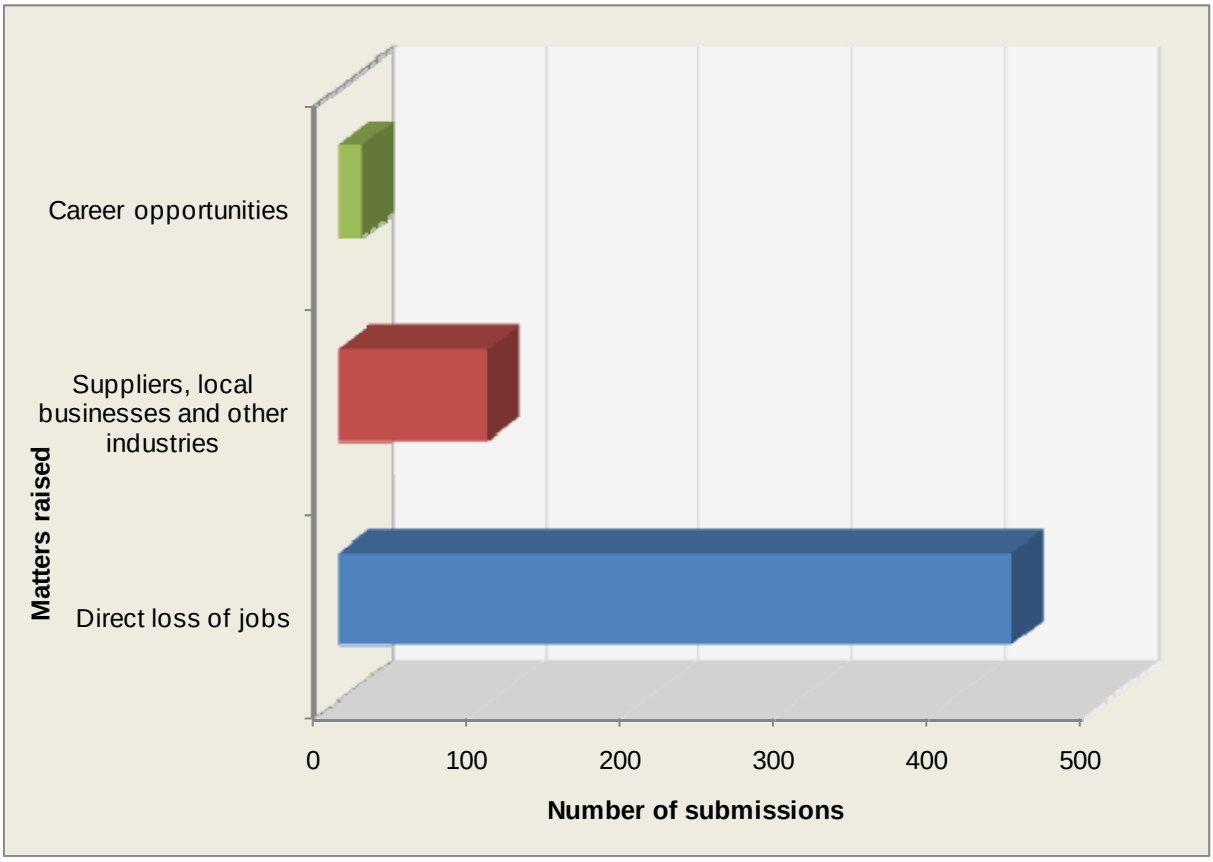


Figure 5.1 Employment matters raised within submissions of support

Of the 505 submissions received in support that referenced matters relating to employment, some 26 per cent were from Singleton LGA (ie 133 submissions) with a further 17 per cent from Cessnock LGA (ie 88 submissions) and 24 per cent from Maitland LGA (ie 123 submissions).

5.2.1 Direct loss of jobs

The most common matter raised was the critical impact the direct loss of jobs at MTW, including full-time contractors, would have on individuals, families and the broader community. This represented approximately 87 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. 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 MTW continuing is reinforced by the HVRF.

As noted in Section 2.2 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 2.2, HVRF's forecast has proven correct. ABS 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 MTO 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 MTW 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 MTO 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, representing 19 per cent of matters related to employment.

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 group submissions with a number of smaller suppliers and other local businesses noting that the ongoing operations at MTO 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**

Notes: 1. Upper Hunter region (Singleton, Cessnock, Maitland, Muswellbrook and Upper Hunter) = $188.1million.

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 8.5 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 operations would flow to that region over the life of the proposals.

The initial flow-on effects or indirect benefits for the Mid and Upper Hunter region of the proposals 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 4.10.5 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 MTO would be approximately 10 per cent of additional income and seven 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 (mining at MTO would cease by 2017 as per its existing development consent). As noted in Section 2.2.2 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 at Warkworth Mine.

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.

Coal & Allied'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 are matters discussed in Section 5.4 of this report.

5.3 Economic contributions

A total of 475 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.

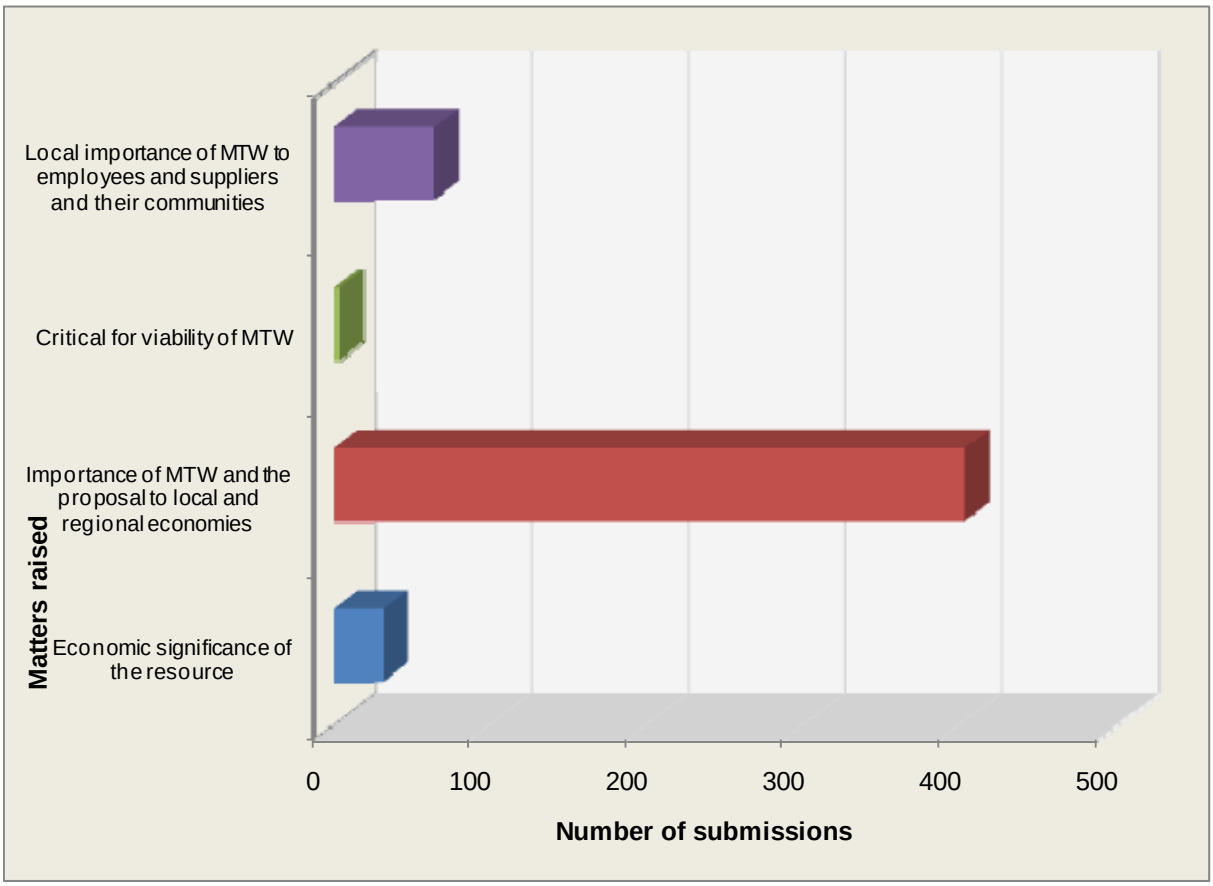


Figure 5.2 Economic contribution matters raised within submissions of support

Of the 475 submissions received in support that referenced matters relating to economic contributions of the proposal, 30 per cent were from Singleton LGA (ie 31 submissions), 18 per cent from Cessnock LGA (ie 19 submissions) and 22 per cent from Maitland LGA (ie 23 submissions).

Thirty-two submissions referenced the economic significance of the resource attributable to MTO, being:

- the continuation of approximately 121 jobs on average in the long-term;
- the payment of $50million in royalties to the state; and
- indirectly, the making of approximately $9million in additional income in NPV terms and additional annual employment of 4 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 support. 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 20.3.4 of the EIS, Coal & Allied 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 hospitals, roads, police and education.

It was noted Singleton and surrounding communities have one way or another benefited 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 20.3.2 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 MTO for the Mid and Upper Hunter region and Singleton LGA are listed in Section 6.6.2 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 MTW 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 313 submissions in support of the proposal referenced social impacts, representing 28 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.

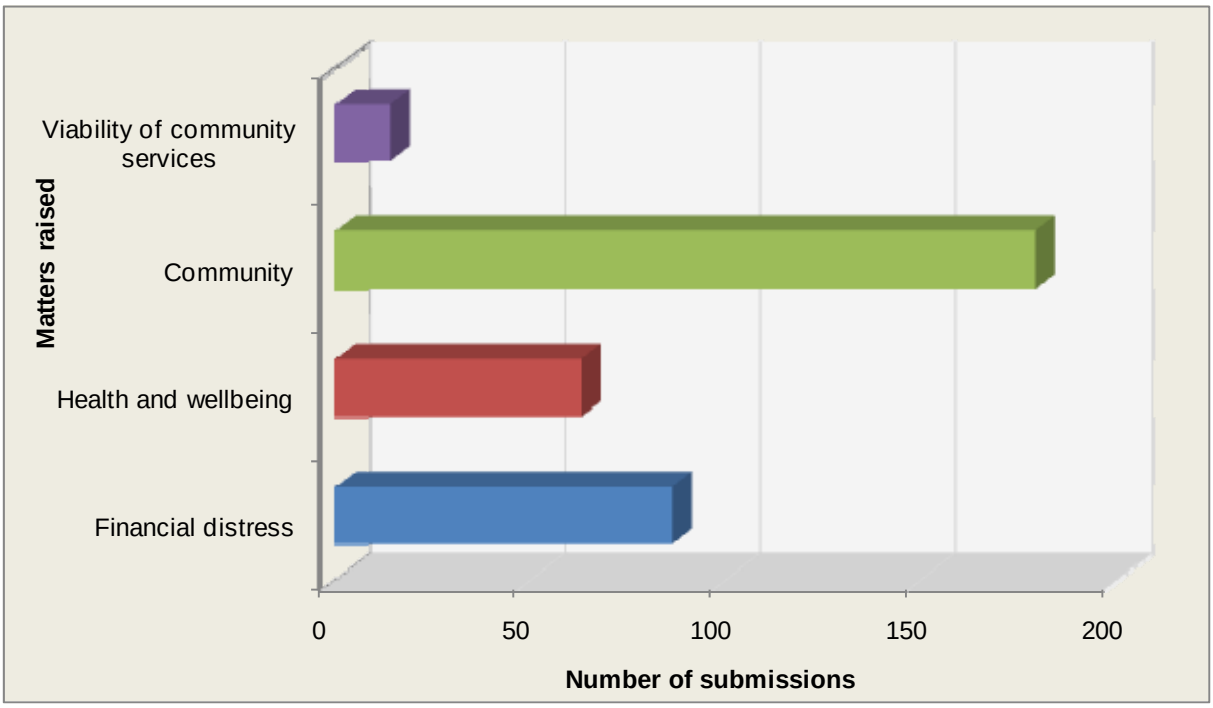


Figure 5.3 Social impact matters raised within submissions of support

Of the 313 submissions received in support that referenced matters relating to social impacts, 36 per cent were from Singleton LGA (ie 114 submissions), 18 per cent from Cessnock LGA (ie 56 submissions) and 19 per cent from Maitland LGA (ie 61 submissions).

5.4.1 Health and well being

Some 63 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 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.

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 86 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 MTW 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 MTW. 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 MTO 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 20.3.2 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 20.4.2 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 MTO (and 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 20.3 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 20.4.2 of the EIS, Milbrodale, Broke and Jerrys Plains Public Schools had 11, 59 and 21 enrolments in 2013, respectively. An analysis of MTO employees with students enrolled at these schools has not been undertaken.

5.5 Environmental management

A total of 55 submissions (ie 5 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.

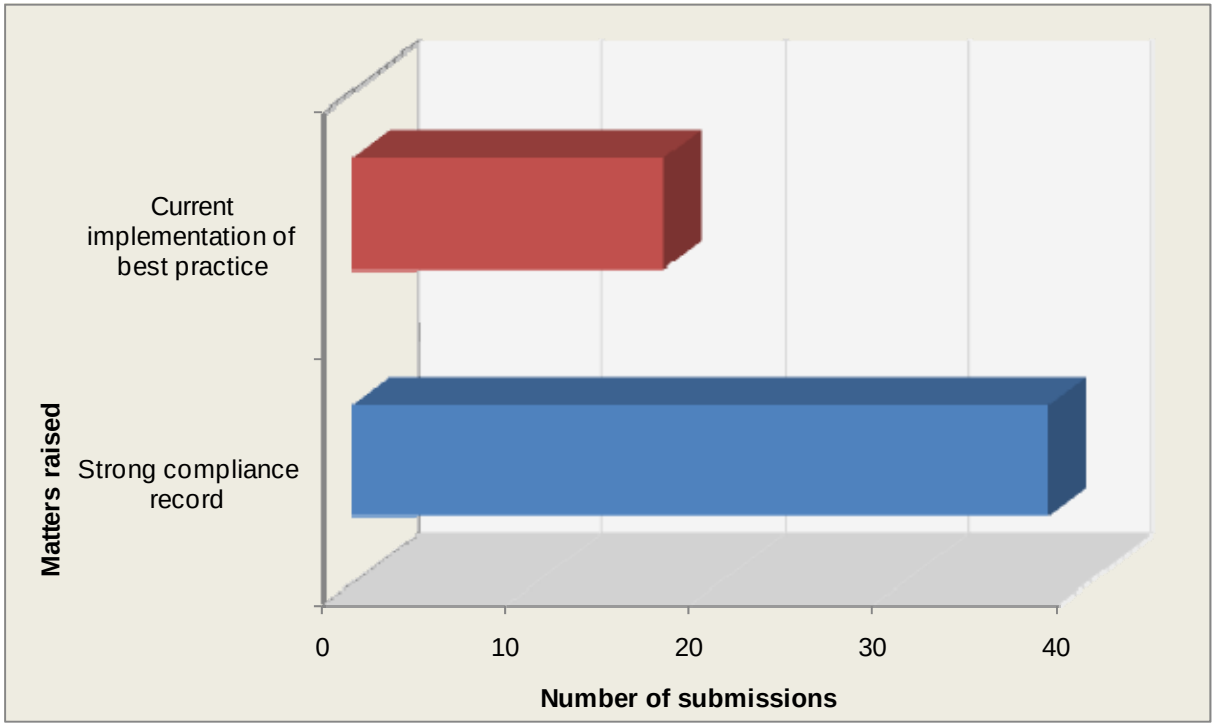


Figure 5.4 Environmental management matters raised within submissions of support

Of the 55 submissions received in support that referenced matters relating to environmental management, 38 per cent were from Singleton LGA (ie 21 submissions), 7 per cent from Cessnock LGA (ie four submissions) and 25 per cent from Maitland LGA (ie 14 submissions).

A number of employees noted awareness of all personnel on 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 21.2 of the EIS, environmental management at MTO 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 and dust. 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 62 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.
- The Hunter region has a rich, multi-generational history of mining that may be lost should the proposal be refused.
- MTO 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 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 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 approximately 1,317 submission received as of 5pm on 11 August 2014, 198 individual submissions and 13 specialist interest groups objected to the proposal, representing 16 per cent of the total submissions. Approximately 56 per cent of objections were form letters.

Matters raised include the L&E Court judgment, 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 173 submissions in objection referenced the L&E Court judgment, representing 82 per cent of objectors.

Matters raised in submissions contended that the proposal was inconsistent with the judgment. It should be noted that the L&E Court judgment was in respect of a development application lodged by Warkworth Mining Limited for an extension to the adjacent Warkworth Mine (ie Warkworth Extension 2010). The application included the use of MTO land and infrastructure for mining-related activities such as the transportation and processing of coal to the MTO CPP and the emplacement of overburden to assist with MTO's final landform.

The majority of submissions received on the proposal referenced aspects of the L&E Court judgment relevant to the Warkworth Continuation 2014 application (for example, clearance of Warkworth Sands Woodland and offsetting in accordance with the L&E Court judgment). These matters are addressed in the Warkworth RTS and are not considered any further in this report. The consistency of the MTO noise and vibration study with the L&E Court judgment is considered in Section 6.4.2 of this report.

6.3 Project design and development

6.3.1 Introduction

Project design and development is described in detail in the EIS, with alternatives described in Chapter 22.

A total of 13 submissions in objection referenced project alternative matters, representing 6 per cent of objectors.

Matters raised with respect to alternative project designs such as underground mining, different timeframe for the consent and alternate TSF options.

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 12.

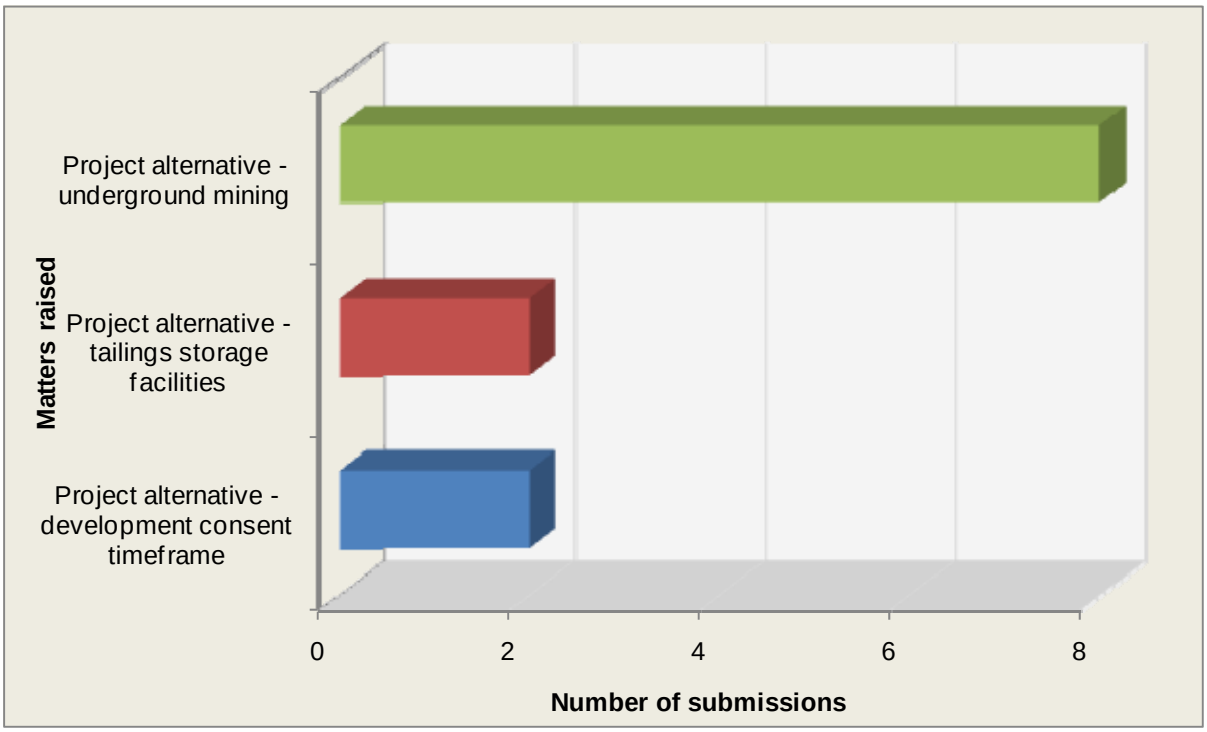


Figure 6.1 Project design alternative matters raised within submissions of objection

6.3.2 Alternatives

Several 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) and emplacement areas. These matters are addressed below.

i Mining areas and method - underground mining considerations

Nine submissions raised support for underground mining methods in preference to open cut mining. The proposal does not seek to extend the approved spatial limits of extraction. The proposal seeks to extend the time for approved mining that has occurred slower than anticipated beyond 2017, due to mining in Loders Pit being delayed for approximately three years due to a significant rain event in June 2007. This matter is therefore, considered in Section 6.3.2 of the Warkworth RTS, and not in this report.

ii Development consent timeframe

Two submissions raised the matter that the proposal need not seek approval for a 21 year consent period to mine the remaining resource within Loders Pit.

As stated in Section 2.1 of the EIS, the proposal seeks to extend the time for approved mining that has occurred slower than anticipated beyond 2017, while enabling the continued use of mining infrastructure and the transfer of overburden from Warkworth Mine to complete the final landform for 21 years upon arrival. The 21 year period is consistent to the consent period applied for within the Warkworth Continuation 2014 proposal.

The primary reason that mining has occurred slower than anticipated at MTO is due to a significant rain event in June 2007 which saw Loders Pit flooded. Loders Pit was utilised as a water storage post the June 2007 flood to allow the MTW operations the ability to return to normal mining in all of the other pits. Loders Pit was successfully dewatered in 2010 and mining recommenced in the same year. Due to this approximately three year cessation of mining in Loders Pit the continuation of mining is sought under this proposal. It is anticipated that mining will be completed in Loders Pit by nominally 2020 (or indicative mine plan Year 6). The proposal also enables mining in AGN which would take approximately two years and be completed nominally before 2022 (or indicative mine plan Year 8).

The 21 year consent period allows for the continued use of MTO infrastructure by Warkworth Mine, subject to its proposal being approved.

iii Tailings storage facilities

Two submissions raised the matter that alternatives to using Loders Pit as a TSF were not considered.

Section 22.2.2 of the EIS described the design process for evaluating tailings storage at MTW. Additional capacity was identified as part of the expected coal production from the Warkworth Continuation 2014 proposal. In assessing the need for additional tailings capacity, a number of options were considered. Firstly, the nature of the location of the proposed TSF was considered. There are two main options for the storage of tailings:

- use of existing dams, or the construction of new dams at either MTO or Warkworth Mine; and
- utilisation of mining pits or part thereof, following completion of mining before being filled with overburden.

At MTO, Loders and AGN pits are approved to be mined and this would continue under the proposal. Mining in Loders Pit and AGN are scheduled for completion in nominally 2020 and 2022, respectively. Tailings emplacement at AGN remains incorporated into the development proposal for MTO.

As described in the EIS, overburden is proposed to be emplaced within Loders Pit upon completion of mining to avoid a final void. The proposed fill level corresponds to the height of the natural ground at the base of the levee in the south-west corner of the lease where the alluvial associated with Salt Pan Creek interact with the existing mining lease boundary. Feasibility investigations included preliminary groundwater modelling to determine whether there would be any offsite impacts. These investigations concluded that the impacts would be minimal with the tailings emplaced and then capped with the transfer of overburden commencing upon the successful completion of the capping. This proposal would have beneficial outcomes when compared to the currently approved operation where the final void remains on closure. As a result, use of the northern part of Loders Pit as a TSF forms part of the proposal.

In general terms, the removal of the approved final void in Loders Pit given the receipt of overburden and tailings from Warkworth Mine, subject to approval of its new development application, is viewed as a long-term environmental improvement in the context of the current development consent.

6.4 Noise and vibration

6.4.1 Introduction

The number of submissions received on matters relating to noise and vibration is shown in Figure 6.2. A total of 50 submissions in objection referenced noise and vibration matters, representing 24 per cent of objectors.

The assessment of potential noise and vibration impacts resulting from the proposal was summarised in Chapter 9 of the EIS, and presented in full in Appendix F of the EIS.

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, cumulative noise, low frequency noise (LFN), sleep disturbance and animal health.

The number of submissions received on matters relating to noise and vibration 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 50.

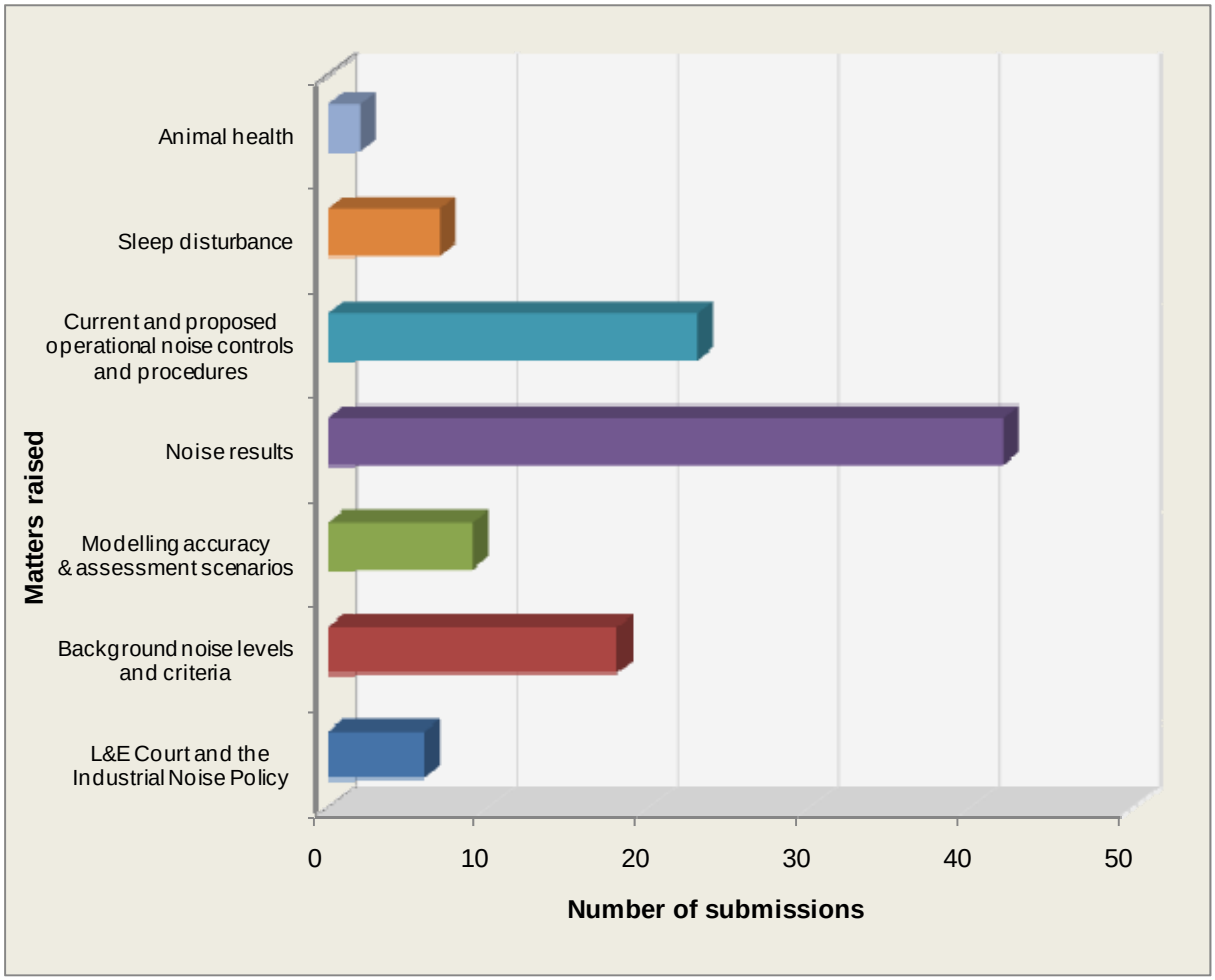


Figure 6.2 Noise and vibration matters raised within submissions of objection

6.4.2 L&E Court and the Industrial Noise Policy

Of the submissions of objection related to noise and vibration matters, 12 per cent of submissions related to noise and vibration (representing three 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 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 9.3 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 low frequency noise (LFN) in rural settings such as that of the proposal. The INP's LFN criteria 15dB threshold is being reviewed in light of the challenges in its practical application at large distances from sources. For example, sounds that do not pose low frequency dominated spectra at close range, would by virtue of enough distance loss factors, inappropriately attract the INP penalty for low frequency as higher frequencies in their spectra are considerably more abated than the lower frequencies.
    - The proposal will enable the extraction of a resource already approved for mining that is unable to be extracted under the current consent timeframe due to pit inundation in 2007.The proposal does not seek to extend the spatial limits of currently approved operations. Noise emissions associated with the proposal are likely to be similar to current approved activities with improvement over time as fleet attenuation progresses and mitigation measures are applied.

- 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 Warkworth Mine development application separately. Further, the approvals do not overlap and it is clear when a noise source is regulated under the MTO development consent and EPL and when it is regulated under the Warkworth Mine 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 surrounding mining operations in the area. Table 9.2 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 checklist

Step		EIS reference
1.	Determining the project specific noise levels for intrusiveness and amenity that are relevant to the site or the area (Section 2)	Section 9.2 and Figures 9.3 and 9.4
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 9.3
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 9.4.4
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 9.4.2
5.	Comparing the predicted or measured noise level with the project-specific noise levels and assessing impacts (Section 6)	Section 9.4.2
6.	Considering feasible and reasonable noise mitigation strategies where the project specific noise levels are exceeded (Section 7)	Section 9.5
7.	Negotiation between the regulatory/consent authority and the applicant and between the community and the applicant to evaluate the economic, social and environmental costs and benefits from the proposed development against the noise impacts (Section 8)	Chapter 6 and Chapter 20
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	To be completed post approval for the proposal. Monitoring information for the current operations is provided in Section 9.5

It is important to note that the INP prescribed 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, Chapter 10 of the INP is dedicated to existing premises, and would apply to a site such as MTO. 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 (refer to Section 4.3.4). 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 Table 9.9 of the EIS.

6.4.3 Background noise levels and criteria

Of the submissions of objection related to noise and vibration matters, 36 per cent of submissions related to noise and vibration (representing nine 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 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 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. Refer to Figures 8.1 to 8.3 of the EIS noise and vibration study.

This approach considered noise levels for MTO, 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 (Umwelt 2013). 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 subject 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.

6.4.4 Modelling accuracy and assessment scenarios

Of the submissions of objection related to noise and vibration matters, 18 per cent of submissions related to noise and vibration (representing four 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 assessing the potential impacts of the proposal on the surrounding area.

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 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.

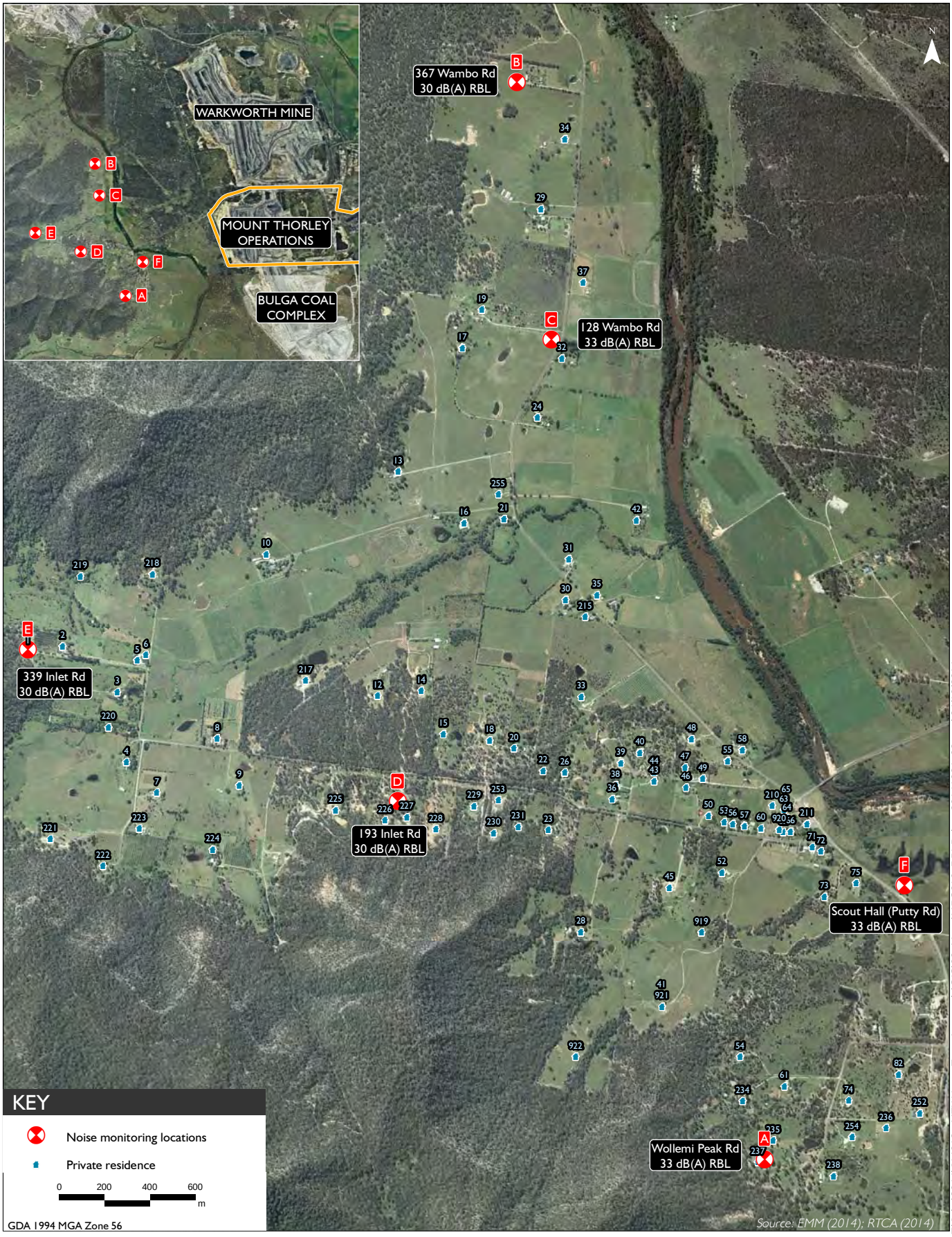
The noise model was configured to predict the total L_{eq} noise levels from mining operations based on the sound power levels of equipment. These sound power levels are short term L_{eq} values of generally pass-by events and are therefore conservative representations of the INP's assessment metric, 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 4.10.1 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 9.4.1 of the EIS, the applicant 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 achieved for all Bulga residences. 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. 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.



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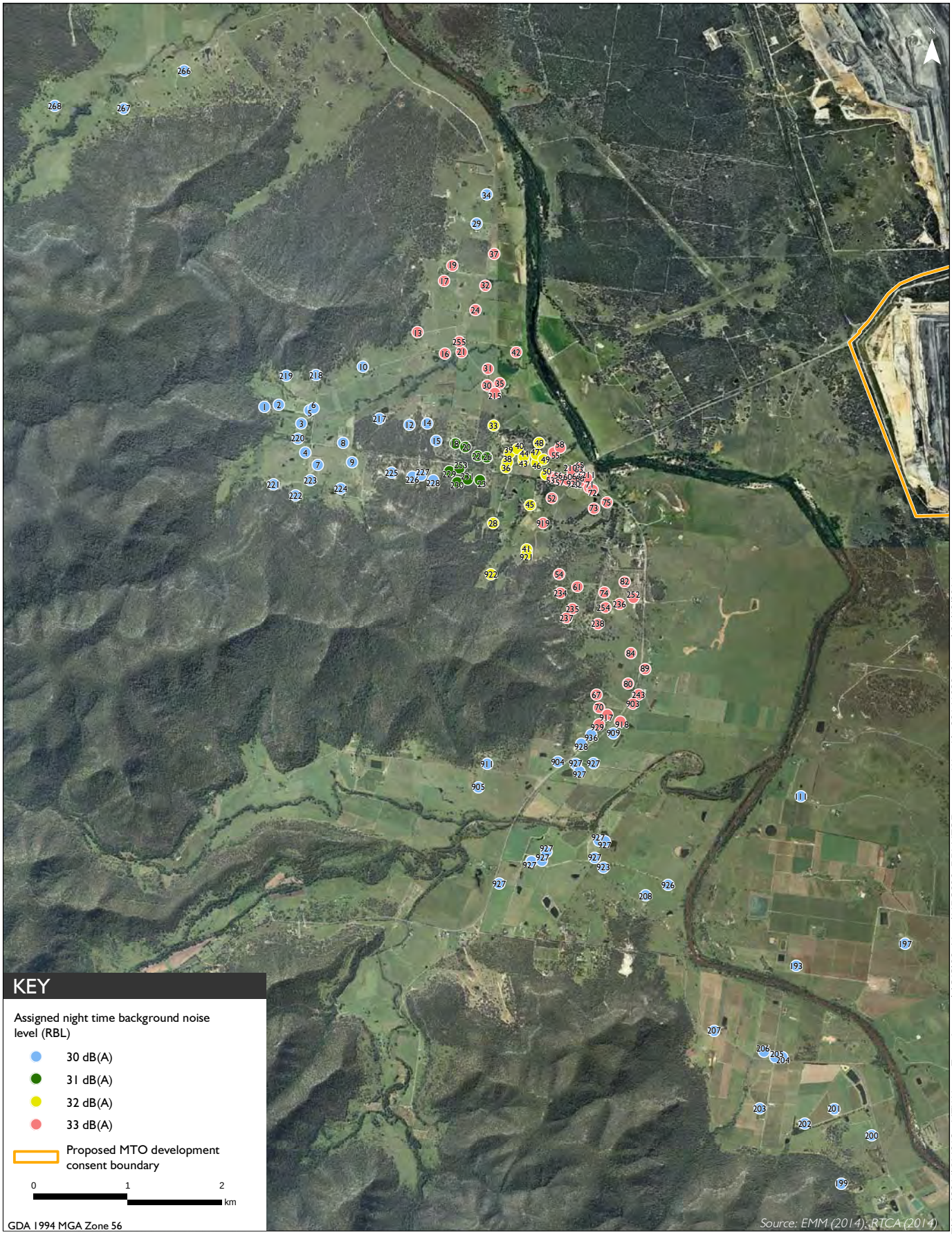
Long-term background noise monitoring locations in Bulga

Mount Thorley Operations 2014
Response to Submissions

Figure 6.3



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Assigned night time background noise levels - Western and southern assessment locations

Mount Thorley Operations 2014
Response to Submissions
Figure 6.4

6.4.5 Noise modelling results

Of the submissions of objection related to noise and vibration matters, 84 per cent (representing 20 per cent of the total submissions of objection) queried the study's results, comprising:

- LFN;
- amenity;
- vibration; and
- cumulative noise.

These matters are addressed in the following sub-sections.

i Low frequency noise

Five submissions received stated that low frequency emissions from the mine were currently unacceptable and that the proposal would continue to produce unacceptable LFN. Matters raised also included that the assessment did not follow the INP method of considering LFN and applying the modifying factor of 5dB to predicted levels.

Section 9.4.4 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. Low frequency noise is discussed further in Section 4.3.1 of this report.

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 MTO 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.

The INP's LFN criteria 15dB threshold is being reviewed in light of the challenges in its practical application at large distances from sources. For example, sounds that do not pose low frequency dominated spectra at close range, would by virtue of enough distance loss factors, inappropriately attract the INP penalty for low frequency as higher frequencies in their spectra are considerably more abated than the lower frequencies. The INP LFN criteria were originally intended for testing sources at relatively close range. In comparison, the German standard DIN45680 (1997) uses a differential of 20dB as a screening tool for LFN.

The proposal will enable the extraction of a resource already approved for mining that is unable to be extracted under the current consent timeframe due to pit inundation in 2007.The proposal does not seek to extend the spatial limits of currently approved operations. Noise emissions associated with the proposal are likely to be similar to current approved activities with improvement over time as fleet attenuation progresses and mitigation measures are applied.

ii Cumulative noise

Of the submissions of objection related to noise and vibration matters, 54 per cent (representing 30 per cent of the total submissions of objection) contended that cumulative noise levels would increase significantly at residences in the areas surrounding the mine should the proposal proceed.

As demonstrated in Section 9.2 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 9.4.7 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 15minute 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, Warkworth Mine, 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:

- an EIS for the expansion of Wambo Mine (Resource Strategies 2003);
- an 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 August 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 9.4.7), 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 and the proposal 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 EIS 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.

Further, noise levels predicted from Bulga Coal Complex referenced in the BOP RTS (Umwelt August 2013) 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 the BOP EIS, but do not result in any change in total cumulative noise levels as presented in the MTO EIS 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 subject 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.

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COAL & ALLIED
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Cumulative noise assessment
Mount Thorley Operations 2014
Response to Submissions
Figure 6.5

iii Amenity

Of the submissions of objection related to noise and vibration matters, 69 per cent (representing 38 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 (refer to Section 9.2 of the EIS) is satisfied for Bulga residences and, therefore, means the area's amenity is not compromised as it meets the INP's Acceptable Noise Level (ANL). Refer to Section 9.4.7 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 9.6 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'.

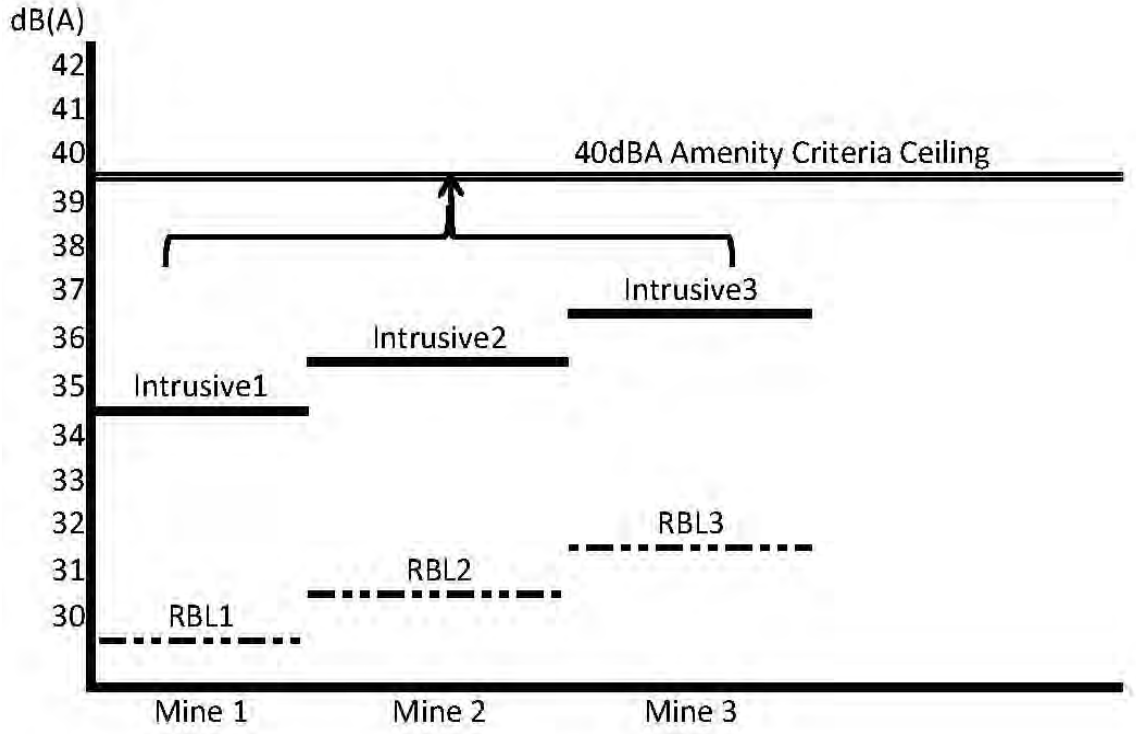


Figure 6.6 Amenity criteria to stop 'noise creep'

Table 9.9 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 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 daily activities of the community (in particular, effects such as sleep disturbance, speech interference, level of annoyance or effects on physical or physiological health) —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)	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 applicant owns a substantial area of land surrounding the Site. MTO has been in operation since 1981 and the originally approved mine has been modified several times. Immediately to the north of MTO is Warkworth Mine, 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, has been operating since the 1980s. Wambo Mine and Hunter Valley Operation South, to the north of Warkworth Mine, commenced operations in 1969 and 1971, respectively. 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, three are predicted with moderate noise level exceedances (3-5 dB(A) above PSNL) and one is predicted with significant noise level exceedances (greater than 5 dB(A) above PSNL). Assessment locations with predicted moderate and significant noise level exceedances account for less than 2% of the total assessment locations considered. A total of 139 assessment locations within Bulga were considered. Of these, 53 are predicted with minor noise level exceedance during Year 3 operations only. A sleep disturbance assessment showed predicted noise levels to satisfy strict EPA criteria. Due to proposed attenuation of mobile plant, noise from current and approved operations is expected to decrease. A cumulative noise assessment in accordance with the INP and Mining SEPP demonstrates criteria would be satisfied for all locations with the exception of those already impacted by other mining operations. 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.

Table 6.2 Residual level of impact

INP factors for consideration	Justification of the proposal
2. Characteristics of the proposal and its noise or vibrations —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 —the degree to which the character of the noise is new to an area and differs from existing noise sources —the economic benefit and social worth of the proposal for the local area, the region or the nation.	The MTO is an existing and well established mine in the Hunter Valley. The proposal seeks a continuation of all aspects of the mine as it presently operates. MTO currently invests significantly in noise management and would continue to do so under the proposal. For example, attenuation of all major plant across the MTW would exceed $50million and will be completed by the end of 2016. The applicant has committed to managing noise levels to meet or be within 1-2 dB of PSNL at the majority 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 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 implementing equipment fleet with best practice noise suppression, that INP PSNLs can be met for the majority of assessment locations. Further, with the proposed attenuation of mobile plant at the Site, it is expected that noise levels would improve for all assessment locations to the east of the Site. The noise modelling adopts area specific validation and, therefore, provides added confidence in the accuracy of predictions. Extensive monitoring to measure compliance would be continued under the proposal. The economic study for the proposal has identified that the direct economic benefit that can be attributed to MTO is around $149million in NPV terms. The economic flow-on effects from MTO amount to: • for NSW, around $39million in additional income (in NPV terms), additional annual employment of 15 full-time equivalent workers, and a contribution to NSW GSP of around $45million; • for the Mid and Upper Hunter region, around $23million in additional income in NPV terms, and additional annual employment of 16 full-time equivalent workers; and • for the Singleton LGA, around $9million in additional income in NPV terms, and additional annual employment of 4 full-time equivalent workers.
3. The feasibility of additional mitigation or management measures: —Alternative sites or routes for the development —The technical and economic feasibility of alternative noise controls or management procedures	The MTO is an existing and well established mine in the Hunter Valley and relocation is not reasonable or feasible. 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: community response officers operating each night, a significant investment in providing best practice noise suppression on equipment fleet (see details in section 10.1.1 of Appendix F). These measures in combination with the established real-time noise monitoring and management system would assist in keeping noise levels to within or below 1-2 dB of PSNL for the majority of assessment locations - this is a reasonable and feasible outcome for the viability of the proposal.
4. Equity issues in relation to: —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	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. 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. The applicant would appropriately address all assessment locations identified with noise level exceedance as negotiated with DP&E and the landowner.

6.4.6 Current and proposed operational noise controls and procedures

Of the submissions of objection related to noise and vibration matters, 46 per cent (representing 11 per cent of the total submissions of objection) contended that current noise emissions and vibration currently 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 MTO are not working as the operation 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 considered in the following sections which discuss the MTO noise management system and the applicant's commitment to continuous improvement. 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 MTW 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; 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. 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 are set below compliance criteria 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 (ie noise levels which exceed the trigger level set below criteria), 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 are shutdown 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.

MTO 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 environmental noise control (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

MTO has a strong compliance record with a total of 154 attended noise measurements taken for MTO in 2014 (up until end of September 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.

Routine compliance assessment has been undertaken from 2004 to the present and in more recent years, monitoring has included low frequency noise assessment.

MTO's monitoring data is publically available via the Rio Tinto Coal Australia website www.riotinto.com/coalaustralia).

In 2013, 410 blast events were initiated at MTW during the reporting period. 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.

6.4.7 Sleep disturbance

Of the submissions of objection related to noise and vibration matters, 14 per cent (representing three per cent of the total submissions of objection) raised concerns regarding sleep disturbance due to activities associated with the proposal.

Section 9.4.3 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 contaminated with 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, four per cent (representing one per cent of the total submissions received in objection) were concerned 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 Agvice 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.

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

6.5.1 Introduction

The assessment of potential air quality and greenhouse gas impacts resulting from the proposal was summarised in Chapter 10 of the EIS, and presented in full in Appendix G.

A total of 95 submissions in objection referenced air quality and greenhouse gas matters, representing 45 per cent of objectors.

Matters raised comprised existing dust levels and MTO contribution, increase in dust impacts – particularly with PM_{10} and $PM_{2.5}$ and cumulatively, health impacts and greenhouse gas impacts. Submissions also raised concerns with dust generation from Loders TSF if it is not managed adequately.

The number of submissions received on matters relating to air quality and greenhouse gas is shown in Figure 6.5. 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 95.

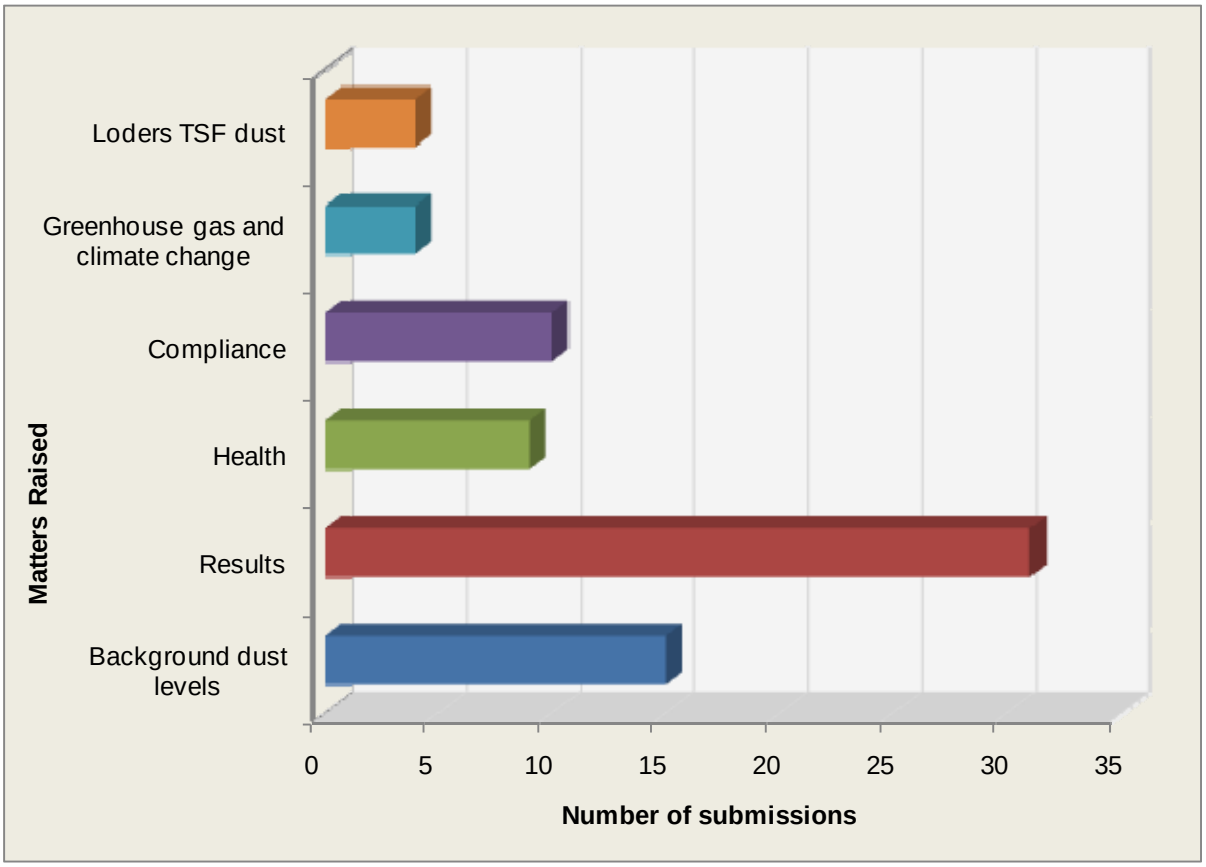


Figure 6.7 Air quality matters raised within submissions of objection

6.5.2 Background dust levels and criteria

Of the submissions of objection related to air quality and greenhouse gas matters, 19 per cent (representing nine 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 10 micrometres (µm) or less (PM_{10}) or 2.5µm or less ($PM_{2.5}$).

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 EPA applies these criteria to assess the potential for impacts for similar projects).

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.

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 10.1 of the EIS) including 12 Tapered Element Oscillating Microbalances (TEOMs), 11 High Volume Air Samplers (HVAS) measuring either TSP or PM_{10}, 13 dust deposition gauges and three NO_2 monitors. A summary of the available and reviewed ambient monitoring data relevant to the proposal is provided below:

- Annual average PM_{10} concentrations are below the relevant criterion of 30µg/m³.
- Maximum 24-hour average PM_{10} 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 PM_{10} 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/m^2/month.
- Maximum daily 1-hour average NO_2 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, 85 per cent (representing 38 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;
- PM_{10} predictions;

- cumulative impacts; and
- amenity, including impacts to rainwater tanks.

i Influence of Saddleback Ridge

This matter is specific to the Warkworth Continuation 2014 application and is addressed in Section 6.5 of the Warkworth RTS.

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 10.3.2.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 (2013) 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. This is shown in Figure 6.8.

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 PM_{10}

Submissions stated that the proposal would result in unacceptable impacts from PM_{10} emissions, particularly at Bulga village.

Contrary to the matter raised, modelling predicts that the proposal would not result in unacceptable impacts from PM_{10} emissions, particularly at Bulga village.

As described in Section 10.3.2 of the EIS, modelling predicts no exceedances of PM_{10} 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 PM_{10}. 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. It should be noted that MTO's contribution to annual average PM_{10} dust levels at these locations is very low with the predicted increment from the proposal of up to 1 µg/m³.

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, exceedances of cumulative PM_{10} criteria are not predicted to occur at locations near Bulga under the proposal.

Cumulative impacts have potential to occur further to the north and north-west of MTO as the mining activity proposed as part of the Warkworth Continuation 2014 proposal 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 10.2 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 or 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, PM_{10} 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 PM_{10}; a series of TEOM monitors that transmit live data (PM_{10}) to site personnel via the SCADA system; and

- three 'early warning unit' DusTrak PM_{10} monitors, located adjacent to existing mining operations, which function as supplementary monitors to alert MTO 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 PM_{10} monitoring units, are used to inform the operation of potentially adverse weather conditions. Following receipt of an alarm the shift coordinator would 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. This is shown in Figure 6.6.

As discussed in Section 6.5.5 below, MTO 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 non-discretionary standard with respect to cumulative air quality impacts is met 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. Similarly, the Mining SEPP's non-discretionary standard with respect to air blast overpressure is met for all privately-owned assessment locations not already in a zone of acquisition from MTO or other mines.

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 amenity may be impacted even when deposited dust and TSP are below criteria.

As described in Section 10.3 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.

Notwithstanding the above, as previously noted, the applicant has committed to the establishment of a Near Neighbour Amenity Resource to provide support to residents surrounding the operation for specific amenity concerns identified by individual residents. It is important to note that this resource is not for compliance purposes and may include cleaning domestic-use rainwater tanks upon request from near neighbours.

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, 19 per cent (representing nine 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.

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 10.2.2i 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 10.3.2iv 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 smoke warrants close attention in any evaluation of health impact as it can be a significant, highly localised source of toxic pollution in the winter period for rural communities and individuals. 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 PM_{10} samples, rather than $PM_{2.5}$. The study however focused on the finer $PM_{2.5}$ particles (as opposed to PM_{10}) '…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 PM_1 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 6.6, and show the lowest readings recorded in the Hunter Valley.

A good example of this can be seen by examination of the PM_{10} 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 PM_{10} 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, 17 per cent (representing eight per cent of the total submissions of objection) stated that current operations do not comply with dust criteria.

Contrary to assertions regarding compliance, as discussed in Section 10.2.3 of the EIS, the recent compliance history of MTW as reported in 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.

6.5.6 Greenhouse gas and climate change

Of the submissions of objection related to air quality and greenhouse gas matters, 53 per cent (representing 24 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 0.559 Mt CO_2-e (Scope 1 and 2) which represents approximately 0.1 per cent and 0.35 per cent of Australia's and NSW's emissions, respectively.

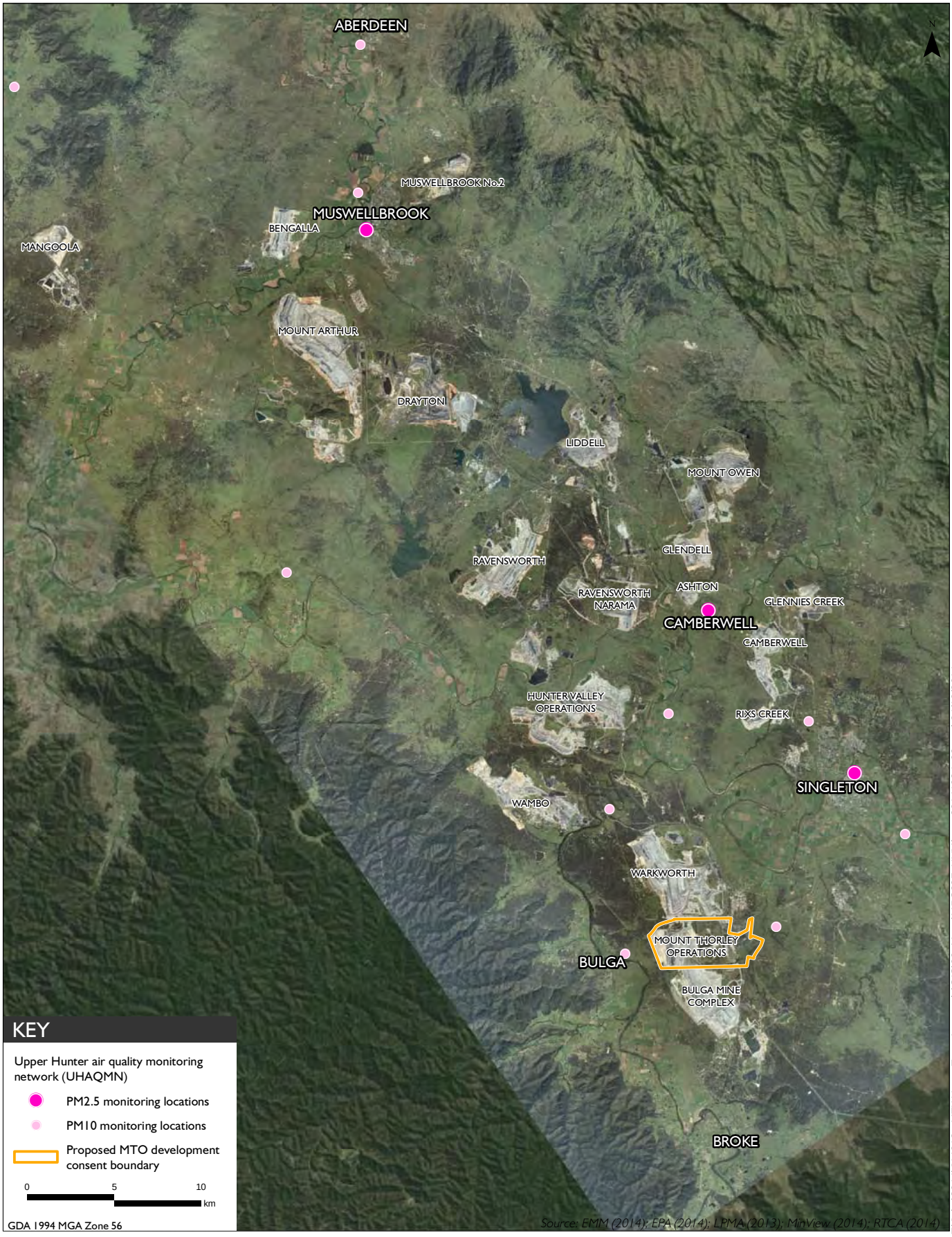
Existing energy saving and greenhouse gas emission reduction measures and projects will continue to be implemented at MTW under the proposal. These include a detailed energy monitoring programme, monitoring electricity and diesel usage on-site to identify the main sources of greenhouse gas emissions 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.

6.5.7 Loders tailings storage facility

Of the submissions of objection related to air quality and greenhouse gas matters, three per cent (representing one per cent of the total submissions of objection) related the use of the completed Loders Pit as a TSF, if not rehabilitated, would generate airborne dust pollutants in the vicinity of Bulga village for the life of the operation and beyond.

As described in the EIS, Loders Pit is scheduled to start receiving tailings in approximately 2026 (subsequent to the indicative Year 9 mine plan presented in the EIS). The Loders TSF will be designed to regulatory standards and managed in accordance with best practice to minimise impacts, including those of dust generation. As illustrated in Figures 2.9 and 2.10 of the EIS, it is incorrect to assert that the entire Loders Pit will be used as a TSF. The use of the facility and subsequent remediation will be integrated into the rehabilitation activities occurring at MTO and will need to be completed prior to relinquishment of the site.

The TSFs are a primary operational domain whose rehabilitation objectives are defined in the MOP. Information is to be provided on the key issues that pertain to their management with the objectives clearly describing the outcomes required to achieve the post mining landuse goal for the site. The management of TSFs is a balance between letting them dry out to enable machinery access to undertake rehabilitation, against the management actions to minimise any dust generation. In practice, tailings are applied in thin layers with sufficient time between applications to allow for the moisture within the tailings to drain and for the tailings to consolidate. Given this, TSFs are not typically large contributors to airborne dust pollutants that need to be intensively managed onsite.



COAL & ALLIED
Managed by Rio Tinto Coal Australia

Proximity of UHAQMN PM10 and PM2.5 monitors to populated areas

Mount Thorley Operations 2014
Response to Submissions

Figure 6.8

6.6 Economics

6.6.1 Introduction

The economic study of the proposal was summarised in Chapter 8 of the EIS, and presented in full in Appendix E of the EIS.

A total of 27 submissions in objection referenced economic matters, representing 13 per cent of objectors.

Matters raised included concerns regarding 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 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 27.

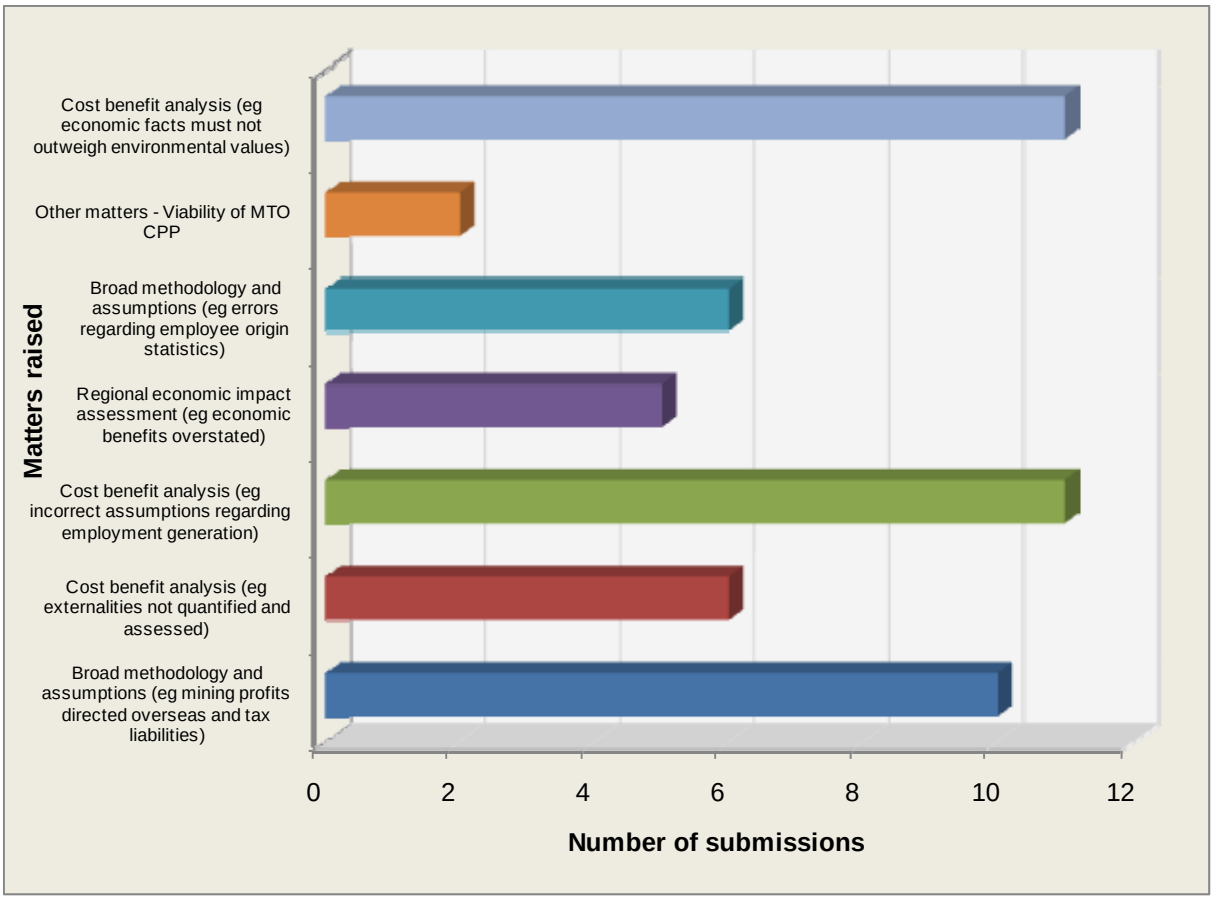


Figure 6.9 Economic matters raised within submissions of objection

6.6.2 Broad methodology and assumptions

i Criticism that the benefits have been overstated

Of the submissions of objection related to economic matters, 19 per cent (representing two 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 assessment 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. Whilst the submissions referenced matters related to the Warkworth Continuation 2014 proposal, the matter is relevant to the assessment methodology undertaken for the subject proposal.

To address the criticisms raised regarding the economic study for the Warkworth Extension 2010, the current assessment used different methodologies and assumptions. The CBA concludes that in NPV terms, the continuation of operations at MTW would deliver direct net benefits to NSW of almost A$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 last application was for Warkworth Mine only and did not consider MTO;

- 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, 41 per cent (representing five 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 expansion 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 MTO, Warkworth Mine or both operations (the combined MTW complex). 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: * numbers were rounded down to 1,300 throughout the EISs.*

v Clarification of employee residential location data

Of the submissions of objection related to economic matters, 22 per cent (representing three 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 Rio Tinto Coal Australia 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

LGAs	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 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 4.10.5 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 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 A$49 million per year from 2015 to 2030.
    - This total of $320million is roughly equal to the average per year (A$49million) over the 20 years (2015 to 2035), with 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 A$0.7 million 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 41 per cent (representing five 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 A$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, 41 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 MTO and Coal & Allied. 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 seven 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.

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 consent timeframes are reached. As noted in Section 1.1, MTO's existing development consent expires in 2017, which would inhibit the ability to complete extraction of the remaining 28.6Mt of ROM coal approved to be extracted and remove and receive overburden material to emplace to complete the final landform. 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, almost three quarters of these would reside in the Mid and Upper Hunter region, and approximately one 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, 19 per cent (representing two 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 the economic models are a tool only to assist the consent authority in respect of determining 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 (from MTO only) are estimated at:

- A$39million in additional income (in NPV terms);
- additional annual employment of around 15 full-time equivalent workers; and
- a contribution to the GSP of NSW of around A$45million in NPV terms.

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 A$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).

6.6.5 Other matters

One submission contended that the MTO CPP is reaching the end of its useful life and the replacement and continued operation to benefit WML operations would be impractical and an uneconomic investment by MTO.

The financial viability of the proposal or aspects thereof, is a risk assumed by the private owners of MTO and Warkworth Mine, and related assumptions concerns the expectations of the owners as to the future financial performance of the mine and are commercial in confidence. The proposal includes an upgrade to the MTO CPP to increase its throughput to 18Mtpa. This is an integral component of the proposal and a necessary investment by MTO. 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.

6.7 Social

The assessment of potential social impacts resulting from the proposal was summarised in Chapter 20 of the EIS, and presented in full in Appendix M. As described in Section 1.2 of this report, submissions that reference the broader MTW where it relates to MTO have been responded to. Submissions that raised social matters predominantly referenced MTW rather than MTO specifically. Therefore, this section responds to social matters in context of MTW.

A total of 173 submissions in objection referenced social matters, representing 82 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 173.

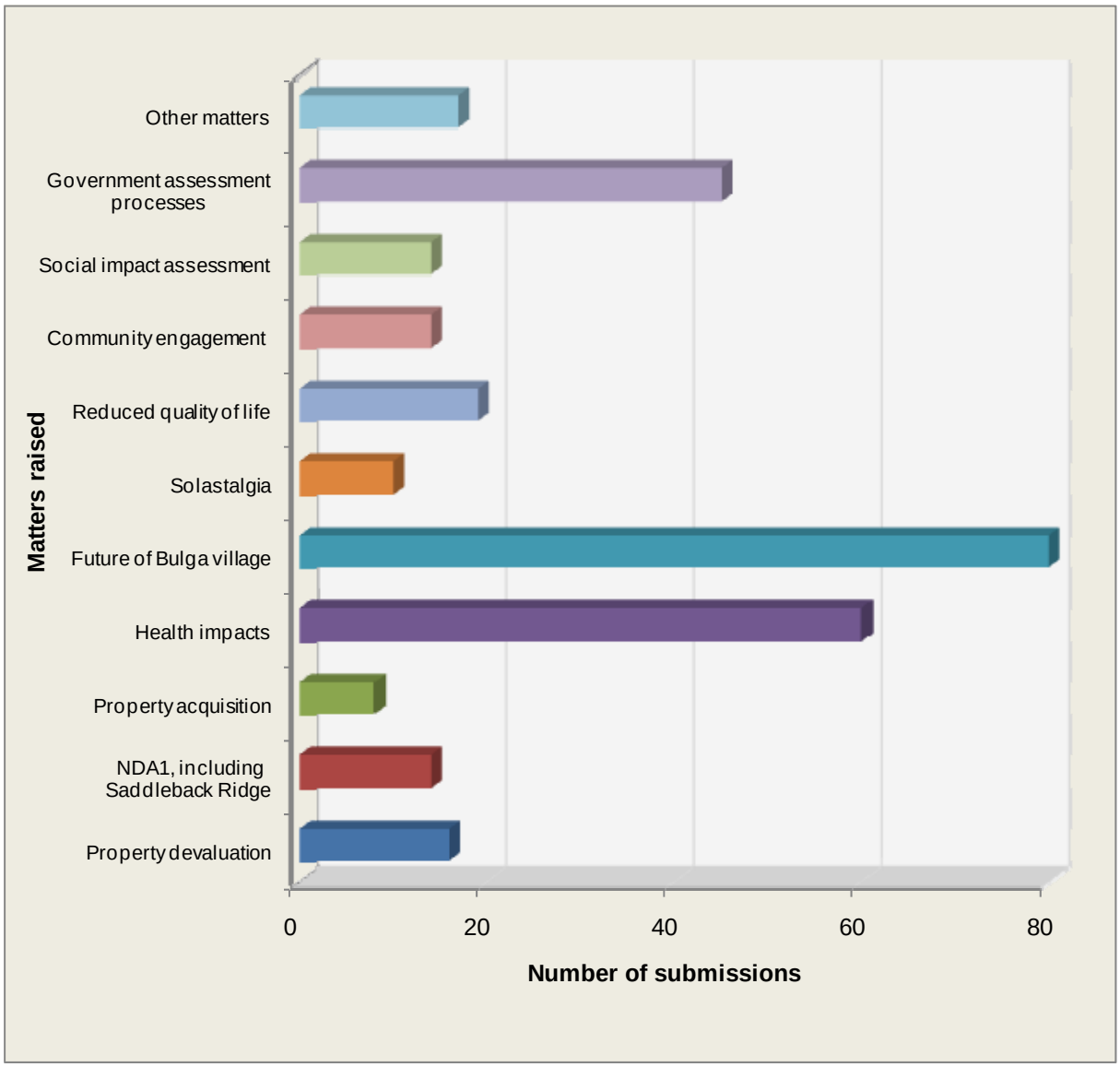


Figure 6.10 Social matters raised within submissions of objection

6.7.1 Property devaluation

Of the submissions of objection related to social matters, nine per cent (representing eight 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 6.7.3 of this report.

Submissions of objection raised as an issue the concern that all properties in Bulga have been devalued by the proposals 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 proposals were 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 proposals (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. While an individual property's value is influenced by its location, it is also influenced by these other factors.

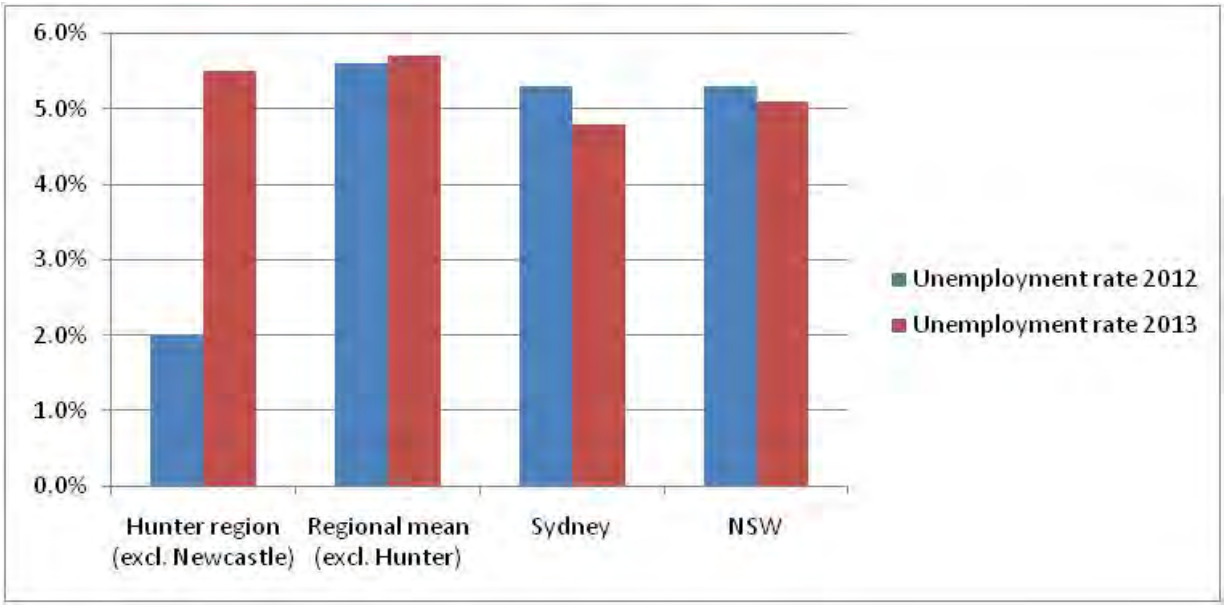
Intuitively, the strength of the mining sector, which provides the highest levels of employment in the region, would be an influencing factor in property sale and rental markets in the Singleton LGA. This matter was commonly raised in submissions in support of the proposal. When the mining sector is robust, property values and rental returns increase in response to increased demand. For example, between September 2009 and September 2010 when the industry was buoyant and number of growth projects had been tabled, median house prices increased by 21.9 per cent (ABS 2014a).

Comparatively, median house prices in other NSW regional areas increased by 9.27 per cent during this period. The lower increase was also reflected in the median house price increases in Sydney which increase by 11 per cent during this period, approximately 12 per cent less than in the Singleton LGA (ABS 2014b).

Concurrent with the mining slowdown and resultant increased rate of unemployment across the Singleton LGA, 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.



Source: Montoya D 2013, Economic indicators: NSW regional labour force trends, Statistical Indicators 3/2013. NSW Parliamentary Research Service.

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 BOP, 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 (2012) analysis and Umwelt (2013) assessment, sourced from the NSW Government Land and Property Information Division, shows there has not been a marked decrease in sales prices, nor the average number of sales from January 2008 and August 2014, shown in Figure 6.12. The median price of sales in Bulga from January 2008 and August 2014 and the number of land and property sales in Bulga annually are 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

MTO acknowledges the importance of retaining value in property in areas surrounding the 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.

6.7.2 Non-disturbance Area 1, including Saddleback Ridge

Of the submissions of objection related to social matters, eight per cent (representing seven 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.

This matter is not relevant to the proposal as it refers explicitly to the Warkworth Continuation 2014 proposal. This matter is considered in Section 6.8 of the Warkworth RTS.

6.7.3 Property acquisition

Of the submissions of objection related to social matters, five per cent (representing four 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. The results predict that no additional properties would exceed acquisition criteria.

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 and 6.5 of this report, respectively.

ii Compensation

It is anticipated that any new development consent for the MTO 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 MTO and Warkworth Mine development 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.

It should be noted that whilst it is not relevant to the proposal, in undertaking individual discussions with respective property owners, Coal & Allied's intention is to reinstate residents' voluntary acquisition rights, subject to approval of the Warkworth Continuation 2014 proposal. This would 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 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.

6.7.4 Health impacts

Of the submissions of objection related to social matters, 35 per cent (representing 28 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 20.5 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.

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.

6.7.5 Future of Bulga village

Of the submissions of objection related to social matters, 46 per cent (representing 38 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 were generally linked to the Warkworth Continuation 2014. However, for completeness, these have also been 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 those already within, or inferred to be in, zones of affectation for mining operations (assessment locations 77, 102, 149 and 264). 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.

ii Sustainability of Bulga

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

As reported in Table 20.5 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 6.7.1 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 west of 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 proposals 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 five years ago and/or one 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 proposals 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.

MTO 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.

6.7.6 Solastalgia

Of the submissions of objection related to social matters, six per cent (representing five 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 E 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 loss when discussing their connections to home, community, family and the rural environment, and that these connections may be lost as a result of the proposals.

A ‘loss of sense of place’ is a concern of some Bulga residents. As stated in Table 20.5 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. MTO 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 Warkworth Extension 2010 was announced which indicates that the community will continue to evolve with new people moving into the community as others leave. MTO 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) and others including contractors and suppliers who would lose business and potentially have to leave the region if the proposals were 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 proposals 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.

6.7.7 Reduced quality of life

Of the submissions of objection related to social matters, 11 per cent (representing nine 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 those already within, or inferred to be in, zones of affectation for mining operations (assessment locations 77, 102, 149 and 264). Notwithstanding, it is recognised that near neighbours of MTO perceive 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. 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.

As described, MTO 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. This would further assist in avoiding potential dust impacts.

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 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.

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, site-specific visual assessments (SSVAs)) would be available to individual landowners and MTO 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 continuation of an existing operation 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.

6.7.8 Community engagement

Of the submissions of objection related to social matters, eight per cent (representing seven 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 adjacent Warkworth Mine proposal to mine through NDA1 (including Saddleback Ridge). One submission contended that the development application, lodged concurrently with that of WML's, 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 2014.

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, however, that Singleton residents provided the most submissions on the proposal with 116 submissions originating from the Singleton LGA. As detailed in Section 3.3.1 of this report, approximately 75 per cent of submissions originating from the Singleton LGA being in support of the proposal.

As described in Section 7.5.7 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 20.5 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 related to the Warkworth Continuation 2014 proposal and not relevant to the subject proposal. This matter is addressed in the Warkworth RTS.

Coal & Allied is committed to continuous improvement across all aspects of its business, including stakeholder engagement. It is recognised that near neighbours of MTO perceive 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. 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. Coal & Allied/MTO 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.

6.7.9 Social impact assessment

Of the submissions of objection related to social matters, eight per cent (representing seven 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 MTO only, being 'approximately 121 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 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 SIA.

iii MTW employees' residing LGAs

Several submissions contended 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 Rio Tinto Coal Australia 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
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%**

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 that '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 C 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.

With near neighbours (which consisted primarily of Bulga residents) accounting for 44 per cent of respondents to the SIA, it is difficult to give the above claims that the Secretary's requirements were not met much credence. Residents of Bulga were clearly the highest stakeholder group that participated in the SIA consultation and, 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 20.6 in Chapter 20 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 20.5 of the EIS and Appendix C 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.

6.7.10 Government assessment process

Of the submissions of objection related to social matters, 26 per cent (representing 21 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 20.5 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.

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.

6.7.11 Other matters

Of the submissions of objection related to social matters, 10 per cent raised social matters that were beyond those categorised in the preceding sections were raised (representing eight 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

This matter is not relevant to the proposal as no proposed spatial extension is contemplated within the development application. This matter refers to the Warkworth Continuation 2014 application and is addressed in Section 6.7.12 of the Warkworth RTS.

ii Contravention of court rulings

As described in Section 6.2, the proposal is a separate development application lodged by a different applicant and is a different project as the Warkworth Extension 2010. As MTO and Warkworth Mine are integrated at an operational level, the refusal of the Warkworth Extension 2010 proposal impacted on MTO. The development application was, however, for Warkworth Mine not MTO.

As described in Section 2.3 of the EIS, the outcomes of the L&E Court judgment where relevant to the proposal were adopted for the assessment undertaken and these were referenced in the EIS (for example, noise and vibration and economic studies). In this regard, the proposal is consistent with the relevant outcomes of the L&E Court judgment.

iii Agriculture and food security

The footprint of the proposal has already been cleared under the existing development consent. The proposal would not adversely impact agriculture and food security (refer also to Section 4.6 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 contended that MTO 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 relevant criteria and reported publically in monthly and quarterly reports and Annual Reviews on Coal & Allied's website. Results from supplementary monitoring programmes are also publically reported on Coal & Allied's website.

Noise and dust monitoring results are publically available and, therefore, considered transparent.

6.8 Ecology

6.8.1 Introduction

Chapter 11 of the EIS contains a summary assessment of biodiversity impacts according to government policies for major projects and prescribed mitigation for the proposal.

A total of 71 submissions in objection referenced ecology matters, representing 34 per cent of objectors.

Matters raised on ecology related to the adequacy of the Biodiversity Offset Strategy, impacts to WSW, re-establishment of WSW from Warkworth Sands Grassland, 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 71.

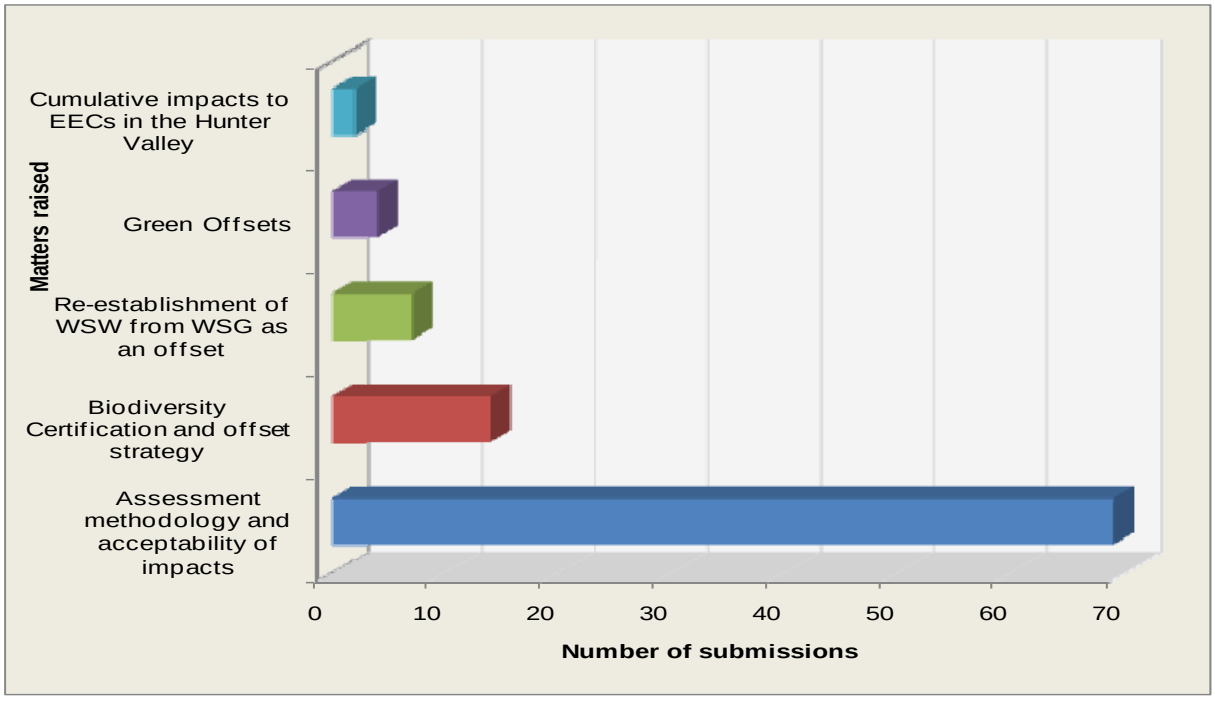


Figure 6.13 Ecological matters raised within public submissions of objection

6.8.2 Impacts of the proposal on ecology

Matters raised in relation to ecology are associated with the disturbance of the Warkworth Continuation 2014 proposal and, accordingly, have been addressed in the Warkworth RTS. These matters are not considered further in this report.

The proposal will not result in additional vegetation clearance and will not introduce ecological impacts to those already assessed and approved under the development consent. The proposal is expected to improve the biodiversity values of the regional area, as rehabilitation is further developed and implemented across the site.

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 19 of the EIS, and presented in full in Appendix L.

Matters raised in a number of submissions included 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 submissions received on matters relating to traffic and transport is shown in Figure 6.14. A total of 15 submissions referenced traffic and transport matters, representing seven per cent of objectors. It is noted that a number of submissions referenced more than one traffic matter and, therefore, the number of matters raised as shown in Figure 6.14 totals more than 15.

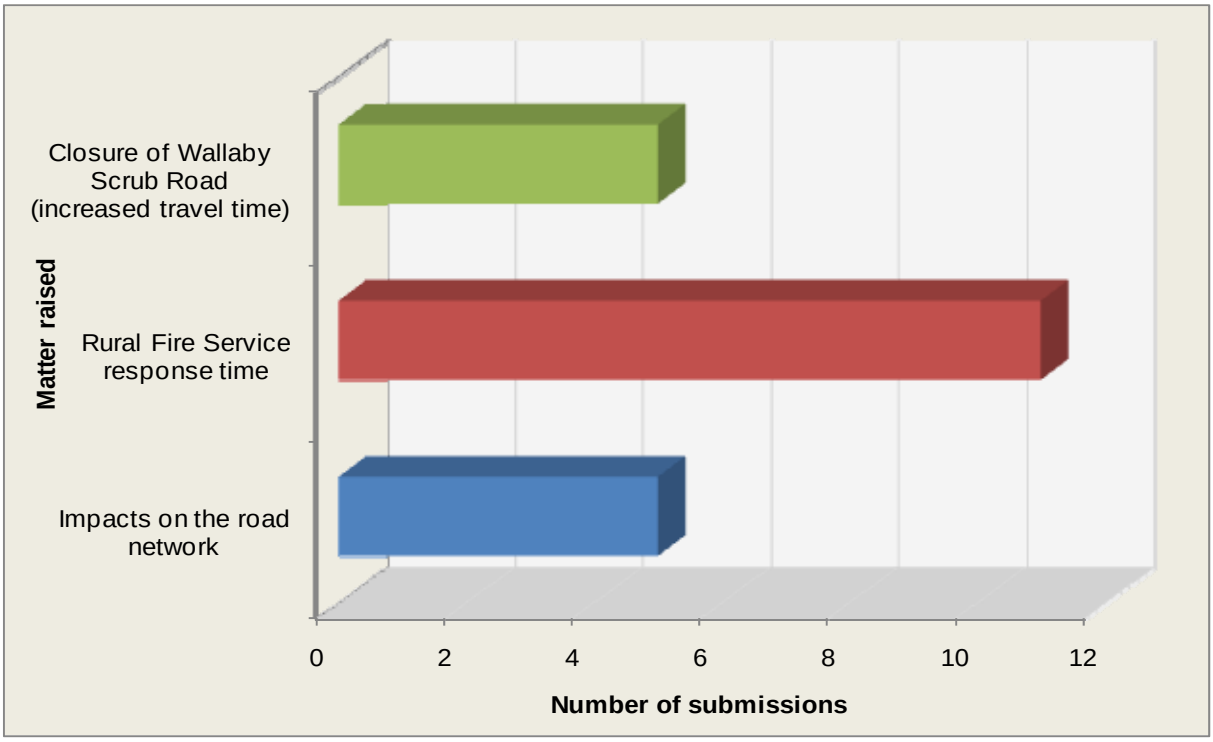


Figure 6.14 Traffic and transport matters raised within submissions of objection

The MTO and Warkworth Mine workforces and coal transport are integrated across MTW and, therefore, impacts of the proposal on the Putty Road and Golden Highway intersection are considered below. Matters raised in relation to the closure of Wallaby Scrub Road are relevant to the Warkworth Continuation 2014 proposal and are considered in the Warkworth RTS.

6.9.2 Impacts of the proposal on the Putty Road/Golden Highway intersection

Of the submissions of objection related to traffic and transport matters, 33 per cent (representing two per cent of the total submissions of objection) were concerned with the potential traffic impacts resulting from the continued operation of MTW, predominantly through workforce traffic movements from both MTO and Warkworth Mine. These submissions stated that traffic movements (inclusive of the detoured traffic from the closure of Wallaby Scrub Road as part of the Warkworth Continuation 2014 proposal) 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 and transport 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.

As part of the Warkworth Continuation 2014 proposal, a Road Closure Implementation Plan for Wallaby Scrub Road is a key mitigation measure. The plan would include strategies to minimise the potential traffic and road safety impacts of the closure.

6.10 Historic heritage

6.10.1 Introduction

The assessment of potential historic heritage impacts resulting from the proposal was summarised in Chapter 18 of the EIS.

Matters raised comprised concerns regarding the identified impacts on 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 6.15. A total of 10 submissions in objection referenced heritage matters, representing five per cent of objectors. 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 6.15 totals more than 10.

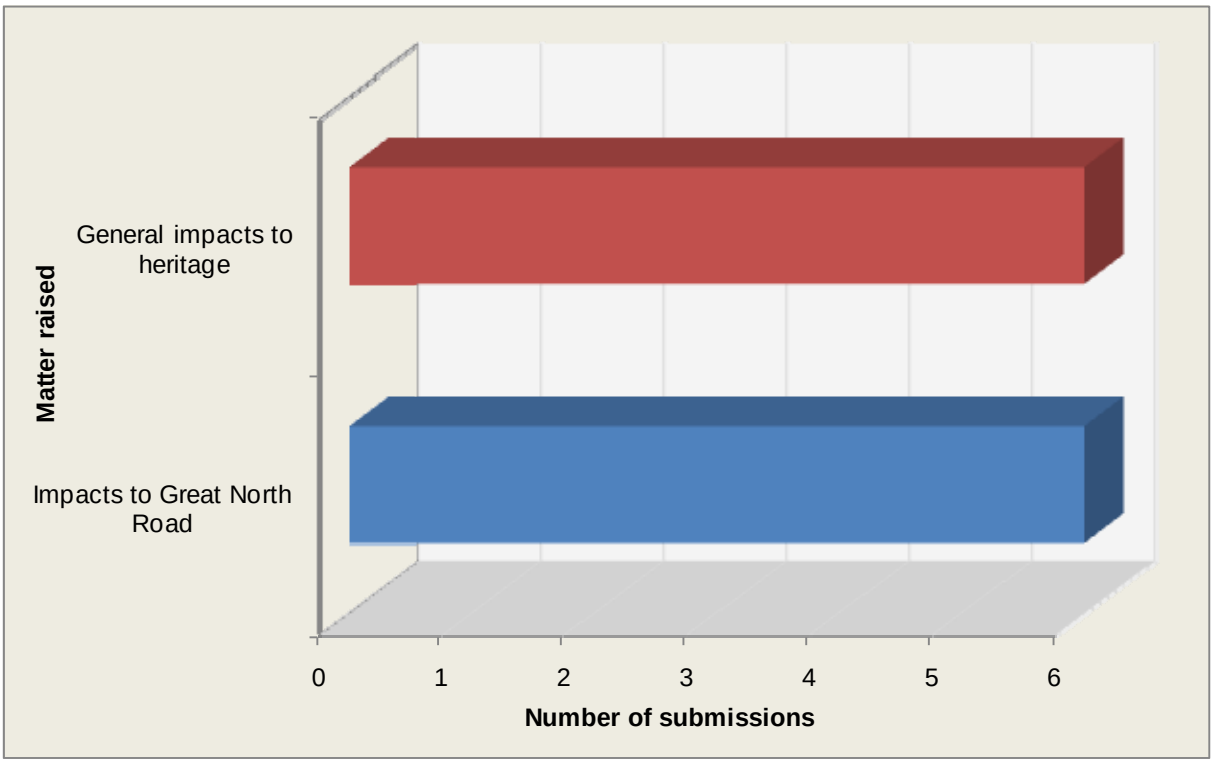


Figure 6.15 Historic heritage matters raised within submission of objection

6.10.2 Impacts of the proposal on historic heritage

The proposal will not result in any disturbance beyond currently approved limits.

Matters raised in relation to historic heritage are associated with the disturbance of the Warkworth Continuation 2014 proposal and, accordingly, have been considered in the Warkworth RTS.

6.11 Groundwater

6.11.1 Introduction

The assessment of groundwater impacts resulting from the proposal was provided in Chapter 15 of the EIS. The groundwater study was presented in full in Appendix I.

A total of 55 submissions in objection referenced groundwater matters, representing 26 per cent of objectors.

Matters raised were generally related to MTW and comprised 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 6.16. 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 6.16 totals more than 55.

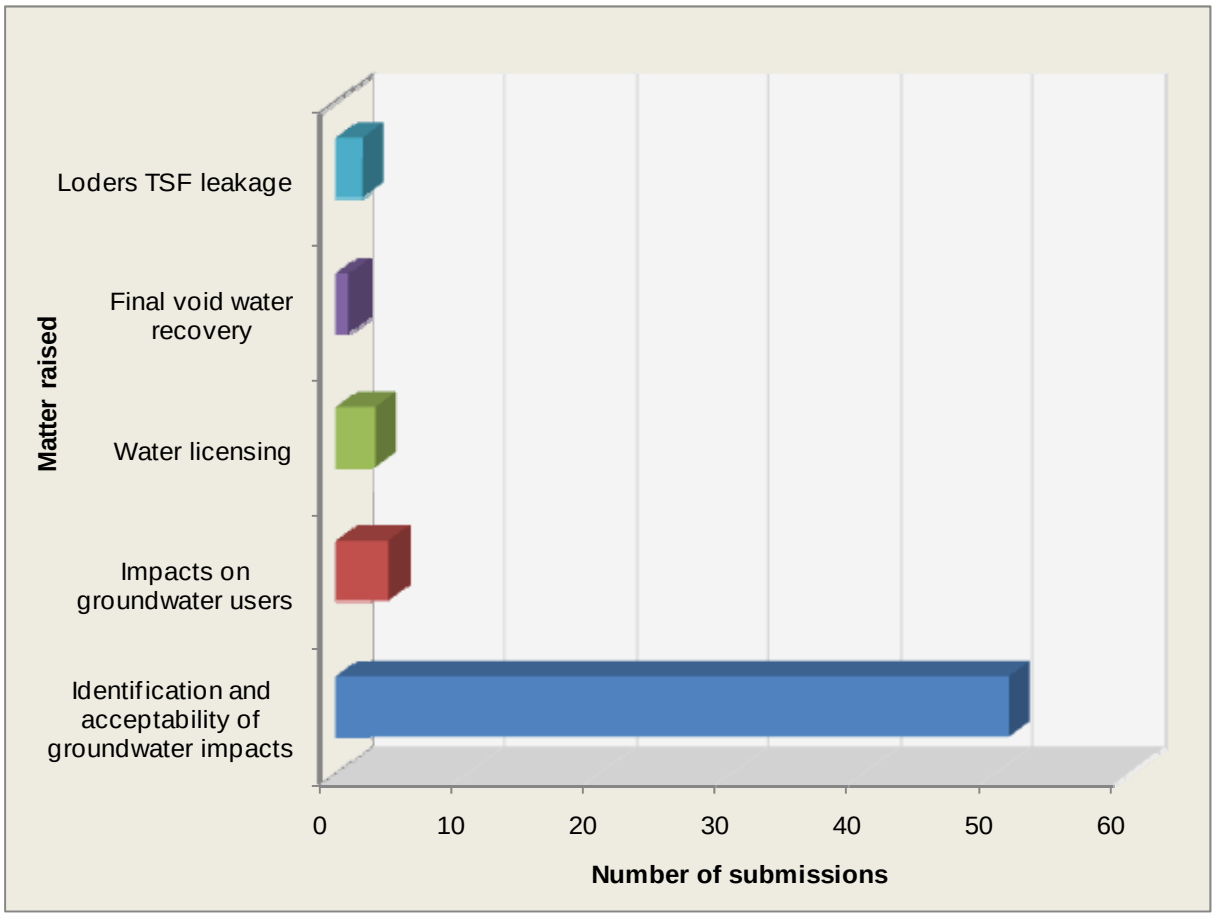


Figure 6.16 Groundwater matters raised within submissions of objection

6.11.2 Identification and acceptability of groundwater impacts

Of the submissions of objection related to groundwater, 93 per cent (representing 24 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 model was able to generally replicate the trends in groundwater levels and impacts on the groundwater regime that have been observed adjacent to the mining areas. It therefore is a suitable tool to project future impacts on the groundwater regime. The groundwater study was focussed to address the Aquifer Interference Policy (AIP) as required by the Secretary's requirements.

An uncertainty analysis undertaken of 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 is fully described in Appendix D of the groundwater study.

Further, the groundwater study was 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.

6.11.3 Impacts on groundwater users

Of the submissions of objection related to groundwater matters, seven per cent (representing two 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 5.3 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 are to reduce by less than 2m due to the proposal (see Figure 5.5 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 on private groundwater users as a result of the proposal.

With regard to the predicted impacts on non-mine owned water supply bores, the modelling indicates that there are no predicted impacts of over 2m on water supply bores in alluvium or Permian.

6.11.4 Final void water recovery

Of the submissions of objection related to groundwater matters, two per cent (representing less than one per cent of the total submissions of objection) referenced final void water quality and recovery. A submission from Bulga Coal Management noted that the groundwater modelling did not take account of the final void for the BOP. These matters are addressed in the following sub-sections.

i Water recovery

As described in Section 15.3.2 of the EIS, the proposal includes backfilling the Loders Pit void to the approximate height of the ground surface in the vicinity of the levee in the south-west corner of the lease. Groundwater, surface runoff and rainfall inflows would slowly fill the backfilled void forming a watertable within the backfilled area and potentially breaking through as a window lake in the lowest lying areas. As the water body begins to form in the backfilled depression, the rate of groundwater inflow to the dewatered area would slow and eventually a state of equilibrium would occur where inputs are balanced by outputs and the water level would stabilise. The water level would be influenced by the balance of groundwater seepage, surface water runoff and infiltration with losses from evaporation. The rate of recovery would be dependent on rainfall (for example, several wet years would reduce the time for groundwater aquifers to recover). Groundwater levels within the backfilled depression are modelled to recover within about 200 years to the final landform surface.

The mounded groundwater or ponded open water in the backfilled depression in Loders Pit was calculated to have a median salinity of 3,000µS/cm. As discussed in this section, the outflow of this water to the Wollombi Brook alluvium is not considered a salinity risk under the AIP.

ii BOP void

Regarding the final void for the BOP, at the time the groundwater model was developed for MTO, no information on the Bulga Coal Complex mining progression and final void as proposed under the BOP were available. Notwithstanding, the inclusion of the Bulga Coal Complex lake in the model would not alter the relevant conclusion of the groundwater assessment: the beneficial use of the alluvial aquifer will not be impacted.

As discussed previously, this is because at closure a lake would form in the planned open void at the Bulga Coal Complex, with evaporation from the lake surface drawing in groundwater from the interconnected spoils heaps. This would reduce groundwater levels within the spoils and the potential for seepage into the alluvium as groundwater is drawn towards the Bulga Coal Complex void lake. The net effect of this is that the Bulga Coal Complex/MTO spoil behaves as more of a sink in the local groundwater environment than simulated by the MTO groundwater model, reducing the potential of the spoils to form a seepage source to the alluvium.

iii Water quality

As described in Section 4.4.2, there are several reasons why there no significant potential for seepage from the spoil and tailings to degrade the beneficial use of the Wollombi Brook alluvium. Firstly, the MTO groundwater model was a worst case scenario that is considered to have conservatively over predicted the potential for flow of water from the spoil to the alluvium. Secondly, a buffer of clay bound alluvium exists between the mining area and the highly productive groundwater that is not evident in published mapping of the alluvium (refer to Figure 4.4). Finally, an engineered structure being the Charlton Levee at the limit of disturbance at the western margin of MTO and will reduce interconnectivity with the alluvium. Even if seepage does occur all the available data indicates the seepage will be fresher than the water within the adjacent alluvium aquifer, indicating an improvement, not degradation in water quality. This is described in Section 15.3.2viii of the EIS.

6.11.5 Loders tailings storage facility

Of the submissions of objection related to groundwater matters, four per cent (representing one per cent of the total submissions of objection) raised concern regarding the construction of the Loders TSF on an elevated area with potential for leakage to surrounding areas.

The proposed Loders TSF will not be located in an elevated position. The north-western end of the Loders Pit void will be used for emplacement of tailings. The final capped level of the TSF is proposed at or close to surrounding ground level. The TSF itself will be capped on completion with suitable low permeability material to retard the infiltration of rainfall into the TSF itself.

6.11.6 Water licensing

Of the submissions of objection related to water matters, five per cent (representing one per cent of the total submissions of objection) referenced the applicant's ability to licence water take predicted under the proposal.

The proposal relates to already approved mining activities that are not able to be extracted under the current consent timeframe due to pit inundation in 2007.

Water sources relevant under the proposal are described in Section 6.12. Table 15.1 of 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.

6.12 Surface water

6.12.1 Introduction

The assessment of surface water impacts resulting from the proposal was provided in Chapter 16 of the EIS. The surface water study was presented in full in Appendix J.

A total of seven submissions in objection referenced surface water matters, representing three per cent of objectors.

Matters raised included increases in water catchment and operation of the HRSTS and impacts associated with illegal discharges on the natural wetland downstream of the mine.

The number of times the surface water related matters were raised in objection is shown in Figure 6.17. 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 6.17 totals more than seven.

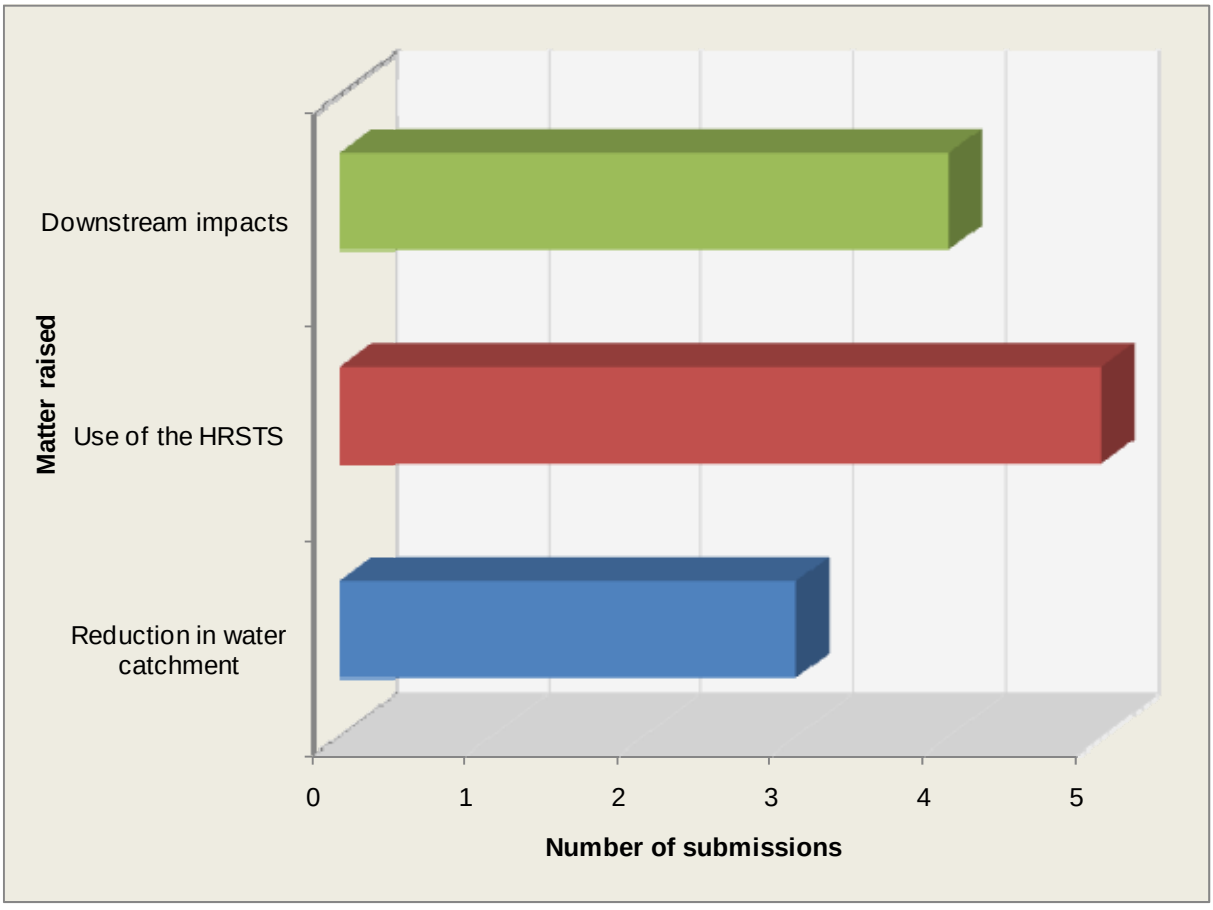


Figure 6.17 Surface water matters raised within submissions of objection

6.12.2 Reduction in water catchment

Of the submissions of objection related to surface water matters, 43 per cent (representing one per cent of the total submissions of objection) referenced the increase the disturbance of the water catchment under the proposal.

As stated in Section 4.3 of the surface water study (EIS Appendix J), 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 surface water study as less than 1 per cent.

The maximum total catchment area captured within the MTW WMS during the proposal is 10.5km^2 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 would be restored to 99.96 per cent of its pre-mining area. The final landform would capture 8.6km^2 or 0.44 per cent of the Wollombi Brook catchment to the confluence of the Hunter River.

6.12.3 Use of Hunter River Salinity Trading Scheme

Of the submissions of objection related to surface water matters, 71 per cent (representing two 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.

MTO currently has approval to discharge under the rules of the HRSTS and the proposal includes an upgrade to the approved discharge point at MTO (Dam 9S) to increase the maximum discharge rate from 100 ML/d to 300ML/d.

The modelling rules for HRSTS discharges used for the proposal 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 Loders 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 16.5.1 of the EIS.

Controlled releases of saline water under the HRSTS may impact:

- on the total flow volume in the Hunter River;
- on stream condition, including bank erosion; and
- water quality.

These potential impacts are discussed further below.

i Hunter River flow volumes

As reported in Section 16.4.5 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 would be less than 300ML/day (3,500L/s) from Dam 9S to Loders Creek (increased rate of discharge from current approval).

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 MTO and Warkworth Mine, 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. Coal & Allied would consider such approach should a corresponding condition be included in the Bulga Coal Complex development consent to ensure an equitable share.

6.12.4 Downstream impacts on the natural wetland

Of the submissions of objection related to surface water matters, 57 per cent (representing two per cent of the total submissions of objection) raised concerns regarding the impact on the downstream natural wetland including the impact of illegal discharges.

As described in Section 16.4.3 of the EIS, the results of the water balance modelling indicate that, under the current model assumptions and configuration, no uncontrolled release of saline water will occur over the life of the proposal. Excess saline water will be released in accordance with the existing rules of the HRSTS. There would be no downstream impacts (including impacts to the wetland) as salinity would be in accordance with the acceptable limits under the HRSTS and managed through the implementation of the measures described in Section 16.5 of the EIS.

The proposal includes an upgrade to the approved discharge point at MTO to increase the maximum discharge rate. The results of the water balance modelling indicate that there is a low risk of the MTW WMS accumulating water over the 21 year life of the proposal and, therefore, a low risk of unlicensed discharges occurring.

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 N.

A total of nine submissions in objection referenced rehabilitation matters, representing four per cent of objectors.

Matters raised included the mine's current performance and lack of adherence to rehabilitation, the disturbance of land that had already been rehabilitated as a result of the proposal, and that rehabilitation should occur immediately after the mine ceases in five years. Inconsistencies in the EIS in relation to rehabilitation were also identified. Other matters were raised in relation to the composition of the final landform.

The number of times the rehabilitation related matters were raised in objection is shown in Figure 6.18. 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 6.18 totals more than nine.

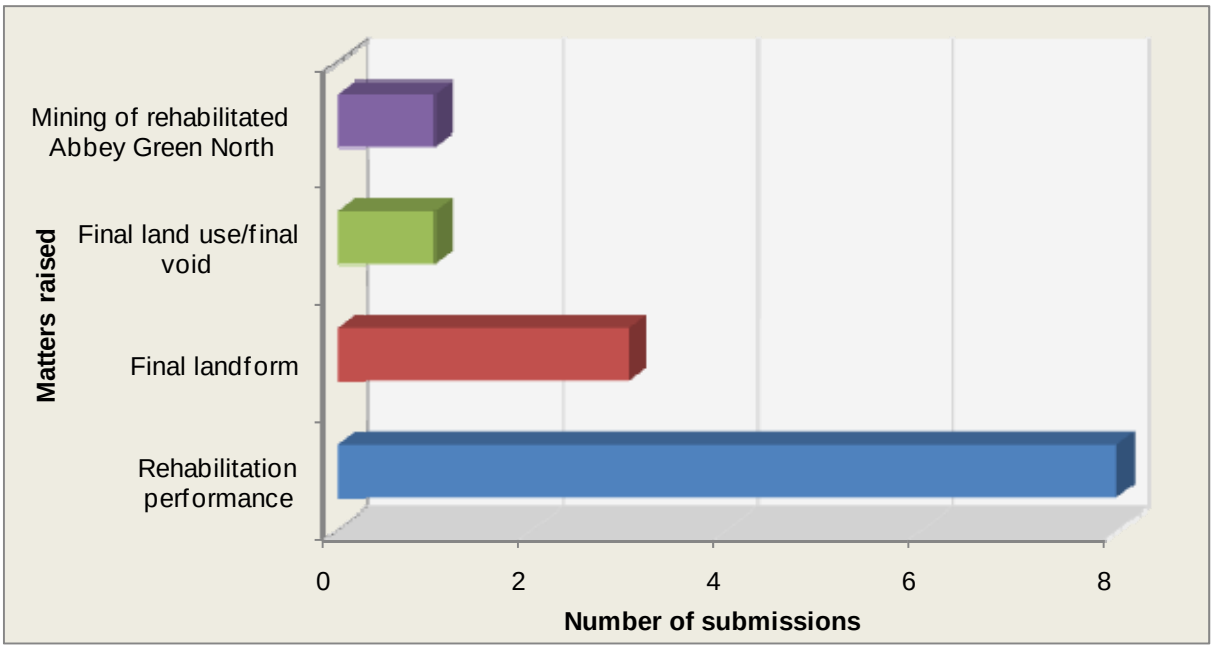


Figure 6.18 Rehabilitation matters raised within submissions of objection

6.13.2 Rehabilitation

i Current performance

Of the submissions of objection related to rehabilitation matters, 89 per cent (representing four per cent of the total submissions of objection) related generally to rehabilitation at MTW contending that the mines current rehabilitation performance is unsatisfactory.

In contrast to the statements that the rehabilitation performance has been unsatisfactory, the 2013 Annual Review for MTW reported that the rehabilitation undertaken during the 2013 calendar year at MTW exceeded the required target area by 13 per cent.

The primary objective of the final landform at MTO 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. Progressive rehabilitation on the site to date has achieved these objectives.

As reported in Section 12.4 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 N. As disturbed areas become available, they are rehabilitated as soon as practicable to minimise the areas that need to be managed for dust generation and sediment-laden water runoff. To assist this management requirement, aerial seeding is undertaken across the various exposed areas to establish temporary vegetative cover to reduce the degree to which wind and water erosion can impact the site.

Further to this, Coal & Allied are undertaking rehabilitation trials and applied research activities in an effort to continually improve the effectiveness and efficiency of rehabilitation of mined lands. The results of the trials to date have been positive and it has been demonstrated that improved growth mediums can be developed onsite which lead to greater recruitment and establishment of native species that are representative of each of the community stratum being returned in post-mined areas. Thus, Coal & Allied are confident of achieving success in the proposed rehabilitation at MTO where it is proposed to progressively establish approximately 483ha of woodland communities predominately across the west of the site.

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 at MTO and Warkworth Mine will facilitate an integrated landform with adjacent areas and provide for enhanced rehabilitation outcomes.

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 are met.

The objectives of the rehabilitation domains of mined areas at MTO are to:

- progressively establish approximately 483ha of woodland communities;
- progressively establish residual areas of EEC woodland (an ironbark community), as part of Warkworth Mine's commitment for mine rehabilitation across MTW;
- 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 2.15 and 2.16 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).

Therefore, contrary to the contentions made in submissions it is considered that the mine's current rehabilitation is compliant with government requirements and is, therefore, considered satisfactory. Rehabilitation will not occur immediately after mining ceases, as contended in one submission. Rather, rehabilitation of mined areas will continue to be undertaken progressively under the proposal, in accordance with the extensive performance/completion criteria (see Appendix N of the EIS).

ii Mining of rehabilitated Abbey Green North

One submission contended that land with established final rehabilitation should not be destroyed, citing the area of rehabilitated land in the vicinity of AGN.

It is acknowledged that some land that has been rehabilitated previously will be required for completion of mining at AGN which is already approved. The rehabilitated area does not conform to any particular vegetation type. The area is largely grassland with some tree plots. If approved, the proposed rehabilitation will supersede the rehabilitation undertaken as part of the current approval and, as stated previously, will continue to be undertaken progressively under the proposal.

6.13.3 Final landform

Of the submissions of objection related to rehabilitation matters, 33 per cent (representing one 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 proposal's conceptual final landform considered 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 MTO 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 Figures 2.15 and 2.16 of the EIS.

The final landform at MTO would be developed with the intent of blending with the surrounding landscape features of MTO, Warkworth Mine and Bulga Coal Complex. The landform would be undulating, with slopes of generally 10 degrees for overburden emplacements and up to 18 degrees for internally draining areas such as low walls and ramps consistent with the approved landform design in the current MTW MOP. This would be achieved by creating gradients for the overburden emplacements similar to the adjoining natural slopes and cognisant of existing rehabilitation.

Backfilling of the void to a level similar to the height of the natural ground level at the base of the adjacent levee, will assist in the ground level visually merging into the rehabilitated and vegetated emplacements. With the exception of the remnant highwall and endwalls where the natural ground level rises to the north and south east, the final landform will integrate well into the surrounding landscape.

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.

6.13.4 Final landuse/final void

One submission contended that MTO should be made to batter the existing highwall at the southern end of North Charlton Ridge, to a slope capable of holding suitable vegetation.

The highwall at the southern end of North Charlton Ridge is within Loders Pit where the alterations to the final landform are described in Section 12.2.3 of the EIS. In summary, the mine plans show active mining in Loders Pit in Year 3, overburden emplacement in Year 9 that would remove the approved final void, with the area then progressively rehabilitated over the remaining life of the mine. Outside of the highwall associated with Charlton Ridge, the intent of the final landform would be to make the post-mining environment integrate with adjacent areas.

It is not proposed to batter the southern highwall of Charlton Ridge. The highwall will remain in place as will the light vehicle safety bunds that are located above the highwall to prevent unintended access. The highwall has been designed for stability while maximising the resource extraction in the area. At the completion of mining, any exposed highwall and endwalls following backfilling of the mining void and rehabilitation of the tailings dam will continue to be stable.

6.14 Visual

6.14.1 Introduction

The assessment of visual impacts resulting from the proposal was provided in Chapter 14 of the EIS. The visual study was presented in full in Appendix H.

Matters raised included the influence of Saddleback Ridge, impacts from lighting and impacts associated with increased emplacement of overburden at MTO.

The number of submissions received on matters relating to visual is shown in Figure 6.17. A total of 25 submissions in objection referenced visual matters, representing 12 per cent of objectors. The number of times the visual related matters were raised in objection is shown in Figure 6.19. 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 6.19 totals more than 25.

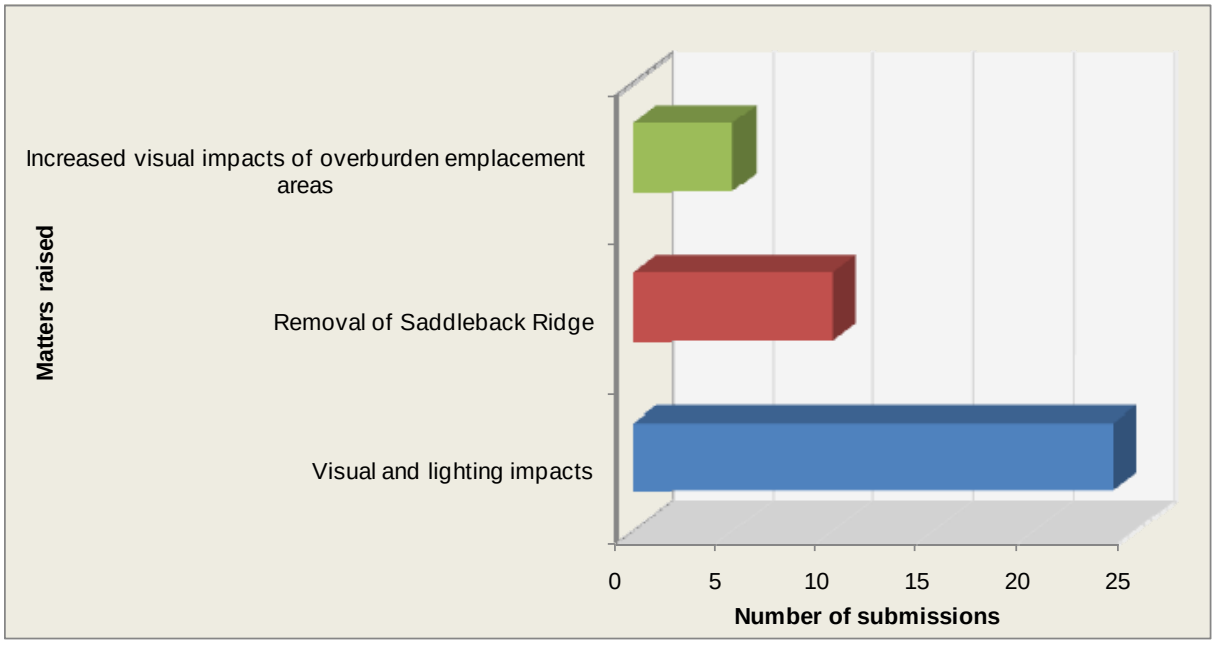


Figure 6.19 Visual matters raised within submissions of objection

6.14.2 Saddleback Ridge

Of the submissions of objection related to visual amenity matters, 40 per cent (representing five per cent of the total submissions of objection) raised adverse impacts on visual amenity from the mining of Saddleback Ridge.

The mining of Saddleback Ridge is related to the Warkworth Continuation 2014 proposal and, therefore, is considered in the Warkworth RTS.

6.14.3 Lighting impacts

Of the submissions of objection related to visual matters, 96 per cent (representing 11 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 14.3.4 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 14.4 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 VIMP would outline a process to undertake SSVAs which would consider potential impacts from lighting and their mitigation. 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 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.

6.14.4 Increased visual impacts of overburden emplacement

Of the submissions of objection related to visual amenity matters, 20 per cent (representing two per cent of the total submissions of objection) raised increased visual impacts from overburden emplacement under the proposal.

As discussed in Section 14.3.4 of the EIS, there is a visual bund at the western Site boundary along Charlton Road and extending north along Putty Road. The bund is currently vegetated with a cover crop of grass. The bund screens views from Charlton and Putty roads and reduces views of the overburden emplacements from more distant locations to the west.

Views from some south-westerly viewpoints along Putty Road as well as parts of Bulga village would exist and the visual effects would range from low to high depending on the location/elevation. The overall visual impact would not be noticeably different to that approved under the existing development consent. Notwithstanding, Section 14.4 of the EIS outlines existing and proposed management and mitigation measures.

It should be noted that ongoing overburden emplacement at the Site would take place to achieve a net positive rehabilitation outcome.

6.15 Aboriginal cultural heritage

6.15.1 Introduction

The assessment of Aboriginal cultural heritage impacts resulting from the proposal was summarised in Chapter 17 of the EIS, and presented in full in Appendix K.

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 6.20. A total of 51 submissions in objection referenced Aboriginal cultural heritage matters, representing 24 per cent of objectors. 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 6.20 totals more than 51.

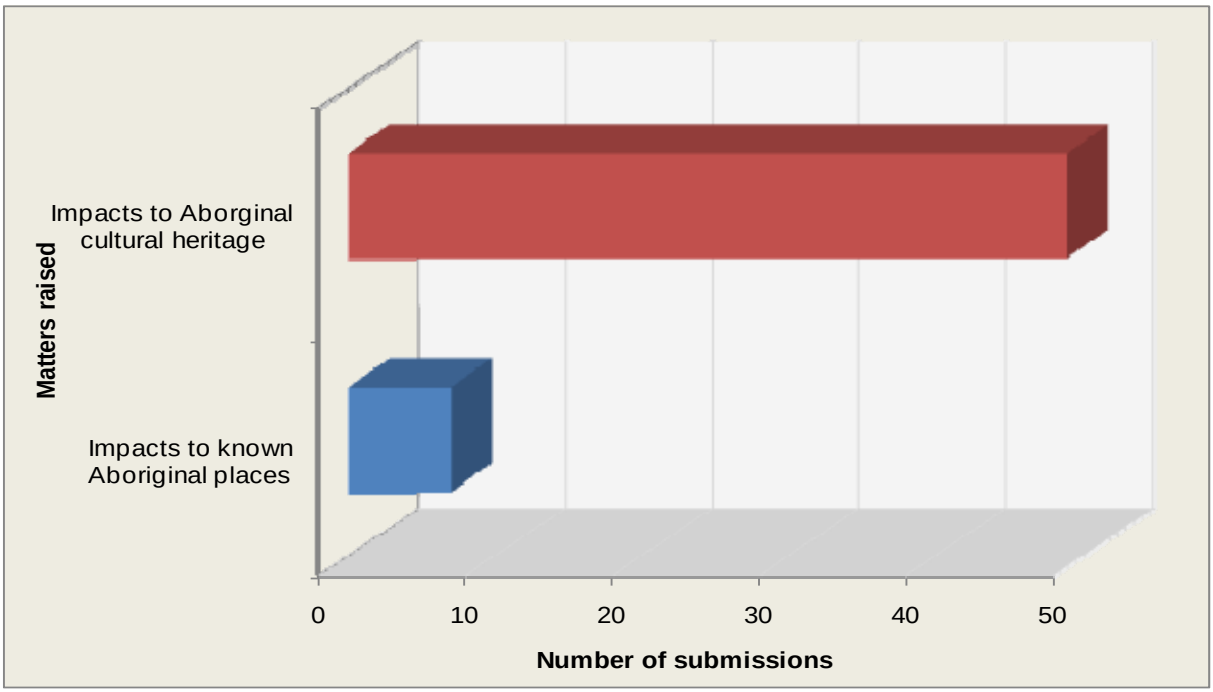


Figure 6.20 Aboriginal cultural heritage matters raised within submissions of objection

6.15.2 Impacts of the proposal on Aboriginal cultural heritage

The MTO proposal will not result in any disturbance beyond currently approved limits. Therefore, the proposal will not impact on Aboriginal cultural heritage. Irrespective of this, additional studies and consultation have been undertaken for the broader MTW and have included contemporising previous investigations and management strategies from MTO. Specifically, Coal & Allied is committed to the establishment of the Loder Creek Aboriginal Cultural Heritage Conservation Area (ACHA) as follows:

- the Loder Creek ACHCA would be established for the long-term conservation and management of Aboriginal cultural heritage places and values. In particular, it would provide for the protective management and cultural maintenance of the remaining undisturbed portion of Loders Creek within the Site;
- the Loder Creek ACHCA would be protected permanently from future mining, exploration drilling and associated development disturbance;
- the Loder Creek ACHCA would be managed in accordance with a specific management plan developed in consultation with the CHWG and other stakeholders including DP&E and OEH. This plan would include the following matters:
  - the establishment of strictly controlled non-access zones and protocols around culturally sensitive areas as determined in consultation with the Cultural Heritage Working Group;
  - the establishment of areas for use by the Aboriginal community for cultural and community purposes;
  - the establishment of areas for active Aboriginal cultural heritage and landscape management, including vegetation rehabilitation;

- the processes and protocols by which ongoing Aboriginal community access to the Loder Creek ACHCA can be facilitated; and

- the plan would be integrated with the MTW Heritage Management Plan;

- the Aboriginal community, through a Coal & Allied ACHCA management committee, would oversee the implementation of the management plan; and

- Coal & Allied would continue to ensure an active Aboriginal community role in both Aboriginal cultural heritage and environmental management activities for the Loder Creek ACHCA.

6.16 Other matters

6.16.1 Introduction

A total of 32 submissions in objection referenced matters that were outside of the categories addressed in the preceding sections of Chapter 6, representing 15 per cent of objectors. Approximately half of these raised concerns regarding impacts on 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's) for MTO and Warkworth Mine at the same time. Other matters raised contended an adequate cumulative assessment of other nearby mines had not been undertaken. These matters are addressed in the following sections.

The number of submissions received on other matters is shown in Figure 6.21. It is noted that a number of submissions referenced more than one matter and, therefore, the number of matters raised as shown in Figure 6.21 totals more than 32.

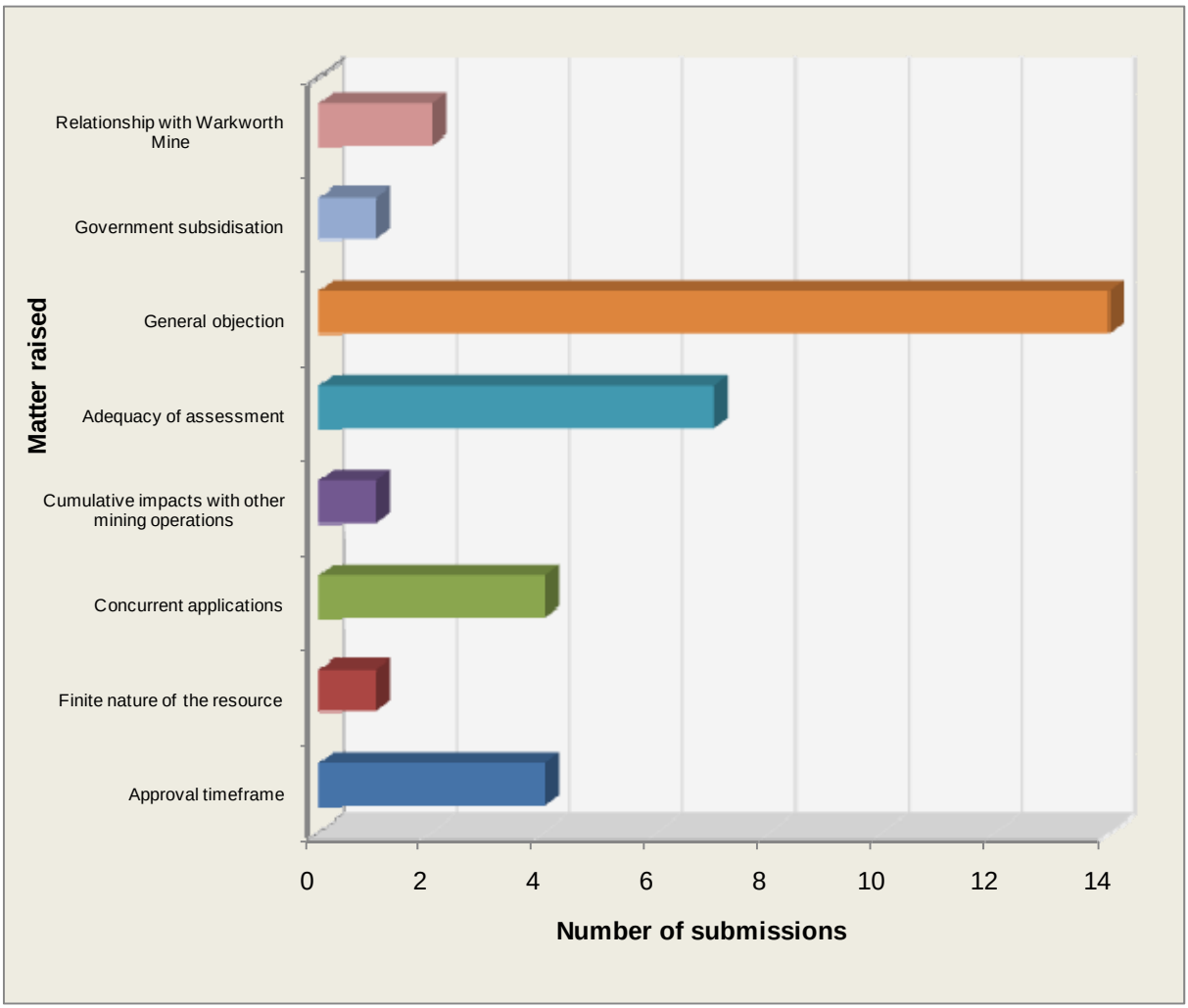


Figure 6.21 Other matters raised within submissions of objection

6.16.2 General objection

As noted above, 14 submissions generally objected to the proposal, including general impacts on the environment and on future generations. These general objections are noted, and are considered in various sections throughout Chapter 6.

6.16.3 Approval timeframe

Of the submissions of objection regarding other matters, 13 per cent (representing two per cent of the total submissions of objection) related generally to MTW and the extension of the approved timeframe for mining. 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.

Specifically in relation to MTO, it was contended that the proposed extension of mining does not correspond with the remaining five year of mining at MTO. One submission asserted that that additional time to complete mining in MTO's Loders Pit cannot be justified. Another submission contended that determination should not be based on MTO's assumption that the application will be approved.

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. MTO's development consent is limited for this same 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.

As described in Section 2.4.1 of the EIS, approved mining in Loders Pit was expected to be completed in 2017, however was delayed due to a significant rain event in June 2007 which saw Loders Pit flooded. Loders Pit was utilised as a water storage post the June 2007 flood to allow the MTW operations the ability to return to normal mining in all of the others pits. Loders Pit was successfully dewatered in 2010 and mining recommenced in the same year. Due to this approximately three year cessation of mining in Loders Pit the continuation of mining is sought under the proposal.

The proposal seeks to extend the time for approved mining that has occurred slower than anticipated beyond 2017, while enabling the continued use of mining infrastructure and the transfer of overburden from Warkworth Mine to complete the final landform for 21 years. The indicative mine plans (Figures 2.7 to 2.10 of the EIS) show mining completed at MTO in the indicative Year 9 mine plan (nominally 2023). Year 9 is approximately the half way point of the proposal timeframe and represents when coal and overburden are being transported from Warkworth Mine to MTO for processing and emplacement, respectively. For the remaining seven years of development consent period, activities would be focussed on the transfer of overburden from Warkworth Mine to facilitate active rehabilitation and rehabilitation to final landform, tailings management, water management and use of MTO infrastructure, including the MTO CPP to maintain efficient operations of the integrated aspects of MTW. The timeframes for both applications were aligned to enable the continued integration of the two operations.

There is no assumption by MTO that the application will be approved. The proposal will be assessed in accordance with the relevant State government legislation (as outlined in Chapter 6 of the EIS) and will be determined by the relevant consent authority in accordance with the legislation. The applicant contends the approval is essential to the long-term viability of MTW.

6.16.4 Finite nature of the resource

Of the submissions of objection related to other matters, three per cent (representing less than one 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 mining leases that MTO is required to maximise the extraction of coal within its respective mining leases.

6.16.5 Government subsidisation

Of the submissions of objection related to other matters, three per cent (representing less than one 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. This is discussed further in Section 6.6 of this report.

6.16.6 Adequacy of assessment

Of the submissions of objection related to other matters, 22 per cent (representing three 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 Warkworth Mine 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, 13 per cent (representing two per cent of total submissions of objection) raised confusion of issues associated with two applications being submitted concurrently.

Although MTO and Warkworth Mine 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 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.

6.16.8 Cumulative assessment with other mines

Of the submissions of objection related to other matters, three per cent (representing less than one per cent of total submissions of objection) contended that a cumulative assessment with other mines needs to be considered.

Where relevant and as required by the Secretary's requirements, government policy and guidelines, the EIS supporting technical studies included cumulative assessments with other nearby mines.

Noise and air quality are two of the main impacts of mining that can potentially cause disturbance to local communities. The modelling approach for the air quality and noise studies estimated emissions from the proposal (including Warkworth Mine) and all nearby approved and proposed mining operations, which were added to existing levels to determine total impacts that may arise. Overall, the cumulative noise assessment demonstrated adherence to the INP's amenity criteria and the non-discretionary mining SEPP at all properties not previously identified as impacted. In relation to air quality, the study identified that the cumulative air quality environment in the vicinity of Bulga village is likely to improve beyond the indicative Year 14 (nominally 2028) as the mines move further away from the assessment locations.

The groundwater and surface water studies considered the interactions of the surrounding mines. The groundwater study identified the potential for Warkworth Mine, Bulga Coal Complex and Wambo Mine to cause cumulative impacts on groundwater pressures as the extract similar coal seams as MTO. Accordingly, the groundwater model was calibrated using available historical mine stresses at these mines. The surface water study considered streamflow and water quality for both the local drainage network and wider Hunter River catchment and the requirements for additional water for the proposal considered options for water sharing with Hunter Valley Operations, Bulga Coal Complex and Wambo Mine. Overall, the studies concluded that the impacts to groundwater and surface water are unlikely to be significantly different to existing approved operations.

The traffic and transport study included daily traffic volume surveys and peak hour intersection counts which quantified existing traffic volumes, which would have included traffic from the surrounding mines. Potential traffic from the proposal as well as potential cumulative traffic from the construction work phase of the BOP were considered. Overall, it was considered that there would be minimal cumulative traffic impacts of the proposal and the existing road network would have sufficient spare capacity to accommodate the predicted cumulative traffic increases. The study also identified that there would be no increase in annual train movements.

6.16.9 Relationship with Warkworth Mine

Two submissions of objection related to other matters contended that Warkworth Mine would be in a difficult position to dispose of overburden if the owners of MTO sell before the 21 year lease expires.

MTO and Warkworth Mine have integrated at an operational level since 2004 with a single management team responsible for all the operations. Should the integrated management of MTO and Warkworth Mine cease to operate within the period of the development consents, both development consents will remain valid and the owners of MTO and Warkworth Mine would continue to be required to comply with the limits prescribed within their respective development consents.

Chapter 7

BMPA submission

Chapter 7 — BMPA submission

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 considers 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 social impact assessment, economic study and noise and vibration study. A response to each of these reviews is provided in Appendices E, F and G, 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 question the statement that the MTO pit was closed for several years because of the major flood event.

The primary reason that mining has occurred slower than anticipated at MTO is due to a significant rain event in June 2007 which saw Loders Pit flooded. These June 2007 floods were the worst flooding in 52 years reported in the Hunter Valley, with many new long-term rainfall records set (BoM, http://www.bom.gov.au/nsw/sevwx/0607summ.shtml).

Loders Pit was utilised as a water storage post the June 2007 flood to allow the MTW operations to return to normal mining in all of the other pits. Loders Pit was successfully dewatered in 2010 and mining recommenced in the same year. Due to this approximately three year cessation of mining in Loders Pit the continuation of mining is sought under this proposal. It is anticipated that mining will be completed in Loders Pit by nominally 2020.

ii ES2 Noise

BMPA 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.

BMPA 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 BMPA's contention is incorrect since it is assessed that all residences in Bulga would satisfy the Mining SEPP's non-discretionary standard for cumulative noise from all industrial noise sources as described in Section 9.2 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.

iii Economics

BMPA references the review of the economic study completed by the Australian Institute which shows that the mine is not viable and that the economic benefits flowing to the community are inflated.

The financial viability of the proposal is a risk assumed by the private owners of MTO and Warkworth Mine, and related assumptions concerning the expectations of the owners as to the future financial performance of the mine are commercial in confidence. Mines like MTO (and Warkworth), 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 F of this report in a response to the TAI submission (Appendix 3 of the BMPA submission).

TAI mischaracterise the purpose of the 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.

iv Social

BMPA contend that the social impact statements made in the EIS fall short of appropriate standards. 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 E.

v ES3.1 Noise

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 5 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 12 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 $L_{90,15minute}$, 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 ±1dB 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.*

It appears that this contention relates to government agencies. Consultation by an applicant with regulators is, however, 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 – Negotiation between proponent and regulator) 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 Table 9.9 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. The EPA's submission on the EIS (see Section 4.3) documents, however, acknowledges the limitations in the INP's LFN method.

Section 9.4.4 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. Low frequency noise is discussed further in Section 4.3.1 of this report.

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 MTO 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.

The INP's LFN criteria 15dB threshold is being reviewed in light of challenges in its practical application at large distances from sources. For example, sounds that do not pose low frequency dominated spectra at close range, would by virtue of enough distance loss factors, inappropriately attract the INP penalty for low frequency as higher frequencies in their spectra are considerably more abated than the lower frequencies. The INP LFN criteria were originally intended for testing sources at relatively close range. In comparison, the German standard DIN45680 (1997) uses a differential of 20dB as a screening tool for LFN.

The proposal will enable the extraction of a resource already approved for mining that is unable to be extracted under the current consent timeframe due to pit inundation in 2007. The proposal does not seek to extend the spatial limits of currently approved operations. Noise emissions associated with the proposal are likely to be similar to current approved activities with improvement over time as fleet attenuation progresses and mitigation measures are applied.

BMPA contends predicted noise levels for the current proposal are higher in Bulga than the previous application.

It is understood that the 'previous application' is in reference to the Warkworth Extension 2010. This matter is considered in the Warkworth RTS.

BMPA contends that the compliance by the mine has not been demonstrated using noise controls.

MTO has a strong compliance record with a total of 154 attended noise measurements taken for MTO in 2014 (up until end of September 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.

Routine compliance assessment monitoring has been undertaken from 2004 to the present and in more recent years, monitoring has included low frequency noise assessment.

MTO's monitoring data is publically available via the Rio Tinto Coal Australia website www.riotinto.com/coalaustralia).

vi ES3.2 Air quality

BMPA contends that MTO [MTW] either cannot or will not control dust.

Contrary to BMPA's submission, MTO has a strong dust compliance record and is committed to industry best practice dust management.

As discussed in Section 10.2.3 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.

The applicant 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.

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 PM_{10} 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 associated with the adjacent proposed Warkworth Continuation 2014 moves toward the west, rather than contributions from the MTO proposal. These cumulative impacts would largely arise due to the prevailing meteorological conditions which favour the transport of material to these areas. Annual and seasonal windroses (see Figure 10.2 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 and 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 in Warkworth village. Both 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 PM_1 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 (PM_{10} 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 NO_2 levels near Singleton are consistent with the levels at monitoring sites far removed from mining. The measured NO_2 levels are low and are well below the applicable criteria. Diesel combustion emits high levels of NO_2 and also fine particulate matter. If there were a significant effect from diesel plant it would be expected that this would appear in the NO_2 monitoring data. But this is not the case.

- The particulate monitoring data described 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 PM_{10} data in the Hunter show the opposite trend to the $PM_{2.5}$ levels. The PM_{10} 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 PM_{10} 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 PM_{10} 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 PM_{10} 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 PM_{10} 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. This is also reflected in the recent study by the CSIRO (CSIRO 2013) into the composition of particulate matter in the Hunter Valley, which found that a dominant source of fine particulate is wood smoke.

vii ES3.4 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 6.7.8 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 20.6 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 20.5, Chapter 20 of the EIS and Appendix C 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 is relates to amenity.

viii ES3.5 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.

ix 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.

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 groundwater dependent ecosystems.

x ES5.8 Aboriginal cultural heritage

BMPA contends that the removal artefacts 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.

As described in Chapter 17 of EIS, the proposal will not adversely impact on Aboriginal cultural heritage. This is discussed further in Sections 6.15 and 7.2.16 of the Warkworth RTS.

xi ES5.11 Final landform and rehabilitation

BMPA contends that MTW 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, MTW does not have a poor rehabilitation performance record. In regards to the final void, the proposal seeks to backfill the MTO void with material extracted from Warkworth Mine (including overburden won from the current MTO lease). In general terms, the removal of the approved final void in Loders Pit, given the receipt of overburden and tailings from Warkworth Mine, subject to approval of its development application is viewed as a long-term environmental improvement in the context of the current development consent.

Land rehabilitation occurs at MTW in a progressive manner in accordance with timeframes that are outlined and approved in the MTW MOP. To date, the rehabilitation at MTO has been concentrated in the east of the Site, predominately away from public roads. In the 2013 MTW Annual Review, which reported on the activities undertaken at MTW 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.

Rehabilitation at MTO will continue to be undertaken progressively across the mined area under the proposal in accordance with the extensive performance/completion criteria outlined in Appendix N of the EIS. As disturbed areas become available, they are rehabilitated as soon as practicable to minimise the areas that need to be managed for dust generation and sediment-laden water runoff. To assist this management requirement, aerial seeding is undertaken across the various exposed areas to establish temporary vegetative cover to reduce the degree to which wind and water erosion can impact the site.

Further to this, Coal & Allied is undertaking rehabilitation trials and applied research activities in an effort to continually improve the effectiveness and efficiency of rehabilitation of mined lands. The results of the trials to date have been positive and it has been demonstrated that improved growth mediums can be developed onsite which lead to greater recruitment and establishment of native species that are representative of each of the community stratum being returned in post-mined areas. Thus, Coal & Allied is confident of achieving success in the proposed rehabilitation at MTO where it is proposed to progressively establish approximately 483ha of woodland communities predominately across the west of the site.

With regard to the final landform, it would be developed with the intent of blending with the surrounding landscape features of MTO, Warkworth Mine and Bulga Coal Complex. The landform would be undulating, with slopes of generally 10 degrees for overburden emplacements and up to 18 degrees for internally draining areas such as low walls and ramps consistent with the approved landform design in the current MTW MOP. This would be achieved by creating gradients for the overburden emplacements similar to the adjoining natural slopes and cognisant of existing rehabilitation.

Backfilling of the void to a level similar to the height of the natural ground level at the base of the adjacent levee, will assist in the ground level visually merging into the rehabilitated and vegetated emplacements. With the exception of the remnant highwall and endwalls where the natural ground level rises to the north and south east, the final landform will integrate well into the surrounding landscape.

xii ES3.12 Visual amenity

BMPA notes that while the EIS states existing topography and vegetation would continue to provide screening to MTO, 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 some elevated residences in Bulga with a view of the mine. Section 14.3.4 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, 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.

xiii ES4 Justifications and conclusion

BMPA disputes reference to MTO and the adjoining Warkworth Mine 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. Therefore, the socio-economic benefits provided by the mine are substantial as described in Chapters 8 and 20 of the EIS.

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, MTO 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 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 considered in Section 6.2 of this report.

BMPA disputes the statement that MTO 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 regarding MTW. 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; and
- of the 667 complaints made, over 88 per cent were related to noise impacts.

MTO has a strong compliance record with a total of 154 attended noise measurements taken for MTO in 2014 (up until end of September 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.

MTO's monitoring data is publically available via the Rio Tinto Coal Australia website www.riotinto.com/coalaustralia).

> *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 current development consent expires in 2017 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. Together with the Warkworth Continuation 2014 proposal, the proposal provides significant social and economic benefits in the form of the continuation of approximately 1,300 jobs on average in the long-term and payment of $617million in NPV terms in royalties to the state. The economic benefits attributable to the MTO include continuing employment for a workforce of approximately 121 persons and some $50million in NPV terms in royalties to the state.

The proposal seeks to extend the time for approved mining that has occurred slower than anticipated beyond 2017, due to mining in Loders Pit (the primary focus of extraction at MTO) being delayed for approximately three years due to a significant rain event in June 2007. It does not seek to extend the approved spatial limits of extraction.

These proposal's 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. 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 new mining operations 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 7.2.5i the assertion here is false and the Australian Institute's analysis is shown to suffer from several fatal flaws as outlined in detail in Appendix F.

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 4.7.2 of this report, it concluded that the resource, the subject of the proposal, is of state significance.

7.2.2 Air quality and health

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 the air quality and greenhouse gas study, and discussed in greater detail in Sections 4.5.1 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.

i 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 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 re-emphasise 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.

ii 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 (PM_{10} 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 all 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). Further, the Mining SEPP's discretionary standard is predicted to be met 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 form nuisance dust, under the proposal would not be compromised.

Air quality and health are addressed in Section 6.5.4.

iii 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 enable 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 10.2.3 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. Loders Pit was active during this period. 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. Chapter 11 of the EIS shows that annual average TSP concentrations were below the criteria of 90µg/m^3 with recorded levels being generally 60µg/m^3, with the exception of recorded levels of approximately 85µg/m^3 at the most impacted monitoring location (WML-HV1 in 2012).

Under the proposal, mining at MTO would continue until nominally 2022, during which time overburden from Warkworth mine 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 the Warkworth RTS, 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.

iv 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 contends 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 in Warkworth village). Further, the Mining SEPP's non-discretionary standard with respect to cumulative air quality impacts is met for all Bulga village assessment locations. This, therefore, demonstrates that amenity under the proposal would not be compromised.

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 (see Section 21.5.2 of the EIS). 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.

7.2.3 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 $L_{90,15minute}$, 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 ±1dB 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 Noise monitoring

The BMPA 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.

MTO has a strong compliance record with a total of 154 attended noise measurements taken for MTO in 2014 (up until end of September 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.

MTO's monitoring data is publically available via the Rio Tinto Coal Australia website www.riotinto.com/coalaustralia).

iii Low frequency noise and INP penalty

BMPA contends that the low frequency noise criteria and INP penalty have not been appropriately adopted (pg 53).

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 EIS (see Section 4.3) documents, however, acknowledges the limitations in the INP's LFN method.

Section 9.4.4 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. Low frequency noise is discussed further in Section 4.3.1 of this report.

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 MTO 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.

The INP's LFN criteria 15dB threshold is being reviewed in light of challenges in its practical application at large distances from sources. For example, sounds that do not pose low frequency dominated spectra at close range, would by virtue of enough distance loss factors, inappropriately attract the INP penalty for low frequency as higher frequencies in their spectra are considerably more abated than the lower frequencies. The INP LFN criteria were originally intended for testing sources at relatively close range. In comparison, the German standard DIN45680 (1997) uses a differential of 20dB as a screening tool for LFN.

The proposal will enable the extraction of a resource already approved for mining activities that is unable to be extracted under the current consent timeframe due to pit inundation in 2007. The proposal does not seek to extend the spatial limits of currently approved operations. Noise emissions associated with the proposal are likely to be similar to current approved activities with improvement over time as fleet attenuation progresses and mitigation measures are applied.

iv Cost of reducing noise

> *BMPA contends that the cost of reducing noise to achieve PSNLs has been discounted by the applicant (pg 53).*

Contrary to BMPA's contention, the cost of reducing noise to achieve PSNLs was not discounted by the applicant.

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 MTO. 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 proposals.

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 per cent 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.

v Low frequency noise assessment

BMPA requires that any assessment of LFN must be based on the INP.

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. This matter is considered in Section 7.2.3iii above.

vi 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 considered in various areas within Section 4.3 of this report.

7.2.4 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 ABS 2011 Census shows that Bulga has a population of 358 people.

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 6.7.9 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 C of this report.

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 H 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 1,673 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 during the L&E Court proceedings. 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 D 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 6.16.3 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 EIS (and the Warkworth Continuation 2014 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 Mine Continuation Project 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 the 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 where 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 Rio Tinto Coal Australia 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), Cessnock (19 per cent) and Maitland LGA (17 per cent).

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 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 (which is publically available via the Rio Tinto Coal Australia website) shows that MTO has a strong compliance record. With a total of 154 attended noise measurements taken for MTO in 2014 (up until end of September 2014), zero exceedances and zero non-compliances were recorded. This further demonstrates that complaints received do not equate to non-compliance with government conditions of approval.

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 20.1 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 M) were not included in the chapter.

EMM agrees that not all information provided in Appendix M 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 para408 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 C 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 (including for example, consideration of noise impacts from the proposal or the need to maintain employment and training opportunities), the analysis of which is presented in Table 20.5 of the EIS and Appendix C 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 is relates to amenity.

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 C 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 C of this report acknowledges that noise is of significant concern to the local community. This is also shown in Figure 20.6 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 a significant exceedance (>5dB(A)) of PSNLs is only predicted to occur at one assessment location (149). This assessment location is at Mount Thorley Industrial Estate and is already afforded acquisition rights from MTO under the development consent.

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 five years. Indeed, almost a quarter of the MTW workforce 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.

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.

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 4.5 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 20.5 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. It is recognised that near neighbours of MTO perceive 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. 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. 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.

7.2.5 Economics

i MTO is 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 MTO and Warkworth Mine, and related assumptions concerning the expectations of the owners as to the future financial performance of the mine are commercial in confidence. Mines like MTO (and Warkworth), 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 F of this report.

The purpose of the CBA 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 as 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 states 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, 'mulitfactor 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 contends 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 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 contends that 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.

7.2.6 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 7.2.5.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 contends 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 proceed.

The EIS and this report describe predicted impacts on the surrounding area including the township of Bulga. This matter is addressed further in Sections 7.2.2, 7.2.3, 7.2.4 and 7.2.7 of this report.

Similarly, an analysis of strategic agricultural land, as defined in the NSW Strategic Regional Land Use Policy, in proximity to the proposal was undertaken and described in the EIS (refer to Chapter 13). A review of the mapping indicated there was no strategic agricultural land within approximately 2km of the site. The nearest critical industry cluster (eg equine or viticultural industry) mapped is approximately 3km south of the Site. The proposal will not adversely impact upon agriculture. It should be noted that Agriculture NSW' submission confirmed that an agricultural impact statement was not required.

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 20.3.3.iii of the EIS states that the mining sector represents 'up to 21 per cent' of the workforce in Bulga. This information was sourced from 2011 Census data provided by the ABS and is also presented in Table 4.2 of the SIA (EIS Appendix M). Notwithstanding, it should be noted that BMPA's contention that Bulga's workforce participation in the mining sector is closer to 5 per cent, still places it well above the NSW average of 1.6 per cent.

7.2.7 Land values

BPMA asserts that the threat of coal mining has and will continue to negatively affect property values. The submission notes the EIS references to the work completed by Dr Stubbs.

As described in Section 6.7.1 of this report, based on publically available data, there is no evidence of substantial decline in property prices due to mining, including since the application for the Warkworth Extension 2010 or the current proposals.

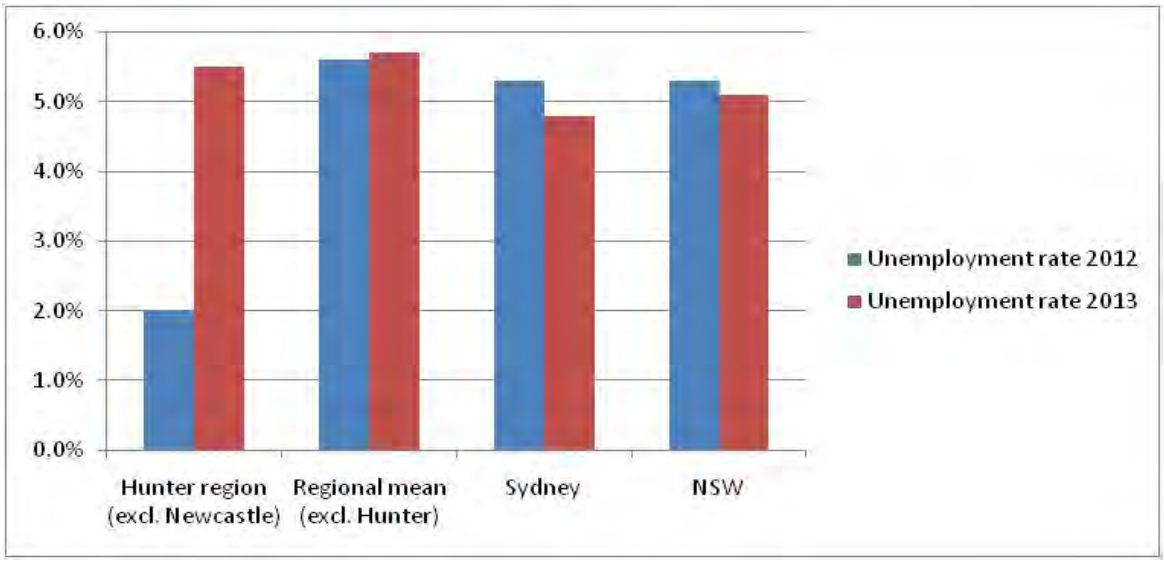
There are a number of factors which determine the value of properties, including supply and demand, interest rates, the state of the economy, demographics and the property's location. While an individual property's value is influenced by its location, it is also influenced by these other factors.

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 2.2.2 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 (see Figure 7.1). 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.



Source: Montoya D 2013, Economic indicators: NSW regional labour force trends, Statistical Indicators 3/2013. NSW Parliamentary Research Service.

Figure 7.1 Comparison of unemployment rates between 2012 and 2013

The proposals 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 D.

Recent analysis undertaken for the BOP, 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 sales prices, nor the average number of sales from January 2008 and August 2014, shown in Figure 7.2. Figure 7.2 shows the median price of sales in Bulga from January 2008 and August 2014 and the number of land and property sales in Bulga annually.

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

The applicant acknowledges the importance of retaining value in property in areas surrounding MTW. 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.

7.2.8 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.

As described in Section 9.4.9 of the EIS, the proposal is for continuation of mining operations which would remain within the current approved boundaries. Blasting impacts would therefore remain as previously assessed in past noise and vibration impact assessments and would not increase under the proposal. This matter has been considered in Section 6.4.6 of the Warkworth RTS.

ii Vibration and damage from blasting

BMPA contends vibration and damage from blasting will increase with the proposal.

As described above, vibration and damage from blasting will not increase under the proposal.

7.2.9 Aboriginal cultural heritage

BMPA asserts that Rio Tinto has chosen to use the same data provided in the now disallowed 2010 EA.

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.

7.2.10 Performance and consent breaches

Matters raised under 'performance and consent breaches' generally relate to Warkworth Mine. These have, however, been responded to below for completeness.

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 PM_{10} criteria.

Notwithstanding the PINs described above, as discussed in Sections 9.5.3 and 10.2.3 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 noted that this matter relates exclusively to Warkworth Continuation 2014 proposal and, therefore, is addressed in the Warkworth RTS.

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.

It is noted that this matter relates exclusively to Warkworth Continuation 2014 proposal and, therefore, is addressed in the Warkworth RTS.

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).

It is noted that this matter relates exclusively to Warkworth Continuation 2014 proposal and, therefore, is addressed in the Warkworth RTS.

Chapter 8

Conclusion

Chapter 8 — Conclusion

8 Conclusion

MTO and the adjoining Warkworth Mine 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 MTW.

This report responds to submissions received on the MTO EIS for the proposal which was publically exhibited from 25 June to 6 August 2014.

A total of 1,317 special interest group and community submissions were received: 1,106 or approximately 84 per cent were in support; and 211 or approximately 16 per cent were in objection. A submission was received from BCM that provided comments on the proposal.

Submissions were also received from Singleton Council and eight 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.

MTO 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.

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:

- it enables the extraction of a resource already cleared and approved for mining;
- it allows for the ongoing provision of services to Warkworth Mine which is critical to the viability of both mines;
- it enables the completion of the final landform at MTO;
- no additional disturbance would result from the proposal and impacts on near neighbours have been minimised to the greatest extent possible while still maintaining an economically viable mine plan;
- it is consistent with the objects of the EP&A Act;
- it is consistent with all government policies;
- MTO has a long history of minimal non-compliances with government approvals;
- it ensures maximum return on hundreds of millions of dollars invested in the mine since it commenced operations and, as an existing mine, it has established access to product transport and distribution infrastructure such as road, rail and port;

- it provides a state significant economic benefit to the local, regional, state and national economies; and
- it contributes to the long-term security for approximately 1,300 jobs.

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Abbreviations

µg/m^3	micrograms per cubic metre
µm	Micrometre
ABS	Australian Bureau of Statistics
ABL	Assessment Background Levels
ACHCA	Aboriginal Cultural Heritage Conservation Area
AGE	Australasian Groundwater and Environmental Consultants Pty Ltd
AGN	Abbey Green North Pit
AIP	NSW Aquifer Interference Policy 2012
ANL	acceptable noise level
ANTSO	Australian Nuclear Research and development Organisation
ANZECC	Australian and New Zealand Environment and Conservation Council
BCM	Bulga Coal Management
BMPA	Bulga Milbrodale Progress Association
BOP	Bulga Optimisation Project
CBA	cost benefit analysis
CCC	community consultative committee
CDF	Community Development Fund
CFMEU	Construction, Forestry, Mining & Energy Union
CHWG;	Coal & Allied Aboriginal Cultural Heritage Working Group
CO	carbon monoxide
CO_2-e	carbon dioxide equivalent
CPP	coal preparation plant
CSIRO	*Commonwealth Scientific and Industrial Research Organisation*
DA	development application
dB	decibels
dB(A)	sound intensity with an 'A' contour filter
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
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	NSW *Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPL	environment protection licence
ERM	Environmental Resources Management Limited
FTE	Full time equivalent
g	grams
GCE	General computable equilibrium
GE	General Electric
GL	giga litres
GSP	gross state product
ha	hectares
Heritage Act	NSW *Heritage Act 1977*
HME	Heavy mining equipment
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
m	metre
m^2	meter squared
Mining Act	NSW *Mining Act 1992*
Mining SEPP	State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
ML	mega litres
MOP	mining operations plan
Mt	million tonnes
MTCL	Mount Thorley Coal Loader
MTIE	Mount Thorley Industrial Estate
MTJV	Mount Thorley Joint Venture
MTO	Mount Thorley Operations
Mtpa	million tonnes per annum
MTW	Mount Thorley Warkworth
NDA	non-disturbance area
NEPC	National Environment Pollution Committee
NEPM	national environment pollution measure
NO_2	nitrogen dioxide
NOW	NSW Office of Water
NPV	net present value
OEH	NSW Office of Environment and Heritage
PAC	NSW Planning Assessment Commission
PM_{10}	particulates which are 10 millimetres in diameter
$PM_{2.5}$	particulates which are 2.5 millimetres in diameter
PMI	Predictive modelling interface

POEO Act	NSW *Protection of the Environment Operations Act 1997*
PSNL	project specific noise levels
RBA	Reserve Bank of Australia
RBLs	Rating background levels
REIA	regional economic impact assessment/analysis
REMP	rehabilitation environmental management plan
RMS	NSW Roads and Maritime Services
ROM	run of mine
RTS	Response to Submissions
SCADA	supervisory control and data acquisition
SEPP	State environmental planning policy
SIA	Social Impact Assessment
SO_2	Sulphur dioxide
SOOP	southern out-of-pit
SSC	State Suburb
SSHEG	Singleton Shire Health Environment Group
SSVA	site-specific visual assessment
SWL	Sound power level
t	tonne
TARP	trigger action response plan
TEOM	tapered element oscillating microbalance
TSC Act	NSW *Threatened Species Conservation Act 1995*
TSF	tailings storage facility
TSP	total suspended particulate matter
VIMP	visual impact management plan
VPA	voluntary planning agreement
WAL	water access license
Water Act	NSW *Water Act 1912*
WM Act	NSW *Water Management Act 2000*
WML	Warkworth Mining Limited
WMP	water management plan
WMS	water management system

WSR	Wallaby Scrub Road
WSW	Warkworth Sands Woodland

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