MAJOR PROJECT ASSESSMENT: Mt Arthur Underground Coal Project

Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

November 2008

Cover photo: View to Mount Arthur

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EXECUTIVE SUMMARY

Mt Arthur Coal Pty Limited (Mt Arthur Coal), a subsidiary of BHP Billiton, operates the Mt Arthur open cut coal mine, located approximately 8 kilometres south of Muswellbrook in the Upper Hunter Valley (see Figure 1). The mine comprises 3 separate mining areas, including:

- Bayswater No.2 (extraction complete);
- Bayswater No.3; and
- Mount Arthur North.

Mt Arthur Coal is proposing to develop a new underground coal mine to add to the existing Mt Arthur mine complex. The proposal – known as the Mt Arthur Underground Project – involves underground longwall mining from 5 coal seams at a rate of 8 million tonnes of run-of-mine (ROM) coal a year over a period of 21 years. Extracted coal would be processed in Mt Arthur Coal's existing coal handling and preparation facilities and then transported to market using existing rail loading and conveyor facilities. The mine infrastructure would be upgraded to service the project.

The project has a capital investment value of $320 million, and would generate 470 jobs during construction and 300 direct jobs during operations.

The proposal constitutes a 'major project' under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as it is development for the purpose of coal mining, and consequently requires the Minister's approval.

The Department exhibited the Environmental Assessment of the project from 23 January 2008 to 25 February 2008, and received 9 submissions on the project: 7 from government authorities, 1 from a special interest group and 1 from the general public. None of the submissions objected to the project, however submissions raised a number of concerns including subsidence effects on infrastructure and private rural land, water resources, flora and fauna, heritage and traffic.

A key issue raised was the potential for subsidence to affect Transgrid's Bayswater to Mt Piper 330/500kV transmission line that traverses the project area – an integral component of the NSW electricity supply network. To address this issue, Mt Arthur Coal has prepared a preferred project report which provides for the relocation of the transmission line.

The Department has assessed the project application, EA, submissions on the project, and Mt Arthur Coal's response to submissions and preferred project report, in accordance with the objects of the EP&A Act and principles of ecologically sustainable development.

Subject to the relocation of the 330/500kV transmission line, and the ongoing management of subsidence impacts on Edderton Road and other areas, the Department is satisfied that the subsidence-related impacts on infrastructure, private property and environmental features, are able to be effectively minimised, managed and/or compensated for.

In this regard, the Department notes that Mt Arthur Coal will be required to secure additional Subsidence Management Plan approvals before it commences any operations that may cause subsidence, which will require additional assessment, management planning and community consultation.

The Department notes that the Mount Arthur North development consent provides a comprehensive basis for managing environmental impacts associated with the mine complex. Accordingly, the Department has recommended conditions that would require Mt Arthur Coal to operate the underground project in an integrated manner within the context of the existing approvals for the mine complex.

On balance, the Department believes that the project's benefits would sufficiently outweigh its residual costs, and that it is therefore in the public interest and should be approved, subject to conditions.

1. BACKGROUND

Mt Arthur Coal Pty Limited (Mt Arthur Coal) (also known as Hunter Valley Energy Coal Pty Limited) operates the Mt Arthur open cut coal mine, located approximately 8 kilometres south of Muswellbrook in the Upper Hunter Valley (see Figure 1). The mine comprises 3 separate mining areas, including (see Figure 2):

- Bayswater No.2 (extraction complete);
- Bayswater No.3 (operating under DA 210/93); and
- Mount Arthur North (operating under DA 144-05-2000).

The combined operations have approval to extract 20 million tonnes of run-of-mine coal a year, including 5 million tonnes from Bayswater No. 3 and 15 million tonnes from Mount Arthur North.

Figure 1: Regional Context

Figure 2: Mt Arthur Coal Mine and Surrounds

2. PROPOSED PROJECT

2.1 Project Description

Mt Arthur Coal is proposing to establish a new underground coal mine to supplement its existing open cut mining complex. The proposal – known as the Mt Arthur Underground Project – involves longwall mining from 5 coal seams at a rate of approximately 8 million tonnes of run-of-mine (ROM) coal a year over a period of 21 years. Extracted coal would be processed in Mt Arthur Coal's existing coal handling and preparation facilities and then transported to market using existing rail loading and conveyor facilities. The mine infrastructure would be upgraded to service the project.

The major components of the project are summarised in Table 1, and depicted on Figure 3. The project is described in full in Mt Arthur Coal's Environmental Assessment (EA), which is attached as Appendix F.

Table 1: Major Components of the Project

Aspect	***Description***
Project Summary	**Construction and operation of an underground coal mine at the existing Mt Arthur Coal Mine Complex.**
Mining and Reserves	Underground longwall mining from 5 coal seams (in order of extraction, Woodlands Hill, Glen Munro, Arrowfield, Bowfield and Piercefield Seams). The project is based on a coal resource of approximately 160 million tonnes.
Production	Extraction of up to 8 million tonnes of ROM coal a year. Total production from Mt Arthur Coal's combined operations would increase to 28 million tonnes a year.
Project Life	21 years.
Coal Washing	Construction and operation of new ROM coal handling facilities plus use and upgrade of the existing Mt Arthur Coal coal handling and preparation plant (CHPP).

Aspect	Description
Product Coal Transport	Product coal would be transported via existing rail loading (export coal) and conveyor facilities (domestic coal). The rail loading facilities would be upgraded to increase capacity.
Coarse Rejects and Tailings Management	Coarse rejects and tailings would be disposed of within existing voids and overburden emplacements in the Bayswater No.2, Bayswater No.3, Mt Arthur North and the adjacent Drayton West Pit (subject to agreement with Drayton).
Surface Infrastructure	• Pit top facilities including office, workshop, store and bathhouse; • ROM coal clearance system including conveyors, stockpiling and a coal sizing facility; • Extension of existing site access road; • Site services including powerlines, water system, water extraction point and pipeline from the Hunter River; • Upgrade of existing Mt Arthur CHPP including a new plant module, stockpiling and associated handling systems; • Upgrade of existing rail loading facility including extension of existing passing lane on the Antiene rail spur; and • Ventilation, borehole, gas drainage and dewatering facilities.
Employment	Peak construction workforce of 470 personnel and an operational workforce of 300 personnel.
Capital Value	$320,000,000
Hours of Operation	24 hours a day, 7 days a week.

2.2 Amendments to the Project

During the exhibition of the EA, Transgrid raised serious concerns regarding potential subsidence impacts on the Bayswater to Mt Piper 330/500kV transmission line which traverses the project site. The transmission line is an integral component of the NSW electricity supply network.

In response to these concerns, Mt Arthur Coal has committed to relocation of the transmission line prior to it being subsided. Mt Arthur Coal has identified two alternative transmission line alignment options, identified as Option A and Option B2. The options are shown on Figure 4.

Option A is nominated as the preferred alignment, although Option B2 has been retained as a contingency.

The transmission line relocation would result in a small reduction in the originally proposed mining area. The project amendment is described in full in Mt Arthur Coal's Preferred Project Report, which is attached in Appendix D.

2.3 Project Setting

The proposed underground mining area is located approximately 10 kilometres south of Muswellbrook in the Upper Hunter Valley.

Landuse above the proposed underground mining area includes mining (Mt Arthur Coal's Bayswater No.3 open cut mine) and agriculture (grazing) (see Figure 5).

All land within the subsidence affectation area is owned by Mt Arthur Coal, apart from 3 private rural landholdings in the western area, and Crown land in the form of road reserves and a travelling stock reserve (see Figure 6).

Sensitive receivers in the locality include:

- Antiene rural-residential area to the north-east, located approximately 8 km from the proposed pit top facilities, 3.5 km from the existing CHPP, and adjacent to the Antiene Rail Spur;
- South Muswellbrook residential area to the north, located approximately 9 km from the proposed pit top facilities, 4.5 km from the existing CHPP, and 5 km from the Antiene Rail Spur;
- Racecourse Road rural-residential area to the north, located approximately 8 km from the proposed pit top facilities, 5 km from the existing CHPP, and 7 km from the Antiene Rail Spur; and
- Denman Road rural-residential area to the north-west, located approximately 4 km from the proposed pit top facilities, 7 km from the existing CHPP, and 8 km from the Antiene Rail Spur.

With regard to the proposed transmission line relocation, Option A would traverse two privately owned properties (ie. the western section of the relocation). Option B2 would be retained within land owned by Mt Arthur Coal (apart from necessary crossings of public roads).

Figure 3: Project Layout Plan

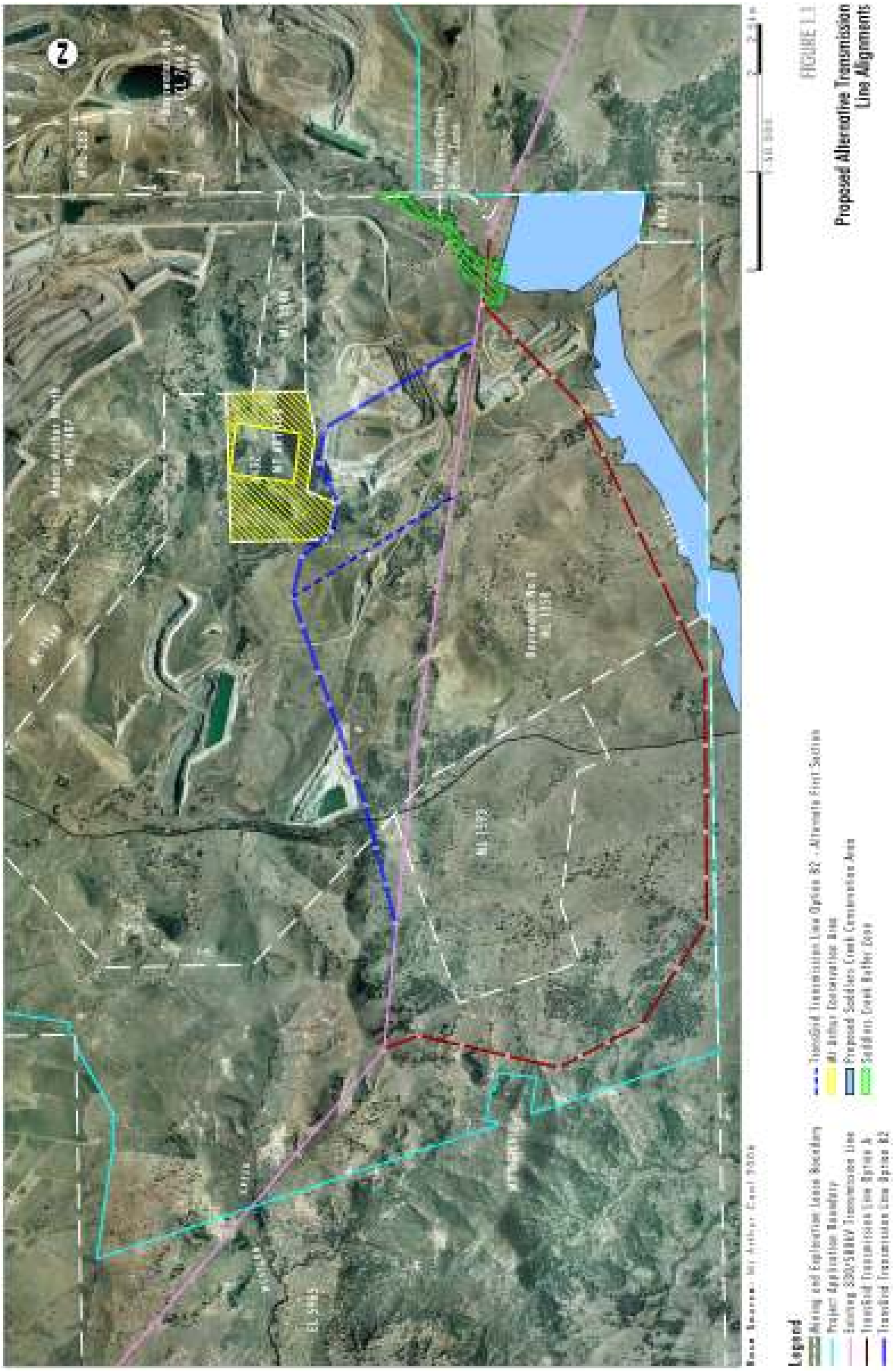

Figure 4: Transmission Line Relocation Options

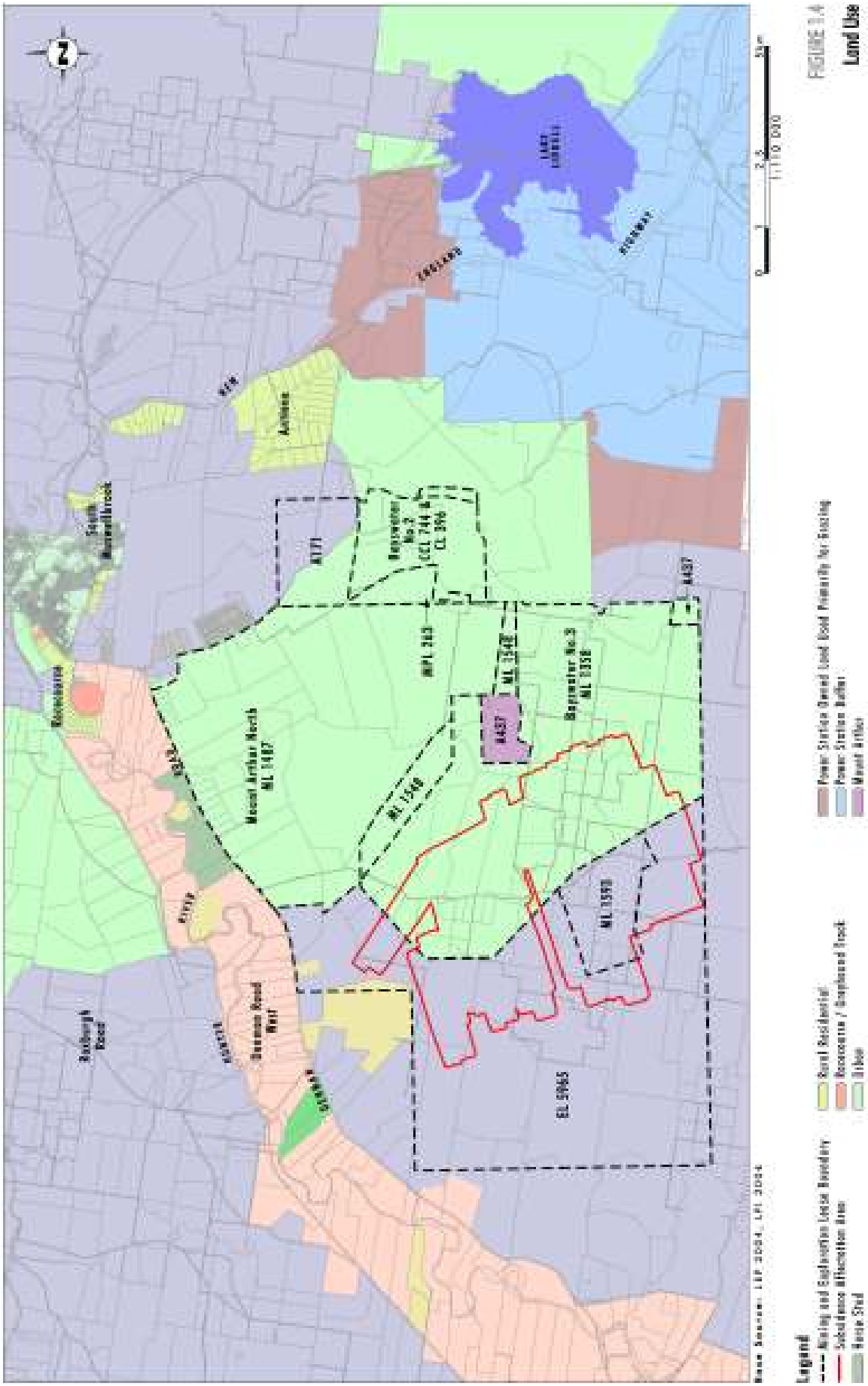

Figure 4: Land Use Plan

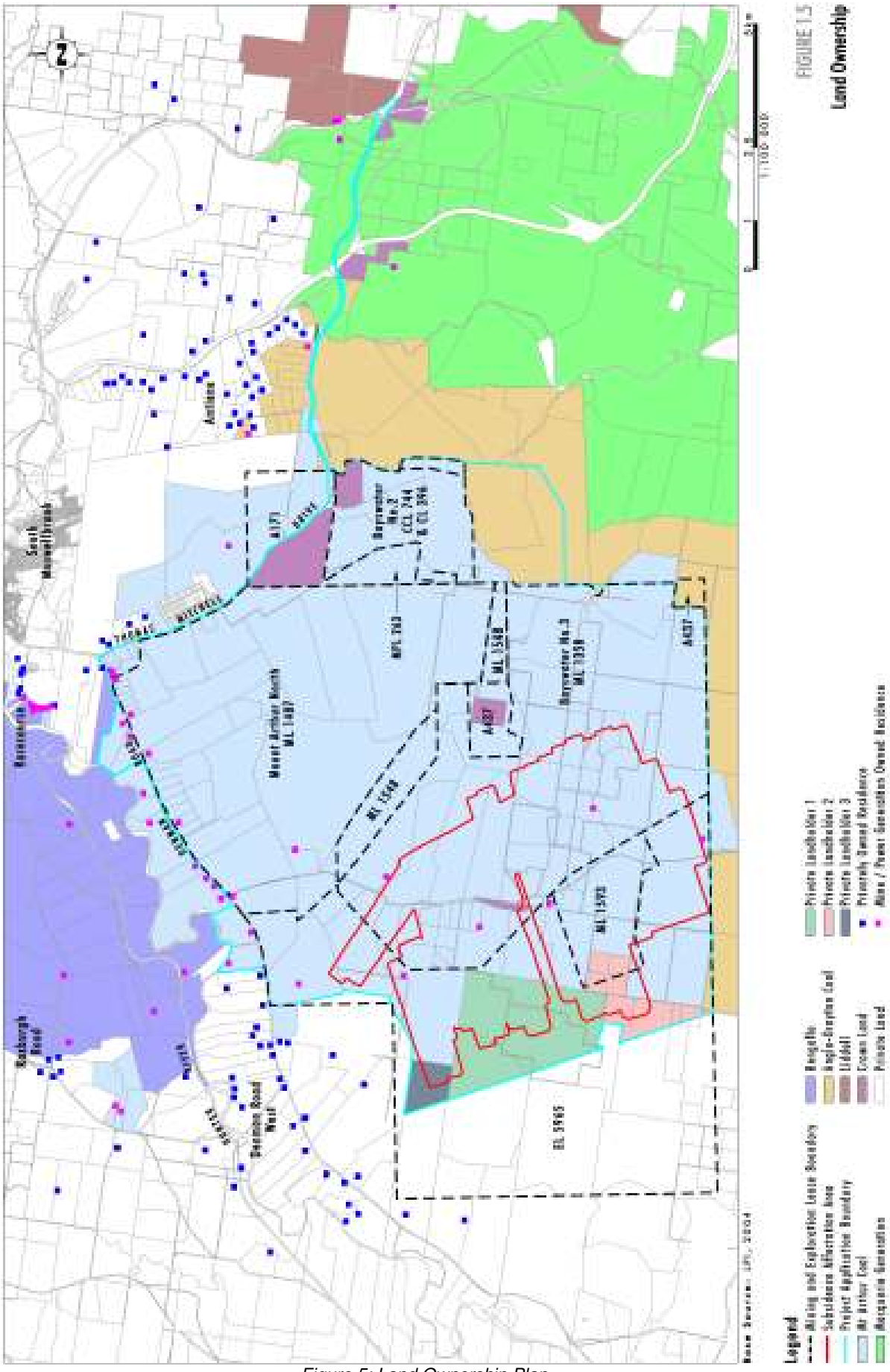

Figure 5: Land Ownership Plan

2.4 Project Need

The Department recognises that society is heavily reliant on coal to meet its basic energy needs (both at a domestic and international level). Coal provides around 90% of NSW's electricity needs, 75% of Australia's electricity needs and 40% of the world's electricity needs.

Access to energy remains a critical development need, particularly for the one-third of the world's population without electricity. As living standards and development in Third World countries increase, it is expected that the demand for coal will rise to satisfy increasing global energy requirements. The Mt Arthur Underground Project would contribute to supplying this rising annual coal demand. Therefore the ultimate need for the project is driven by both domestic and international markets to meet current and future energy needs.

Consequently, the Department is satisfied that there is a demonstrable need for the project in terms of meeting society's need for adequate, reliable and affordable energy.

At the local level, the Department recognises that the proposed area of coal extraction is largely surrounded by existing mining operations undertaken by Mt Arthur Coal and Anglo Coal (Drayton). The project is able to be undertaken using existing mining facilities and infrastructure. In this regard, the Department acknowledges that the project represents a logical extension to existing coal mining activities at Mt Arthur.

From the State's perspective, the project would deliver a number of key benefits, including the generation of 300 new jobs at the Mt Arthur mine complex, flow-on regional economic benefits, and significant royalty and tax income.

Notwithstanding the above, the Department recognises that a balance must be met in the promotion and co-ordination of the orderly and economic use of land; the proper management and development of the State's resources; and the protection of the environment and ecologically sustainable development. The Department has considered these matters in detail in its assessment of the project.

3. STATUTORY CONTEXT

3.1 Major Project

The proposal is classified as a major project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), because it is development for the purpose of coal mining, and therefore triggers the criteria in Clause 5 of Schedule 1 of *State Environmental Planning Policy (Major Projects) 2005*.

Consequently, the Minister for Planning is the approval authority for the project.

3.2 Permissibility

The land subject to the application is primarily zoned 1(a) (Rural "A" Zone) under the *Muswellbrook Local Environmental Plan 1985*, with a smaller portion zoned 7(L1)(Environment Protection General (Alluvial Areas)).

Mining is permissible with consent in zone 1(a), and prohibited in zone 7(L1).

Notwithstanding, *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* makes underground mining permissible with consent on all land in the project area.

Consequently, the Minister can approve the project.

3.3 Exhibition and Notification

Under Section 75H(3) of the EP&A Act, the Director-General is required to make the Environmental Assessment (EA) of a project publicly available for at least 30 days.

After accepting the EA for the project, the Department:

- made it publicly available from 23 January until 25 February 2008:
  - on the Department's website, and
  - at the Department's Information Centre and Muswellbrook Shire Council;
- notified landowners in the vicinity of the site about the exhibition period by letter;
- notified relevant State government authorities and Muswellbrook Council by letter; and
- advertised the exhibition in the Muswellbrook Chronicle.

This satisfies the requirements in Section 75H(3) of the EP&A Act.

In accordance with Section 75H(6) of the EP&A Act, the Director-General required Mt Arthur Coal to submit a Preferred Project Report (PPR) for the project describing the proposed relocation of Transgrid's 300/500kV transmission line. After accepting the PPR, the Department:

- notified the two affected landowners and the neighbouring mine (Drayton Coal) by letter, and invited the stakeholders to make a submission on the PPR;
- notified relevant State government authorities and Muswellbrook Council by letter, and invited the agencies to make a submission on the PPR; and
- made the PPR publicly available on the Department's website.

This satisfies the requirements in Section 75H(7) of the EP&A Act.

3.4 Environmental Planning Instruments

Under Section 75I of the EP&A Act, the Director-General's report is required to include a copy of or reference to the provisions of environmental planning instruments that substantially govern the carrying out of the project.

The Department has considered the project against the relevant provisions of several *State Environmental Planning Policies* (SEPPs) and other environmental planning instruments (see Appendix C), and is satisfied that none of these instruments substantially govern the carrying out of this project.

3.5 Objects of the Environmental Planning and Assessment Act 1979

The Minister is required to consider the objects of the EP&A Act when he makes decisions under the Act. The objects of most relevance to the Minister's decision on whether or not to approve the proposed modifications are found in section 5(a)(i),(ii),(iii),(vi)&(vii). They are:

> *'The objects of this Act are:*
> *(a) to encourage:*
> *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
> *(ii) the promotion and co-ordination of the orderly and economic use and development of land,*
> *(iii) the protection, provision and co-ordination of communication and utility services,*
> *(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
> *(vii) ecologically sustainable development (ESD).'*

The Department is satisfied that the project encourages the proper use of resources (Object 5(a)(i)) and the promotion of orderly and economic use of the land (Object 5(a)(ii)), particularly as the subject coal resource is located in the centre of existing mining activities and is able to be undertaken using existing mining facilities and infrastructure.

The Department is also satisfied that the project protects and provides for communication and utility services (Object 5(a)(iii)), particularly in that it provides for the relocation and protection of the significant 330/500kV transmission line that traverses the site.

Consideration of environmental protection (Object 5(a)(vi)) is provided in Section 5 of this report. Following its consideration, the Department is satisfied that the project is able to be undertaken

in a manner that would maintain and potentially improve biodiversity values of the locality in the medium to long term.

The Department has considered the encouragement of ESD (Object 5(a)(vii)) in its assessment of the project application. This assessment integrates all significant economic and environmental considerations and seeks to avoid any potential serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences. Mt Arthur Coal has considered a number of alternatives to the proposed project (including the alternative of not proceeding) and considered the proposal in the light of the ESD principles (see Appendix F).

3.6 Statement of Compliance

Under Section 75I of the EP&A Act, the Director-General's report is required to include a statement relating to compliance with the environmental assessment requirements with respect to the project.

The Department is satisfied that the environmental assessment requirements have been complied with.

4. ISSUES RAISED IN SUBMISSIONS

During the exhibition period for the EA, the Department received 9 submissions on the project:

- 7 from public authorities (DPI, DECC, DWE, MSB, RTA, Heritage Office and Muswellbrook Council);
- 1 from a special interest group (CFMEU); and
- 1 from the general public.

In response to the additional consultation undertaken for the PPR, the Department received additional submissions from the DPI and DECC.

None of the submissions objected to the project.

A summary of the issues raised in submissions is provided below. A full copy of the submissions is attached in Appendix E.

4.1 Public Authorities

The ***Department of Primary Industries*** (DPI) does not object to the project, however it noted that the project has the potential to result in significant subsidence-related impacts, including impacts on:

- the local community, particularly due to the potential temporary closure of Edderton Road, and impacts to private property (such as serviceability of farm infrastructure, erosion, changes to drainage, etc.); and
- Transgrid's 330/500kV transmission line.

In response to DPI's and Transgrid's concerns, Mt Arthur Coal has prepared a PPR which provides for the relocation of the transmission line. The DPI does not object to the relocation options as provided for in the PPR, but noted its preference for 'Option A'. This issue is addressed in Section 5.1 below.

The ***Department of Environment and Climate Change*** (DECC) does not object to the project, and is satisfied that the impacts of the project in relation to noise, air quality, greenhouse gases, flora and fauna and Aboriginal cultural heritage are manageable (with the exception of noise impact at one property). DECC recommended a number of conditions to manage these environmental impacts, which the Department has incorporated into the recommended conditions of approval.

Further, DECC does not object to the transmission line relocation options as provided for in the PPR, subject to additional archaeological assessment being undertaken once the new pylon locations are determined, and the relocated transmission line avoiding the existing Mt Arthur Conservation Area.

The ***Department of Water and Energy*** (DWE) does not object to the project. DWE recommended that a number of matters be addressed as part of the mine's environmental and rehabilitation management plans, including:

- quantification of flow volume loss from surface and groundwater resources;
- ongoing site water balance assessment (including integrated assessment for the combined Mt Arthur mine complex);
- demonstration that water resource interceptions are appropriately licensed and that mining operations comply with relevant water use and water sharing regulations;
- appropriate remediation measures for damage to streams caused by subsidence, as part of 'stream management plans'; and
- rehabilitation of existing degraded sections of Saddlers Creek.

The ***Mine Subsidence Board*** (MSB) does not object to the project, but noted that the erection of surface improvements will require the approval of the MSB.

The ***Roads and Traffic Authority*** (RTA) does not object to the project, but raised some concern regarding the traffic modeling in the EA, including that the modelling should be revised to include background traffic growth. The RTA also recommended that Mt Arthur Coal be required to undertake a Road Safety Audit of key intersections (including the intersections of Thomas Mitchell Drive with the New England Highway and Denman Road).

The ***NSW Heritage Office*** does not object to the project, but raised some concerns about aspects of the historical heritage assessment in the EA. The Heritage Office recommended a number measures to address these issues and manage the heritage impacts of the project, including recommendations for a detailed Heritage Management Plan, Conservation Management Plans, archival recording and/or relocation of heritage items, and additional historical research and/or excavation of heritage items.

Muswellbrook Shire Council supports the project, subject to a number of matters including:

- that the water pipeline from the Hunter River be buried and established in consultation with Council and DWE;
- that approval be gained for sewage treatment and disposal on the site;
- that the commitments of the EA be included as conditions of approval;
- that the endangered population (ie. *Acacia pendula*) be signposted and/or fenced to prevent impact;
- that the Traffic Management Plan be reviewed every 3 years and include provisions for regular road maintenance;
- that no trains be allowed to block the Antiene Railway Station Road level crossing; and
- that external medical services be obtained where possible (in particular for workplace medical assessments) to alleviate local medical service shortages.

4.2 Community and Interest Groups

The ***Construction Forestry Mining and Energy Union*** supports the project.

A submission was also received on behalf of ***Rosebrook Pty Ltd***, which owns one of the private landholdings above the proposed underground mining area. The submission did not object to the project, but raised serious concerns associated with subsidence, including:

- the requirement to fence off and therefore 'quarantine' part of the private agricultural (grazing) land whilst undermining is occurring;
- impact on groundwater resources;
- impact on surface water resources; and
- danger to livestock and humans associated with surface movement.

The submission requested that consideration be given to the granting of acquisition rights to Rosebrook Pty Ltd, should the project be approved.

4.3 Response to Submissions and Preferred Project Report

Mt Arthur Coal has provided responses to the issues raised in submissions (see Appendix D), as well as a revised Statement of Commitments for the project. As stated above, Mt Arthur Coal also prepared a Preferred Project Report which addresses the proposed relocation of Transgrid's 330/500kV transmission line.

The Department has considered the issues raised in submissions, and Mt Arthur Coal's responses to these issues and the PPR, in its assessment of the project.

5. ASSESSMENT

5.1 Subsidence and Landforms

Issue
The project would cause surface and sub-surface subsidence, which would affect a range of man-made and natural features both overlying and in close proximity to the proposed underground mining operations.

Consideration
The EA includes a specialist subsidence impact assessment undertaken by Mine Subsidence Engineering Consultants Pty Ltd, which was subject to peer review by Frith Consulting Services.

Subsidence modelling indicates that the maximum subsidence associated with mining in any one seam would range between 2.1 and 2.9 metres, and that maximum total subsidence associated with mining in all seams would be approximately 5.6 metres. Predicted total surface subsidence across the mining area is shown on Figure 6.

The Department notes that subsidence associated with multi-seam longwall mining in NSW and Australia is not well understood at this time, as there is a lack of multi-seam mining experience in Australian conditions and little empirical data available to validate predictions.

As such, there is some doubt about the accuracy of the cumulative subsidence predictions. However, Mt Arthur Coal has used conservative predictions in its subsidence assessment (ie. subsidence of 70-75% of extracted seam height for multi-seam conditions), and the Department is satisfied that Mt Arthur Coal's approach is reasonable.

The predicted subsidence has the potential to affect a number of natural and man-made features, including:
- local landforms (surface cracking, slumping and steep slope destabilisation);
- rural land improvements (including residences, farm buildings, farm dams, fences and groundwater bores);
- public infrastructure and utilities (including Edderton Road, Transgrid's 330/500kV transmission line and low voltage transmission lines, and underground copper telephone cables);
- surface water and groundwater resources – see Section 5.2;
- flora and fauna – see Section 5.6;
- Aboriginal heritage sites – see Section 5.7;
- historic heritage sites – see Section 5.8.

<u>Local Landforms</u>
With regard to local landforms, the assessment indicates that an area of approximately 820 hectares above the mine would be potentially impacted by irregular subsidence profiles and/or surface cracking. These areas would potentially require subsidence remediation works by way of cultivation (tilling and/or infilling of cracks to restore the surface profile and drainage paths) or more extensive earthworks (dozing and deep ripping). The areas predicted to require such remediation works are shown on Figure 7.

The assessment indicates that whilst there is potential for soil slumping occurring on steep slopes in the northern and western areas of the affectation area, it is unlikely that that mine subsidence would result in any large scale slope failure.

The DPI and the Department are satisfied that the project's impacts on local landforms are able to be mitigated and managed as part of the Subsidence Management Plan (SMP) process for the project (see below).

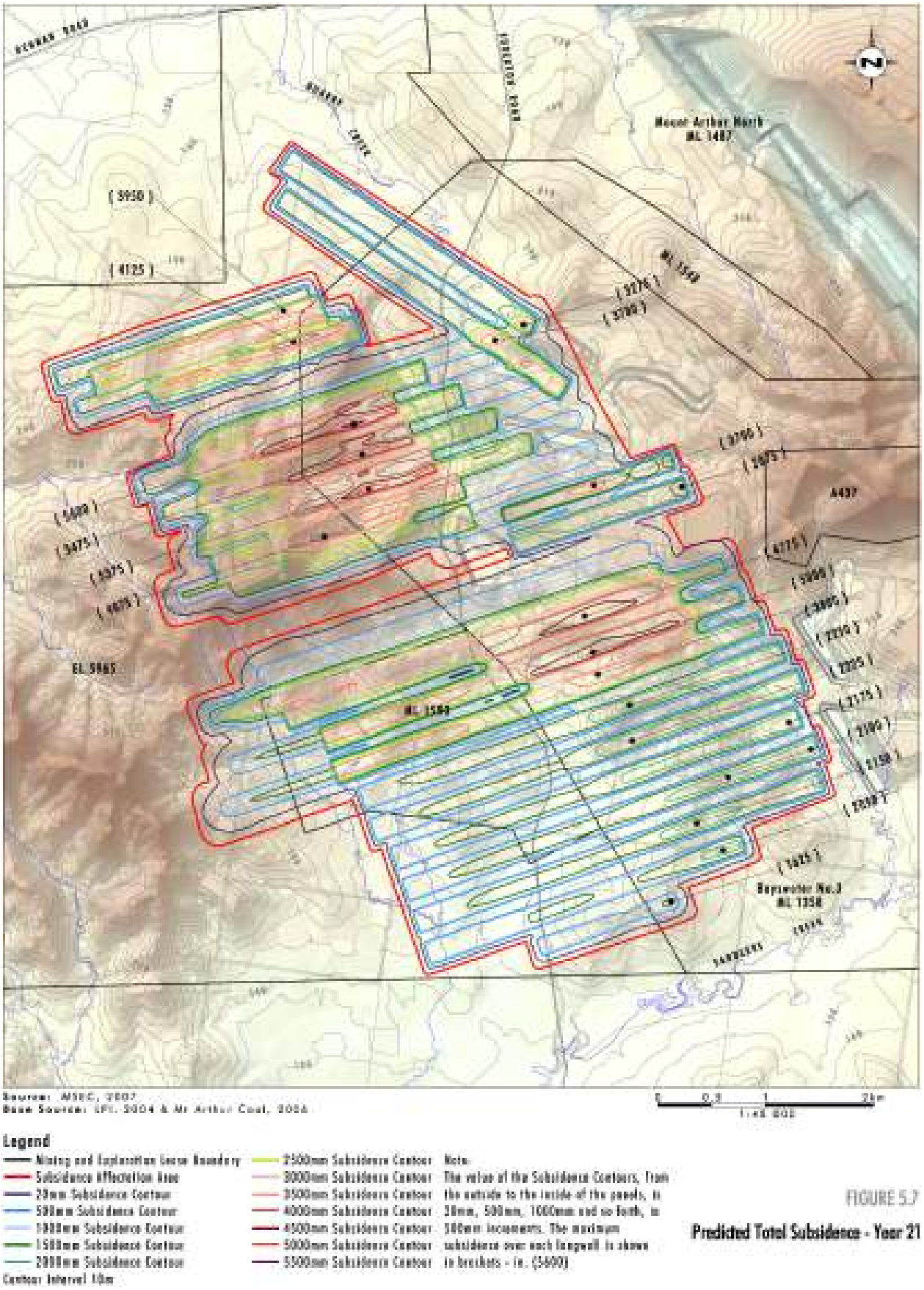

Figure 6: Predicted Total Subsidence

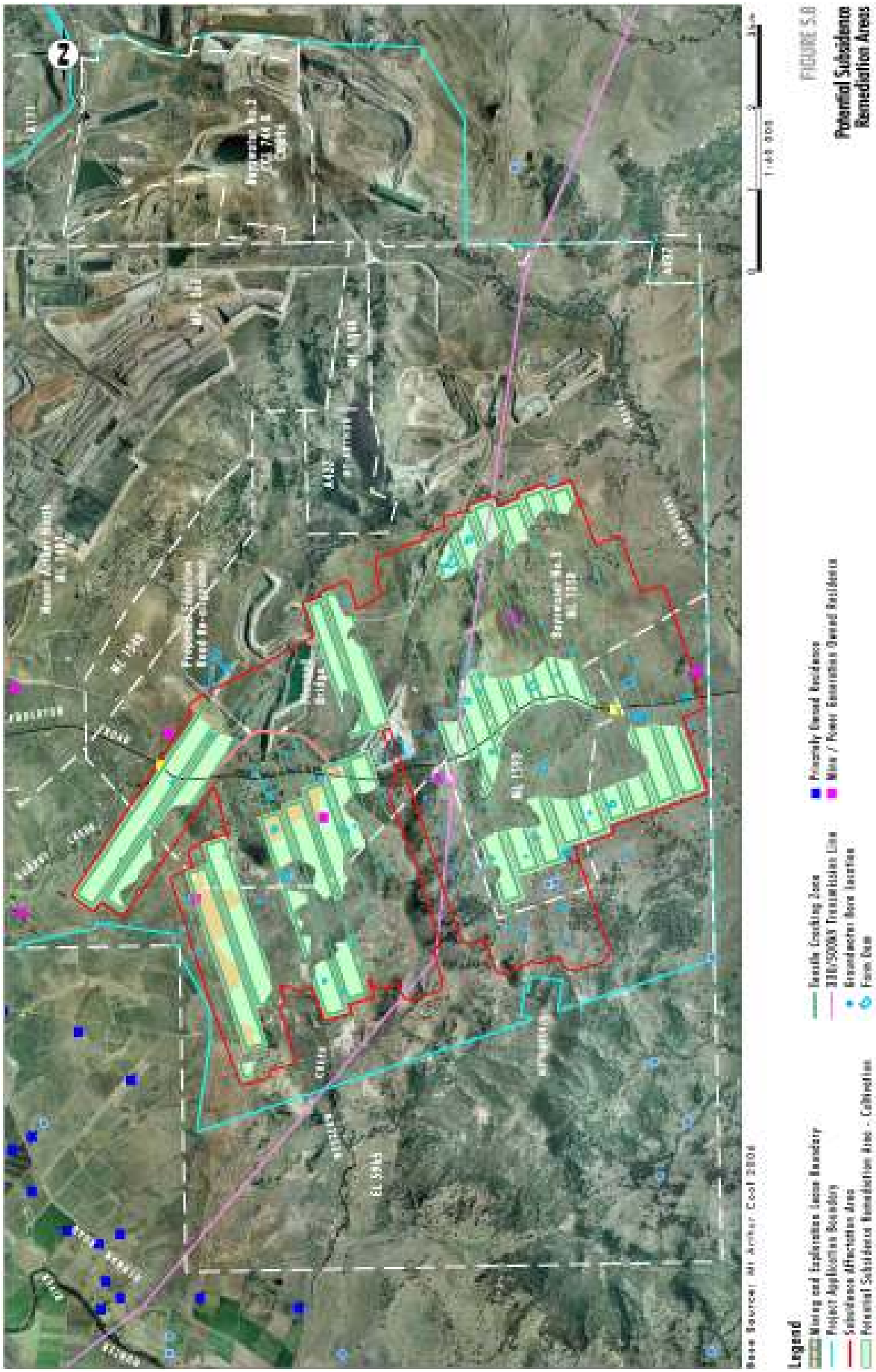

Figure 7: Predicted Subsidence Remediation Areas

Rural Land Improvements

With regard to rural land improvements, the EA notes that the following improvements exist within the subsidence affectation area:

- 10 residences, all owned by Mt Arthur Coal;
- 39 rural building structures, including farm sheds, garages and other structures, all of which are owned by Mt Arthur Coal;
- 90 farm dams, nine of which are privately owned;
- 11 registered water bores, three of which are privately owned; and
- stock fences.

Many of the residences and building structures (all owned by Mt Arthur Coal) are expected to be affected by subsidence, and would require extensive repair work to be returned to a safe and serviceable condition. Mt Arthur Coal proposes to inspect all structures before and after mining to determine the extent of any preventive or remedial works required. Some structures would be demolished or fenced off prior to undermining.

Of the farm dams, 68 (including 4 privately-owned dams) are predicted to be subject to some cracking or leakage of water from the dam walls, although none are predicted to be subject to failure or significant water loss. Mt Arthur Coal proposes to monitor and remediate impacts to farm dams, and has committed to providing alternative water supplies to any private landowner whose farm dam water supplies are affected.

Similarly, Mt Arthur Coal has committed to providing alternative water supplies to any private landowner whose bore water supplies are affected by the proposal. In this regard, all of the bores in the area (including the 3 privately owned bores) are predicted to be impacted by subsidence.

One of the three private rural landowners within the subsidence affectation area (ie. Rosebrook Pty Ltd) raised a number of concerns regarding subsidence-related impacts, including:

- that the requirement to fence off and therefore 'quarantine' part of the farm whilst undermining is occurring would *'present a major dislocation to the…workings of the land'* and therefore affect the income obtained from the land;
- impact on groundwater resources (water bores);
- impact on surface water resources (farm dams); and
- that subsidence would present a danger to livestock and humans associated with surface movement.

With regard to impacts on water supplies, as stated above the project is predicted to have some impact on privately-owned groundwater bores and farm dams, including those owned by Rosebrook. However, the Department acknowledges Mt Arthur Coal's commitment to monitor impacts to water supplies and to provide alternative water supplies to any private landowner whilst repairs to supplies are being affected. This commitment is consistent with practice in most other rural areas affected by underground mining, and the Department is satisfied that water supplies to Rosebrook and other rural landusers are able to be maintained throughout the project (see Section 5.2 for further consideration of impact to water resources).

The other two points raised by Rosebrook are related – that is, that part of the private rural land would be required to be fenced off whilst subsidence is occurring to mitigate dangers to livestock and humans associated with ground surface movements.

Mt Arthur Coal has acknowledged that the potential requirement to temporarily restrict access to parts of private agricultural land may temporarily affect the proper and normal working of the land. The company notes that the fencing may be required to be maintained until the subsidence remediation has been completed, and that subsidence remediation would be undertaken progressively as subsidence occurs, thereby minimising the duration of required fencing.

The Department agrees that temporary restrictions on access to parts of private landowners agricultural properties would have some affect on the normal working of the land, but that the project is unlikely to significantly affect the continued operation of the three affected private landowners. The Department is satisfied that these impacts are able to be mitigated, managed

and/or compensated as part of the SMP process for the project, which would include the preparation of specific Private Property Plans (PPPs) for each of the affected private landowners.

Public Infrastructure

The main public infrastructure within the subsidence affectation area includes:

- Edderton Road;
- underground copper telephone cables; and
- Transgrid's 330/500kV transmission line and low voltage transmission lines.

Edderton Road

Edderton Road is a local road providing access to rural properties in the locality. It has a speed limit of 100 km/h, supports relatively low traffic volumes (565 vehicle movements per day) and traverses the project area in a north-south direction (see Figure 6). A diversion of a section of the road has previously been approved as part of the Bayswater No. 3 project and Mt Arthur Coal proposes to construct this diversion prior to underground mining of the Glen Munro seam.

There are two small bridges on Edderton Road within the subsidence affectation area, and a third bridge will be constructed along the Edderton Road diversion spanning the Belmont Pit.

The subsidence impact assessment indicates that Edderton Road will suffer cracking and rippling of the road surface (cracks up to 30 millimetres are likely) within the subsidence affectation area. The two existing bridges are likely to remain safe and serviceable, but tensile strains will result in gaps in the bridge abutments of up to 50 millimetres, and subsidence may result in some cracking of the road surface on one of the bridges. The proposed bridge across the Belmont Pit would be designed to tolerate the maximum subsidence movements.

Mt Arthur Coal proposes to monitor subsidence impacts on the road and bridges throughout the mining operations, and effect repairs as mining proceeds using standard road maintenance techniques. Temporary diversions around subsidence affectation areas would be established prior to subsidence, in accordance with a Traffic Management Plan.

Underground Telephone Cables and Low Voltage Transmission Lines

Underground copper telephone cables cross the subsidence affectation area along the alignment of Edderton Road. The cables are likely to be affected by subsidence, and preventive measures (including relocation of the cables to conduits and additional lengths of cable) would be required to ensure that they remain safe and serviceable throughout the project.

The low voltage power lines within the subsidence affectation area would also likely require some preventative measures (including cable tensioning and guy ropes) to ensure that they remain safe and serviceable.

Bayswater-Mount Piper 330/500kV Transmission Line

The 330/500kV transmission line, owned by Transgrid, crosses the subsidence affectation area in an east-west direction (see Figure 4). The subsidence impact assessment in the EA indicated that preventive measures (including pylon stabilisation, cable tensioning and a change to the mine plan to reduce subsidence on one key 'tension' pylon) could be undertaken to some of the pylons to ensure that the transmission line remains safe and serviceable throughout the project.

The DPI (on behalf of Transgrid) raised serious concerns about the potential for subsidence to affect the safety and serviceability of the transmission line, particularly given the nature of the transmission line, the low depth of cover, and the proposed multi-seam extraction.

In response to these concerns Mt Arthur Coal – in consultation with the DPI, the Department and Transgrid – agreed to relocate the transmission line to avoid the areas of greatest subsidence. Mt Arthur Coal identified two options for relocation of the transmission line, referred to as Option A and Option B2 (see Figure 4).

Option A involves relocating the transmission line to the south of the existing alignment. The realignment is approximately 11.7 kilometres in length, and traverses land owned by Mt Arthur

Coal and two private landowners (Rosebrook and Wonarua properties). Neither of these private landowners have objected to the relocation of the transmission line across their properties.

Option B2 involves relocating the transmission line to the north of the existing alignment, across land owned by Mt Arthur Coal. The realignment is approximately 7.2 kilometres in length.

Both alignments have been designed to mitigate the risk of subsidence damage to the transmission line. Modeling indicates that the relocated transmission line would be subject to the following subsidence (for any tower):

- Option A:
  - <20mm (proposed 21 year mine plan);
  - 30mm (all seams with mining potential[1]);
- Option B2:
  - 50mm (proposed 21 year mine plan);
  - 320mm (all seams with mining potential[1]).

As a comparison, the maximum predicted subsidence along the existing transmission line alignment is 4,931 mm.

Given that the predicted subsidence impacts for Option A are lower than those for Option B2, Mt Arthur Coal notes that Option A is its preferred option. Notwithstanding, Mt Arthur Coal notes that both options are viable and seeks approval for either one of the options, subject to detailed engineered studies and consultation with Transgrid and affected landowners (in the case of Option A).

Transgrid has advised that either route would be acceptable to it, although Option A is preferred in that it avoids mining areas.

DPI has also advised that its preference is Option A, but does not object to Option B2 (however the DPI stated that Option B2 would require additional feasibility assessment if this option is to be progressed further). The DPI does have some residual concerns about potential subsidence effects on 'Tower 36', which is common to both relocation options. DPI's concerns about this tower stem from its proximity to multi-seam mining areas (the subsidence impacts of which are not able to be predicted with a high level of confidence at this stage), the fact that the tower is an integral component of the NSW electricity grid (it is the largest angled tower in the state), and that the tower is located in an area of steep topography with significant geological structures.

Notwithstanding, the DPI acknowledges that the potential impacts on Tower 36 could be managed through a minor alteration to the mine plan, and that this issue can be dealt with during the SMP approval process. DPI recommends a condition requiring Mt Arthur Coal to avoid any subsidence on the Option A route.

The Department is satisfied that the impacts on the 330/500kV transmission line are able to be mitigated through relocation of the line and/or through minor alteration of the mine plan, as proposed by Mt Arthur Coal in its PPR, and as recommended by DPI. The Department believes that the decision on which route to progress should be made prior to causing subsidence on either of the identified options.

Conclusion

The Department and the DPI are satisfied that Mt Arthur Coal has adequately assessed the project's subsidence-related impacts. Whilst there is some uncertainly about the accuracy of the subsidence predictions for multi-seam mining, the Department is satisfied that Mt Arthur Coal's approach to subsidence prediction is reasonable.

Based on the subsidence assessment, the Department and the DPI are satisfied that the project's subsidence-related impacts to local landforms, rural land and private and public infrastructure are able to be effectively avoided, minimised, remediated and/or compensated for.

[1] The project area contains additional coal seams beyond the 5 proposed to be extracted by the proposal, which may be extracted in the future (subject to separate approval).

The Department notes that Mt Arthur Coal will be required to obtain a separate approval for subsidence, in accordance with the approval process under the *Mining Act 1992,* prior to undertaking any operations that would potentially lead to subsidence of the land surface. Before an approval is granted, Mt Arthur Coal will be required to prepare a Subsidence Management Plan (SMP) for the proposal in accordance with DPI guidelines. Preparation of the SMP and adherence to its terms is managed by the DPI under the *Mining Act 1992.*

The Department also notes that all improvements in the proposed mining area are covered by the *Mine Subsidence Compensation (MSC) Act 1961* and that, in the event of damage to surface structures, the Mine Subsidence Board could rectify or compensate any such damage.

The Department is satisfied that these measures would ensure that the project does not result in any significant subsidence-related impacts. Notwithstanding, the Department believes that Mt Arthur Coal should be required to:

- avoid any subsidence on the 330/500kV transmission line until is has been appropriately relocated, and avoid any subsidence on the Option A transmission line relocation route;
- prepare a Subsidence Management Plan/s for the project in accordance with DPI guidelines, which includes detailed procedures to monitor, manage, remediate and/or compensate subsidence-related impacts on:
    - natural features;
    - public utilities;
    - farm land and facilities, and
    - areas and items of archaeological and heritage significance;
- validate subsidence predictions and report on subsidence effects and impacts at the end of each longwall panel;
- undertake regular independent audits (every 3 years), including an audit of subsidence predictions and impacts by a subsidence expert; and
- prepare a detailed Traffic Management Plan to manage subsidence impacts on Edderton Road.

5.2 Surface Water and Groundwater

Issues

The project has the potential to affect surface water and groundwater resources in a number of ways, including:

- altering the water balance for the Mount Arthur mine;
- affecting surface water flows in local and regional catchments, and water availability to downstream water users;
- affecting groundwater flows in sub-surface aquifers, and water availability to local groundwater users;
- affecting water quality in downstream surface water and groundwater resources; and
- affecting flood behaviour.

Consideration

The EA includes detailed surface water and groundwater impact assessments, undertaken by Umwelt Pty Ltd and Mackie Environmental Research Pty Ltd, respectively. The assessments include consideration of baseline water flow and quality conditions, water balancing and modelling to assess the impacts of the project on water quality and flows.

Water Balance

The Mt Arthur Underground Project is proposed to be integrated into the Mt Arthur Coal's existing water management system.

The EA includes a water balance assessment which indicates that the project would result in groundwater inflows into the underground workings of up to 2,057 megalitres per year. Water use would also increase as a result of the underground project, with total water demands of approximately 700 megalitres per year associated with the underground project.

Modelling of the revised mine water balance, including the underground project, indicates that the site water balance would vary between a net water deficit of 2,920 ML/yr for a dry year and net water surplus of 2,620 ML/yr for a wet year. The deficit would increase to 3,542 ML/yr for

the worst case driest year on record. Mt Arthur notes that this deficit is able to be reduced by up to 760 ML/yr by use of haul road dust suppressants.

The predicted maximum water deficit is approximately 350 ML/yr higher than that predicted for the existing open cut mine, and is primarily due to increased coal production.

During periods of water deficit, Mt Arthur Coal notes that it has access to a number of external water supplies, including water access licences on the Hunter Regulated River Water Source (comprising about 4,000 general security units and 342 high security units), treated effluent from Muswellbrook Shire Council, and recycled water from neighbouring industrial sources (eg. mine water from Drayton Mine).

The Department and the DWE are satisfied that these existing water sources should satisfy the water demands of the project (based on historical data), that the project would not have a significant impact on water availability and water sharing in the locality, and that the project water supply is able to be managed in a manner that is consistent with the water market established under the *Water Management Act 2000*.

During periods of water surplus, Mt Arthur Coal proposes to store the excess mine water in on-site storages, and/or discharge it in accordance with the rules of the Hunter River Salinity Trading Scheme.

Following a request by the DECC, Mt Arthur Coal provided additional information on the ability of the mine to comply with the rules of the Scheme under all conditions. The additional assessment indicates that the mine would be able to comply with the rules of the Scheme under all conditions.

Surface Water

The subsidence affectation area is located in the catchments of Quarry Creek, Western Creek and Saddlers Creek (which includes the Southern Creek and South-East Creek sub-catchments). All of these creeks (within the subsidence affectation area) are ephemeral creek systems (ie. flow intermittently) and ultimately drain to the Hunter River.

The proportion of the relevant catchments within the subsidence affectation area are shown in the following table.

Table 2: Project Area Sub-catchments

Catchment	***Area of Catchment within Subsidence Affectation Area***
Saddlers Creek	10%
- Southern Creek sub-catchment	*56%*
- South-East Creek sub-catchment	*35%*
Quarry Creek	39%
Western Creek	11%

Given the ephemeral nature of the affected creeks, and that the majority of the land downstream of these catchments is owned by Mt Arthur Coal or Drayton Coal, the Department is satisfied that any flow reductions in these catchments is unlikely to be significant, and that the reduction would not result in any impacts to downstream surface water users or the environment.

Notwithstanding, the DWE and the Department believe that Mt Arthur Coal should be required to comprehensively monitor stream flows, and provide compensatory water supplies to any downstream surface water user that experiences loss of surface water flows as a result of the project.

With regard to surface water quality, monitoring undertaken for the Mt Arthur mine indicates that Saddlers Creek has variable water quality, with a neutral to slightly alkaline pH ranging from 6.7 to 8.7, and a moderate to high salinity (electrical conductivity) ranging from 760 µS/cm to 17,000 µS/cm. Quarry Creek is also of variable water quality, with a pH ranging from 7.6 to 9.1, and electrical conductivity ranging from 490 µS/cm to 14,630 µS/cm.

The EA indicates that the project would act as a salt sink (through lowering of the groundwater table), and therefore is unlikely to result in an increase of salt levels in the downstream catchments.

As detailed above, land areas affected by subsidence would be remediated by cultivation, dozing and other earthworks. With the implementation of standard best practice techniques to mitigate erosion and sedimentation risks, the Department is satisfied that the project is able to be managed in a manner which would not significantly affect local and regional water quality.

The Department believes that Mt Arthur Coal should be required to manage the surface water impacts of the project within the context of, and in an integrated manner with, the existing Mt Arthur operations. In this regard, the Department has recommended conditions that require Mt Arthur Coal to review and update the existing water management plans and monitoring programs for the Mt Arthur mine to incorporate the project, in consultation with the DWE and DECC.

Groundwater

The groundwater impact assessment indicates that there are 3 key aquifer systems in the area, including aquifers associated with:

- the coal measures;
- the regolith (soils and weathered bedrock) near the ground surface; and
- alluvial sediments associated with the Hunter River, Saddlers Creek and their tributaries.

Groundwater quality within the coal measures and the alluvial lands is generally brackish to saline, while groundwater quality in the regolith is variable from fresh to saline.

Private groundwater bores in the locality are mostly concentrated on the alluvial lands of the Hunter River more than 3 kilometres to the west and north of the project area, although there are a small number of bores drawing water from the regolith and coal measures closer to the proposed mining area, with 3 private bores located within the subsidence affectation area.

Groundwater modelling indicates that the project would result in groundwater flows into the mine increasing from an initial rate of 0.5 ML/day to about 6 ML/day on the completion of mining. The regional groundwater depressurisation (or drawdown) associated with these inflows would extend approximately 3 to 4 kilometres from the mining area in each direction. The modelling indicates that the depressurisation would not extend to the Hunter River alluvial lands, and hence would not affect important groundwater supplies within these alluvials (see Figure 8).

However, the depressurisation would extend below Saddlers Creek and its alluvials. Analysis indicates that the existing upward seepage from the coal measures to the Saddlers Creek alluvium of 0.34 ML/day in the vicinity of the project area would be reduced to 0.26 ML/day. No regional reversal to downward leakage is expected, and hence the Saddlers Creek alluvials are expected to continue to receive saline seepage from the coal measures and to remain relatively unimpacted by the project. Surface cracking within the Saddlers Creek system would be rehabilitated through a program of shallow crack repair during mining operations.

There are 5 privately-owned groundwater bores above and to the west of the mining area which are likely to be adversely affected by the project, although only one of these is currently used. All of the bores are owned by the one landowner. Mt Arthur Coal has committed to providing an alternative water supply to the affected landowner as required.

Following the completion of mining, groundwater levels and pressures within the depressurised area would gradually recover (over about 50 years), although other Mt Arthur voids associated with open cut mining would act as a permanent groundwater sink.

The DWE did not raise any major concerns in relation to the groundwater impact assessment or the groundwater impacts of the project, however the DWE recommends that Mt Arthur Coal be required to compensate any loss of water to groundwater users in the event that this occurs. The DWE also recommended that detailed management plans be developed to address stream remediation, riparian area management and monitoring.

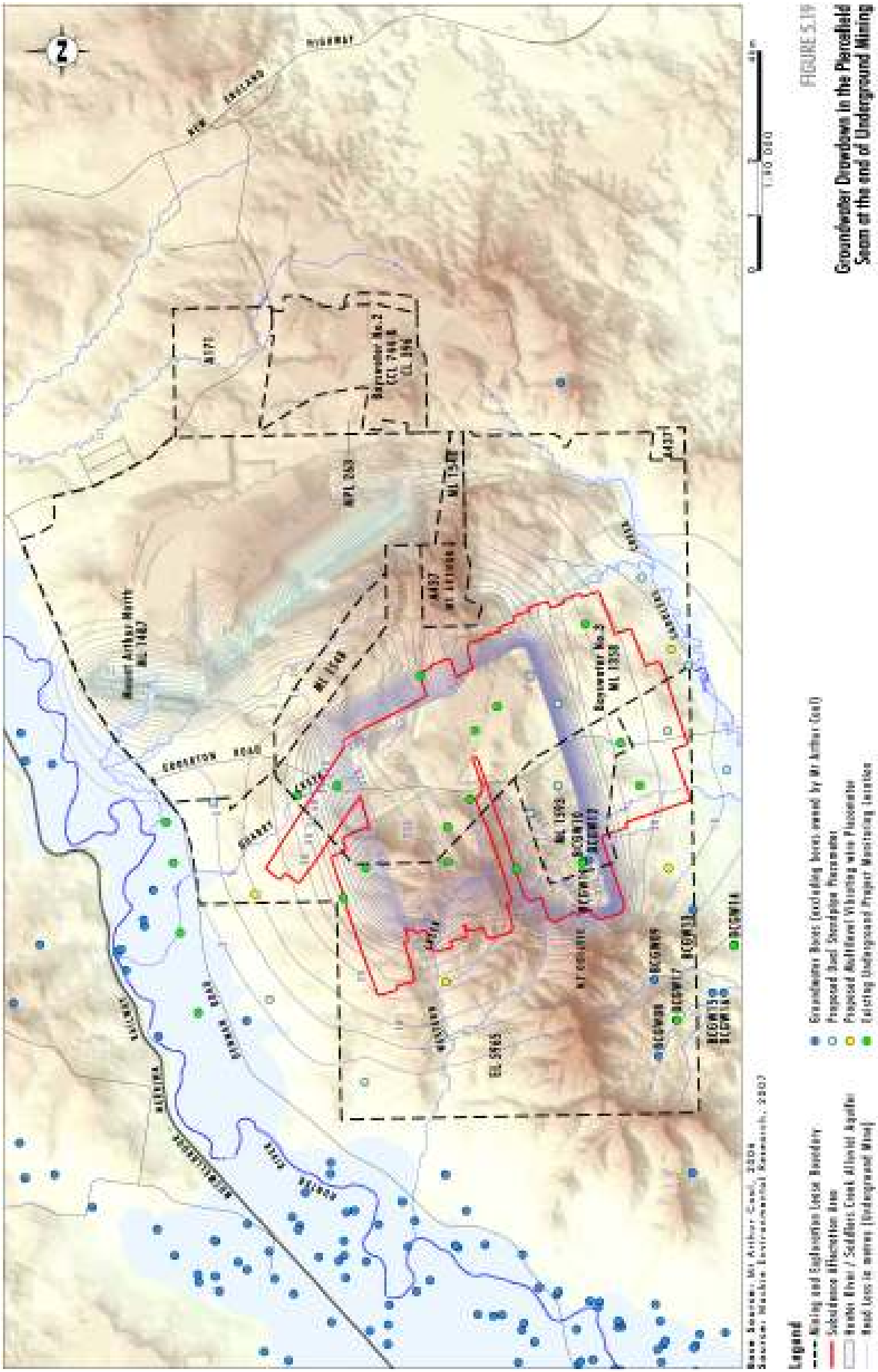

Figure 8: Predicted Regional Groundwater Drawdown

The Department is satisfied with the groundwater impact assessment provided in the EA. Based on this assessment the Department believes that, whilst the project would result in relatively significant regional depressurisation of the groundwater resource, this depressuriation is unlikely to affect a significant number of groundwater users, or result in a significant environmental impact.

The Department has recommended conditions that require Mt Arthur Coal to review and update the existing water management plans and monitoring programs for the Mt Arthur mine to incorporate the project, in consultation with the DWE. These plans/programs would include provisions to compensate landowners of privately-owned land whose water supply is adversely affected by the project.

Conclusion
The Department is satisfied that Mt Arthur Coal has adequately assessed the project's potential impacts to surface water and groundwater resources.

Following its assessment, the Department is satisfied that the project can be managed such that it would not have a significant impact on water resources. The Department has recommended conditions that require Mt Arthur Coal to review and update the existing water management plans and monitoring programs for the Mt Arthur mine complex to incorporate the project, in consultation with the DWE and DECC. In particular, the water management plans would be required to include:

- a Site Water Balance;
- an Erosion and Sediment Control Plan;
- a Surface Water Monitoring Plan;
- a Groundwater Monitoring Plan; and
- a Surface and Ground Water Response Plan.

5.3 Noise

Issue
The project has the potential to generate operational, traffic and rail-related noise impacts.

Consideration
The EA includes a noise impact assessment undertaken by specialist acoustics consultants Wilkinson Murray Pty Ltd in accordance with applicable guidelines, including the *NSW Industrial Noise Policy (INP)*.

The assessment was undertaken with reference to sensitive receivers in the vicinity of the Mt Arthur mine, which include (see Figure 5 and Section 2.3 for locations and more detail):

- Antiene rural-residential area;
- South Muswellbrook residential area;
- Racecourse Road rural-residential area; and
- Denman Road rural-residential area.

Construction Noise
The main construction activities associated with the project would include upgrade of the existing Mt Arthur Coal Handling and Preparation Plant, construction of pit top facilities, and construction of a ROM coal handling facility.

The EA indicates that the sound power levels associated with the construction plant would be no greater than the plant associated with operations in these locations. Given that construction works would be undertaken during the daytime period, the EA concludes that the noise emissions associated with construction would be no worse than the operational emissions.

The Department is satisfied that the construction noise impacts associated with the project can be managed within the context of the operational noise assessment (see below).

Operational Noise
The operational noise assessment includes consideration of the project in isolation as well as the combined operations of the project and concurrent Mount Arthur North operations.

The assessment adopts the background noise levels and project specific noise level criteria determined for the approved Mount Arthur North mine, which were based on the procedures under the INP. The Department is satisfied that this approach is both conservative and appropriate.

Further, the assessment is based on a number of reasonable and feasible noise mitigation measures that Mt Arthur Coal would implement, including:

- locating the North Saddlers ROM Facility in an existing mining area shielded from receivers by Mt Arthur;
- locating pit top facilities within existing mining voids or in areas with topographic shielding;
- maximising use of existing equipment where possible;
- using covered conveyors rather than haul trucks for delivery of coal from the North Saddlers ROM Facility to the existing CHPP;
- using enclosures on CHPP equipment;
- using noise attenuated equipment; and
- considered location of ventilation shafts.

When considered in isolation, the noise assessment indicates that the underground project would comfortably comply with the relevant noise criteria, apart from residences at Antiene which would experience noise exceedances of up to 3 decibels, with the exceedances associated with train passbys on the Antiene Rail Spur.

However, as the underground project would operate as part of the Mt Arthur mine complex, the Department considers it appropriate that the project be assessed on a combined Mt Arthur operations basis.

When considered in combination, the noise assessment indicates that the combined operations would result in exceedances of the applicable noise criteria at all of the sensitive receiver locations, as shown in the following table (excluding East Antiene which is discussed separately below). For comparative purposes, the worst case noise levels predicted in the Mt Arthur North EIS are also included in the table.

Table 3: Predicted Noise Impacts – Combined Mount Arthur Coal Operations including Underground Project (Exceedance in bold), dBA $L_{Aeq(15\ min)}$

Receiver Location	***Worst Case Combined Noise Level (all years)***	***Criterion***	***Worst Case Noise Level Predicted in MAN EIS[2]***
Yammanie monitor	**40**	37	**39**
Sth Muswellbrook residence	**38**	35	33
Sth Muswellbrook monitor[1]	**37**	35	35
Antiene residence	**42**	38	38
Racecourse Rd Sth	**39**	35	**41**
Denman Rd monitor[1]	**39**	35	**39**
Denman Rd residence	**37**	35	**37**

Notes:

1 Not privately-owned land

2 Noise levels predicted in the MAN EIS have been demonstrated through ongoing mine noise monitoring to have been overly conservative. The combined noise levels shown in the above table are based on re-calibrated noise levels from MAN, hence some combined noise levels are lower than those predicted in the MAN EIS.

As illustrated above, the combined operations would result in exceedances of the applicable noise criteria of between 2 and 4 decibels.

The Department sought additional information from Mt Arthur Coal on the total number of affected privately-owned properties at each of these sensitive receiver locations. A summary of the affected properties, and the Department's typical policy with regard to noise exceedances, is shown in the following table.

Table 4: Summary of Operational Noise Impacts

Noise Exceedance	***Management generally required at this level of exceedance***	***No. of affected private properties (all years)***
Marginally Affected Residences (1-2dB exceedance)	Noise mitigation, if possible	~270
Moderately Affected Residences (3-5dB exceedance)	Noise mitigation, inc. noise mitigation at residence	2
Significantly Affected Residences (>5dB exceedance)	Acquisition	0
Significantly Affected Vacant Land (>5dB exceedance)	Acquisition	0
Total Properties Exceeding Noise Criteria		**~272**

The assessment indicates that a substantial number of properties would be marginally affected by noise under worst case conditions at some stage during the operation of the project. Most of these properties are located in the residential area of South Muswellbrook, with smaller numbers in the rural areas around Racecourse Road and Antiene. The Department notes that an exceedance of 1 to 2 decibels is generally not perceptible to the human ear.

Two properties would be moderately affected, including one in the Racecourse Road area (3.8dB exceedance) and one in Antiene (4.2dB exceedance).

The existing approval for the Mount Arthur North mine contains a number of noise-related conditions to control noise associated with the mine, including requirements on Mt Arthur Coal to:

- comprehensively monitor noise emissions;
- undertake management measures to reduce and mitigate noise levels that exceed applicable noise criteria;
- acquire (upon request) private properties where noise levels exceed applicable acquisition criteria;
- independently investigate noise complaints and undertake applicable management measures; and
- prepare and implement a comprehensive Noise Management Plan.

The Department and DECC are satisfied that the operational noise emissions associated with the underground project can be managed within the context of the existing approval for the Mount Arthur North Mine. In this regard, the Department believes that Mt Arthur Coal should be required to comply with the existing noise criteria and conditions under the Mount Arthur North consent, for the combined operations of the project and Mount Arthur North.

In addition, the Department has recommended specific conditions requiring Mt Arthur Coal to:

- undertake architectural noise treatments (such as double glazing, insulation and/or air conditioning) on the 2 moderately affected properties, at the request of the landowner; and
- review and update the Noise Management Plan for the Mt Arthur mine, including specific noise mitigation measures aimed at reducing noise levels at all properties to meet the applicable criteria.

The Department is satisfied that, with this approach, the project is unlikely to result in any significant noise-related impacts over and above the existing impacts of the Mount Arthur mine.

East Antiene

Residents of East Antiene, whilst not affected by operational noise from the mine itself, are affected by noise from rail movements on the Antiene Rail Spur (see Figure 5). In accordance with noise assessment policy, train noise on 'internal' rail spurs is conservatively assessed against the operational noise criteria under the INP, rather than the criteria for off-site rail noise.

The noise assessment in the EA indicates that the rail movements on the Antiene Rail Spur would exceed the applicable noise criteria at 2 residences in East Antiene – with one property experiencing a moderate 4 dB exceedance, and one property experiencing a significant 9 dB exceedance.

The Department acknowledges that these properties are already affected by rail noise associated with Mt Arthur's operations and that, as outlined above, the existing approval for the Mt Arthur North mine contains a number of measures to monitor, mitigate and/or compensate the noise impacts of the mine, including rail noise on the Antiene rail spur.

As stated above, the Department has recommended conditions that would require Mt Arthur Coal to comply with the existing noise conditions under the Mount Arthur North consent, for the combined operations of the project and Mount Arthur North.

In addition, the Department has recommended specific conditions requiring Mt Arthur Coal to:
- undertake architectural noise treatments on the 2 affected properties at East Antiene, at the request of the landowner; and
- acquire the significantly affected property, at the request of the landowner.

Road and Off-site Rail Noise
The EA includes an assessment of off-site road and rail traffic noise, concluding that both road and rail noise would comply with applicable noise criteria.

The Department and the DECC are satisfied that the project is unlikely to result in any significant road or off-site rail noise impacts.

Cumulative Noise
The EA includes a cumulative noise assessment which assesses the impact of the project together with nearby surrounding industrial sources (including the Bengalla and Drayton mines). The assessment also considered rail noise impacts associated with Mt Arthur Coal's operations on the Antiene area. The assessment indicates that the cumulative noise impacts associated with the project would comply with applicable amenity criterion at all residential locations.

Conclusion
The Department and the DECC are satisfied that Mt Arthur Coal has assessed the potential noise impacts of the project in accordance with relevant DECC guidelines, and appropriately considered reasonable and feasible noise mitigation measures.

The impact assessment indicates that the project, when combined with noise emissions from Mount Arthur North, would exceed operational noise criteria by up to 4 dB(A). In addition, noise associated with rail movements on the 'internal' Antiene rail spur would exceed operational noise criteria by up to 9 dB(A) at one property.

The Department is satisfied that the project's noise emissions can and should be managed within the context of existing noise related conditions of the Mount Arthur North consent, to ensure an integrated approach to noise management for the mine complex. In this regard, the Department has recommended conditions that require Mt Arthur Coal to:
- comply with the noise criteria and conditions of the Mount Arthur North consent for the combined operation of the project and Mount Arthur North; and
- review and update the existing Mount Arthur North Noise Management Plan and monitoring program to encompass the project.

In addition, the Department has also recommended specific conditions requiring Mt Arthur Coal to acquire and/or undertake architectural noise treatments on the properties predicted to be moderately affected by operational noise associated with the project.

5.4 Air Quality

Issue
The project has the potential to result in dust-related impacts associated with mining operations.

Consideration
The EA includes a specialist air quality impact assessment undertaken by Holmes Air Sciences Pty Ltd. The assessment includes consideration of total suspended particulates (TSP), fine particulate matter (PM_{10}), and dust deposition, with reference to relevant 24-hour, monthly and annual air quality goals.

The assessment includes consideration of the incremental increase caused by the project, and the total cumulative emissions generated by the project and existing background dust levels.

The assessment indicates that the project would comply with all applicable air quality criteria. The worst case predicted dust levels at the nearest sensitive receivers are shown in the following table.

Table 5: Predicted Air Quality Impacts

Pollutant	***Averaging Period / Units***	***Criterion***	***Max. Predicted Incremental Dust Level***	***Max. Predicted Total Dust Level***
Total suspended particulate (TSP) matter	Annual / $\mu g/m^3$	90	3.7	71
Particulate matter < 10 µm (PM_{10})	Annual / $\mu g/m^3$	30	2.7	28
	24 hour / $\mu g/m^3$	50	26.8	-[1]
Deposited Dust	Annual / g/m^2/month	2 (max. increase)	0.52	-
		4 (total)	-	3.6

Notes:
1 Not assessed, given technical difficulties in establishing a reliable short-term PM10 background level.

Conclusion
The Department and DECC are satisfied that the project is unlikely to result in any significant dust-related impacts, and that the project's dust emissions can generally be managed within the context of existing air quality related conditions of the Mount Arthur North consent.

The Department has recommended conditions that would require Mt Arthur Coal to:
- comply with contemporary air quality criteria for the combined operation of the project and the existing Mount Arthur mine complex; and
- comply with the air quality management conditions of the Mount Arthur North consent.

5.5 Greenhouse Gas Emissions

Issue
The project would generate direct and indirect greenhouse gas (GHG) emissions that would contribute to global warming and climate change.

Consideration
The EA includes a detailed Greenhouse Gas and Energy Assessment, undertaken by SEE Sustainability Consulting Pty Ltd. This assessment was undertaken in accordance with applicable GHG guidelines, including:
- the World Business Council for Sustainable Development and World Resource Institute's *Greenhouse Gas Protocol 2004* (GHG Protocol); and
- the Australian Greenhouse Office's *Factors and Methods Workbook, December 2006* (AGO Workbook).

The assessment calculates direct and indirect GHG emissions associated with the project, including 'Scope 1' emissions (ie. direct GHG emissions from sources controlled by Mt Arthur Coal), 'Scope 2' emissions (ie. indirect emissions associated with the import of electricity) and 'Scope 3' emissions (ie. other indirect emissions, such as those associated with the downstream combustion of the coal).

The calculated GHG emissions associated with the project are presented in the following table.

Table 6: Project Direct and Indirect GHG Emissions

Scope	***GHG source(s)***	***Annual average GHG emissions (tonnes carbon dioxide equivalent, TCO_2e)***	***Total project GHG emissions (TCO_2e)***
Scope 1	Methane, diesel, spontaneous combustion, explosives, slow oxidation	143,250	3,008,246
Scope 2	Upstream electricity	71,792	1,507,627
Scope 3	Downstream electricity, diesel	130,308	2,736,461
	Downstream coal combustion	12,986,776	272,722,262
Total (exc. downstream coal combustion)		**345,350**	**7,252,334**
Total (inc. downstream coal combustion)		**13,332,126**	**279,974,596**

The assessment indicates that 97% of the total GHG emissions generated as a consequence of the project are those associated with the downstream burning of the product coal at power stations – ie. Scope 3 indirect emissions. Of the 3% residual GHG emissions, the various GHG sources make the following (approximate) contribution:

- methane (36%);
- diesel use (35%);
- electricity (25%);
- spontaneous combustion (4%); and
- slow oxidation (0.2%).

The total GHG emissions arising as a consequence of the project (ie. including coal combustion) represents approximately 0.03% of annual global GHG emissions.

The DECC noted that methane is the largest single contributor to direct GHG emissions, and that Mt Arthur Coal would have access to a high volume of this gas via the gas drainage and ventilation systems required for the project. DECC recommends that a feasibility study be undertaken to identify and assess potential options to capture and use the methane for the generation of electricity, rather than simply venting the gas to the atmosphere.

The Department agrees, and has recommended a condition requiring such a feasibility study to be undertaken prior to the start of mining operations. The Department acknowledges that Mt Arthur Coal, in response to DECC's recommendation, has committed to making an application for the appropriate petroleum tenure to enable it to beneficially reuse the methane emissions, as well as committing to the feasibility study.

With regard to the wider consequential GHG impacts associated with the project, the Department acknowledges the impacts posed by global warming/climate change, but does not believe that the threat posed by global warming/climate change should necessarily preclude the approval of the project.

Rather, the consideration of the project application with regard to GHG impacts needs to be balanced with consideration to:

- the project's contribution to global warming/climate change;
- whether refusing the project application would reduce global GHG emissions;
- the need for the project;
- the benefits of the project, including job creation and its contribution to the NSW economy;
- the objects of the EP&A Act, including the encouragement of ESD; and
- available GHG impact mitigation measures.

The project's contribution to global warming/climate change is discussed above. Following this consideration, the Department is satisfied that the project's contribution to global GHG emissions, even when assessed on a full life cycle basis (ie. including downstream GHG emissions), would be very small.

It must be noted that if the project was not allowed to proceed, the resultant gap in the coal supply would be almost certainly filled by another coal resource either in NSW, Australia or overseas. In other words, removing the GHG emissions from the project would not likely result in any decrease in global CO_2 emissions. This point illustrates the reality that the key response

to the issue of global warming/climate change needs to be made at a policy or strategic planning level, outside and above the NSW project assessment process.

The need for the project is discussed in Section 2.3. Based on its consideration, the Department is satisfied that there is a clear need for the development of new coal deposits, for at least the foreseeable future, to meet society's basic energy needs.

The benefits of the project are summarised in Section 5.11. Following its consideration, the Department is satisfied that the project would have considerable socio-economic benefits, and that it represents a logical extension to Mt Arthur Coal's existing mining operations.

The objects of the EP&A Act are outlined in Section 3.5, and these objects have informed the Department's assessment of the project. With regard to the principles of ESD, the Department acknowledges that global warming/climate change presents a clear threat of serious or irreversible environmental damage, as well as a threat to intergenerational equity and a threat to the conservation of biological diversity. However, it must also be acknowledged that the downstream energy and other socio-economic benefits generated by the project would also benefit future generations, particularly through the shoring up of national and international energy needs.

With regard to GHG impact mitigation measures, the Department acknowledges Mt Arthur Coal's commitment in the EA to developing energy conservation and GHG management plans. The Department believes that, in addition to the methane capture and use feasibility study outlined above, Mt Arthur Coal should be required to prepare and implement a comprehensive Energy Savings Action Plan for the project, and seek to continually improve its energy efficiency. In this regard, the Department notes that the existing approvals for the Mt Arthur mine complex already include a requirement for such a plan. The Department has recommended a condition requiring the existing plan to be expanded to encompass the project.

The Department does not believe it is reasonable to apply other requirements on Mt Arthur Coal through the NSW planning system to significantly reduce GHG emissions, including Scope 3 emissions associated with the downstream burning of the product coal. Any such impost – for example a CO_2 levy on product coal – would unfairly penalise Mt Arthur Coal and its ability to compete in the energy industry. The Department believes that such an ad hoc approach to the issue of global warming/climate change is not in the public interest. The Department is satisfied that much more effective measures have been, and are continuing to be, planned and implemented at the State, national and international levels to combat global warming/climate change.

Conclusion

The Department has weighed the GHG impacts of the project against a range of matters, including its contribution to global GHG emissions, the need for the project and its benefits, its consistency with the objects of the EP&A Act, and the GHG impact mitigation measures available. On balance, the Department is satisfied that the project's potential GHG impacts should not preclude approval of the project.

However, the Department believes that Mt Arthur Coal should be required to mitigate, manage or offset direct and indirect GHG emissions by:

- undertaking a detailed feasibility study to capture and beneficially use methane gas emissions from the project;
- expanding the existing Energy Savings Action Plan for the Mt Arthur mine complex to encompass the project; and
- monitoring and continually improving energy efficiency.

5.6 Flora and Fauna

Issues

The project would have direct and indirect impacts on flora and fauna, primarily through subsidence-related impacts.

Consideration
The EA includes a detailed flora and fauna assessment undertaken by Umwelt Pty Ltd.

Subsidence-Related Impacts
As outlined above in Section 5.1, an area of approximately 820 hectares within the subsidence affectation zone would potentially require subsidence remediation works (via cultivation or earthworks). Of this area, 630 hectares comprises derived grassland (pasture), and a further 140 hectares is approved to be cleared for open cut mining as part of the Bayswater No.3 consent.

The remaining 50 hectares comprises woodland areas, including approximately 25 hectares each of:
- Central Hunter Bulloak Forest Regeneration; and
- Central Hunter Box – Ironbark Woodland.

The EA notes that, where remediation works are required within these woodland areas, the clearing would be minimised by using small machinery, and that the remediation would generally only affect the ground layers. Clearing of canopy trees would be avoided as far as practicable.

Threatened species identified within the wider project area include:
- 1 threatened flora species:
  - *Bothriochloa biloba* (a grass), listed as vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- 2 endangered flora populations:
  - *Cymbidium caniculatum* (a mistletoe), listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act); and
  - *Acacia pendula* (a tree), also listed under the TSC Act;
- 8 threatened fauna species, all listed as vulnerable under the TSC Act, including:
  - 2 birds (speckled warbler and grey-crowned babbler);
  - 1 marsupial (squirrel glider); and
  - 5 bats (eastern bentwing-bat, large-footed myotis, greater broad-nosed bat, eastern freetail-bat and eastern cave bat); and
- 1 endangered ecological community (EEC):
  - Hunter Valley Weeping Myall Woodland, listed under the TSC Act.

Mt Arthur Coal has undertaken tests of ecological significance for each of the identified threatened species, as well as for a number of additional threatened species that, although not identified in the surveys, have the potential to occur within the project area. The tests of significance conclude that the subsidence-related impacts associated with the project would not have a significant impact on any of the listed threatened species.

The Department and the DECC are satisfied that the project subsidence is unlikely to significantly affect flora and fauna values above the mine, subject to adequate offsetting arrangements as detailed below, and monitoring and remediation of any subsidence-related impacts, particularly on threatened species.

Surface Infrastructure Impacts
The surface infrastructure associated with the project would be predominately located in areas previously, presently or approved-to-be disturbed by open cut mining operations associated with the Mt Arthur mining complex.

However, some vegetation clearing would be required for the installation of certain project infrastructure, as outlined in the following table.

Table 7: Surface Infrastructure Vegetation Clearing

Infrastructure	***Approx. area of Woodland Vegetation to be Removed (ha)***				***Total (ha)***
	Central Hunter Box – Ironbark Woodland	***Central Hunter Bulloak Forest Regeneration***	***Narrabeen Footslopes Slaty Box Woodland***	***Hunter Floodplain Red Gum woodland Complex***	
Overland conveyor	-	-	-	0.16	0.16
Access road	-	-	-	0.5	0.5
Transmission line relocation – Option A	1.9	0.3	9.5	-	11.7
Transmission line relocation – Option B2	5.1	-	-	-	5.1
Total (Transmission line Option A)					**12.4**
Total (Transmission line Option B2)					**5.8**

The tests of ecological significance undertaken in the EA (and the preferred project report in the case of the transmission line relocation) indicate that the clearing required for the surface infrastructure would not have a significant impact on any of the identified threatened species.

The Department and the DECC are satisfied that the clearing required for the project is unlikely to result in any significant impact on flora and fauna values of the area, subject to the implementation of suitable offsetting arrangements.

Biodiversity Offsets

To offset the project's direct and indirect impacts on flora and fauna, Mt Arthur Coal proposes to extend and conserve in perpetuity the previously planned conservation area along Saddlers Creek (see Figure 9). The conservation area is also proposed to offset the impacts on Aboriginal cultural heritage – as discussed in Section 5.7.

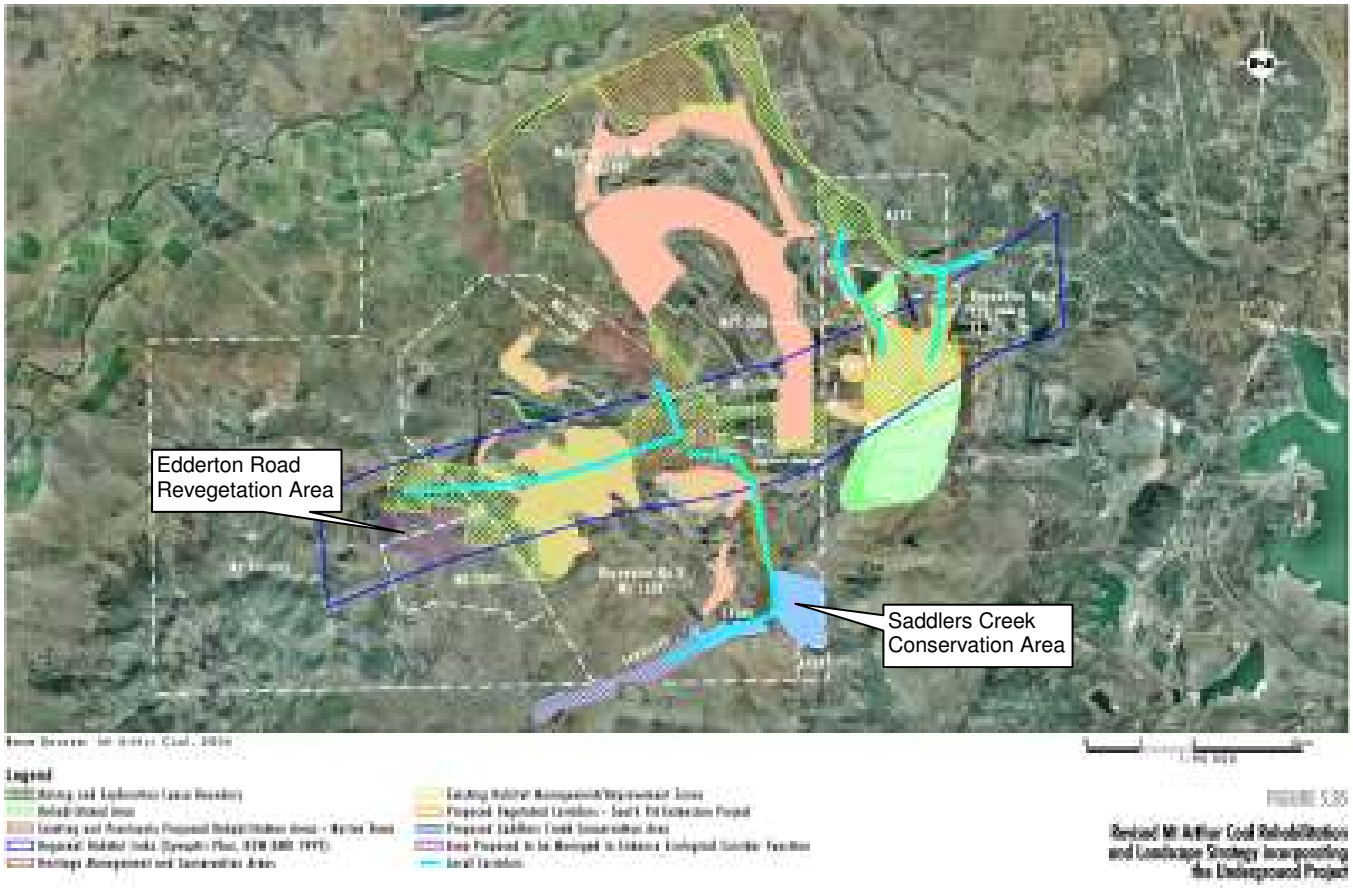

Figure 9: Mt Arthur Rehabilitation and Landscape Strategy Plan

The proposed Saddlers Creek Conservation Area comprises some 295 hectares, including 53 hectares of Hunter Floodplain Red Gum Woodland Complex, and 213 hectares of derived grassland. Mt Arthur Coal proposes to fence the area, de-stock it to allow for natural regeneration, manage the area for conservation purposes, and provide for the conservation of the area in perpetuity through formal title arrangements.

Mt Arthur Coal also proposes to enhance the ecological corridor values of a 154 hectare parcel of land to the west of Edderton Road (see Figure 9). This area forms part of an important regional habitat linkage as identified in DPI's *Synoptic Landscape Plan (1999)*.

The Department and the DECC are satisfied that the proposed offset strategy would adequately compensate for the flora and fauna impacts of the project.

Conclusion
The Department and the DECC are satisfied that the project is unlikely to result in any significant flora and fauna impacts, subject to implementation of the proposed offset strategy which should be able to achieve a net gain in biodiversity values in the area over the medium to long term.

The Department has recommended conditions that would require Mt Arthur Coal to:
- implement the proposed offset strategy;
- monitor and manage the flora and fauna impacts of the project, including within the subsidence affectation area;
- provide for the long term conservation of the offset area; and
- lodge a substantial conservation bond for the offset area.

5.7 Aboriginal Heritage

Issue
The project would affect a number of identified Aboriginal sites.

Consideration
The EA includes a specialist Aboriginal cultural heritage assessment, undertaken by Umwelt Pty Ltd in consultation with local Aboriginal groups. The assessment draws on previous archaeological assessments for the Bayswater No.3, Mount Arthur North and South Pit Extension projects.

The surveys identified a total of 77 Aboriginal 'sites' within the project area, with these sites identified and defined according to archaeological terrain units. Areas within these 'sites' in which artefacts have been located have been referred to as site 'loci'. A total of 509 loci have been identified within the 77 sites.

Three of the sites were assessed as having high archaeological and Aboriginal cultural significance, including:
- SC01, an artefact scatter along Saddlers Creek, containing a large number (1,670) of artefacts and additional potential archaeological deposits (PAD);
- QC01, an artefact scatter along Quarry Creek, containing a large number (2,768) of artefacts and additional PAD; and
- QC02, a scarred tree in the Quarry Creek catchment.

Subsidence remediation works have the potential to impact 28 of the 77 identified sites including the highly significant QC01 and QC02 sites. In addition, surface infrastructure would have a small impact on site SC01, where the overland conveyor crosses Saddlers Creek.

To mitigate and offset these impacts, Mt Arthur Coal proposes to:
- conserve the majority of SC01 in perpetuity, through establishing the 295 hectare Saddlers Creek Conservation Area;
- undertake surface collection with subsurface investigation for significant Aboriginal sites within the subsidence remediation area (including QC01) and that part of SC01 affected by the proposed surface infrastructure;
- undertake surface collection for all other Aboriginal sites within the subsidence remediation area; and

- manage subsidence remediation work to avoid impact on the highly significant scarred tree (QC02).

The mitigation measures would be managed in accordance with an Aboriginal Cultural Heritage Management Plan, prepared and implemented in consultation with the relevant Aboriginal groups.

As part of the Saddlers Creek Conservation Area offset, Mt Arthur Coal also proposes to:
- fund and construct a Keeping Place within the area, including a storage room for artefacts and a staffed display centre for education purposes;
- provide funding for 'collection training' at the Australian Museum (or similar) for 5 representatives from Aboriginal groups;
- construct an additional teaching facility near Quarry Creek; and
- provide training in site and artifact recording and analysis for representatives from all Aboriginal groups.

The majority of the Aboriginal groups and the DECC support these measures. The Department agrees, and has recommended a condition requiring these measures to be detailed in a comprehensive Aboriginal Cultural Heritage Management Plan for the Mt Arthur mine complex.

With regard to the required relocation of the Transgrid 330/500kV transmission line, the DECC recommends that additional archaeological assessment be undertaken at each pylon site and access track once these are identified in detailed design. The DECC also recommends that, if Option B2 is chosen for the transmission line relocation, that the route be required to avoid the Mt Arthur Conservation Area. The Department agrees, and has recommended conditions requiring these measures.

Conclusion
The Department and the DECC are satisfied that, subject to the implementation of the proposed mitigation and offsetting measures, the project is unlikely to result in a significant impact to Aboriginal heritage values. The Department has recommended conditions that would require Mt Arthur Coal to:
- establish and conserve the Saddlers Creek Conservation area in perpetuity; and
- prepare and implement a comprehensive Aboriginal Cultural Heritage Management Plan for the project (as part of the wider plan for the Mt Arthur mine complex), in consultation with all applicable Aboriginal groups and the DECC.

5.8 Non-indigenous Heritage

Issue
The project would affect a number of items of local heritage significance.

Consideration
The EA includes a specialist non-indigenous heritage assessment, undertaken by Umwelt Pty Ltd. The assessment includes a literature review and site inspection to identify items of heritage significance.

The assessment found that there are no items listed on the national or State heritage registers that would be affected by the project. However, the survey identified 8 sites of local historic significance, as listed in the following table.

Table 8: Heritage Sites

Heritage Item	***Significance***
The Hospital Building	High local
The Ruins Site	Low local
Mills Cottage Precinct	Low local
Farm and Farm House, 550 Edderton Road	Low local
Belmont Homestead Precinct	Moderate local
Slab Hut near Belmont Homestead	Moderate local
Edderton Homestead Precinct	Moderate local
Edderton Catena Heritage Site	Low local

The Hospital Building is located within the footprint of the approved Bayswater No. 3 open cut mine, and is proposed to be relocated in accordance with an approved management plan for that project.

The remaining sites would all be affected by subsidence to varying degrees. Mt Arthur Coal proposes to undertake full archival recording of these sites prior to subsidence, as well as undertaking structural inspections before and after undermining to determine the structural condition and recommend remedial works, if possible.

In addition, pre-subsidence impact mitigation measures (eg. structural support) would be implemented on the moderately significant Belmont Homestead and Slab Hut to minimise subsidence impacts on the sites. The other moderately significant item, the Edderton Homestead Precinct, is not predicted to be significantly affected by subsidence.

The Heritage Office, whilst somewhat critical of parts of the heritage assessment, does not object to the heritage impacts of the project subject to a range of conditions including requirements for additional historical research and archaeological excavation of the affected heritage items. The Department has recommended conditions consistent with the Heritage Office's recommendations.

Conclusion

The Department is satisfied that the project is able to be managed such that it would not significantly impact the heritage values of the locality. The Department has recommended a condition that would require Mt Arthur Coal to prepare and implement a comprehensive Heritage Management Plan for the project (as part of the wider plan for the Mt Arthur mine complex) in consultation with the Heritage Office and local historical organisations, including requirements for:

- conservation management plans for the Belmont Homestead and Edderton Homestead complexes;
- photographic and archival recording;
- dilapidation surveys;
- subsidence monitoring and management; and
- additional archaeological excavation and/or recording for any significant heritage items requiring demolition.

5.9 Traffic and Transport

Issue

The project would increase traffic levels on local roads around the site, would directly impact Edderton Road through subsidence, and would generate additional movements on the Antiene Rail Spur and the Main Northern Rail Line.

Consideration

Road Traffic

The majority of road traffic would access the site from Muswellbrook via the New England Highway, Denman Road, and Thomas Mitchell Drive (to the Mt Arthur mine access road) (see Figure 10).

Mt Arthur Coal's traffic assessment, undertaken by Transport & Urban Planning, calculates that the project would generate:

- up to 420 vehicle trips per day during construction; and
- up to 640 vehicle trips per day during operations.

During operations, these traffic levels would increase daily traffic volumes on the road network as follows:

- Thomas Mitchell Drive – up to 12.8%;
- Denman Road – up to 4.8%; and
- New England Highway – up to 3%.

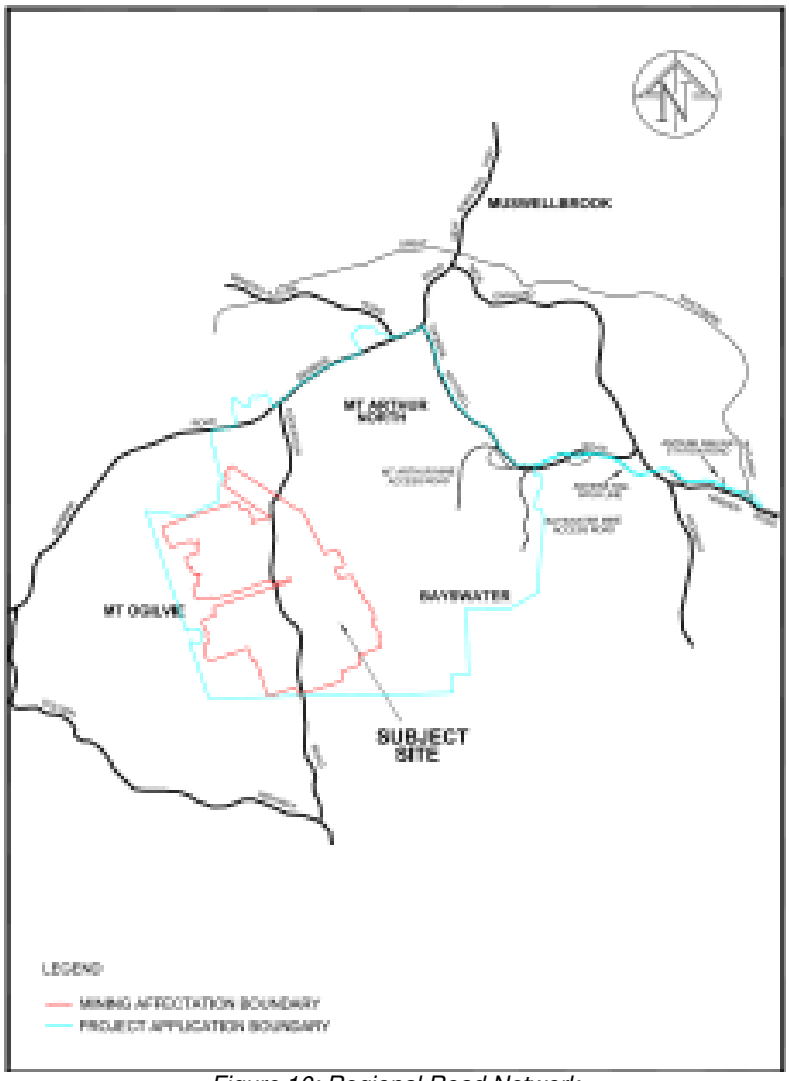

Figure 10: Regional Road Network

The traffic modeling indicates that, at these traffic levels, the project would not significantly affect the level of service of the existing road infrastructure (including key intersections).

The RTA raised some concern regarding the traffic modelling, including that the modelling should be revised to include background traffic growth. Mt Arthur Coal subsequently addressed the RTA's concerns in its response to submissions, and the Department is satisfied that Mt Arthur Coal's traffic assessment is reasonable and conservative. In particular, the Department acknowledges that the traffic assessment includes modelling of a conservative and cumulative worst-case scenario, which assumes coinciding shift change-over times for the Mt Arthur and the approved but not commenced Mangoola (formerly known as Anvil Hill) and Mt Pleasant mines (in practice, coinciding shift changeover times are not expected to occur). This worst case modelling indicates that the road network would continue to operate satisfactorily.

The RTA also recommended that Mt Arthur Coal be required to undertake a Road Safety Audit of key intersections (including the intersections of Thomas Mitchell Drive with the New England Highway and Denman Road). The Department notes that Mt Arthur Coal has committed to undertaking this audit (including consideration of the Mt Arthur Underground Project) as part of the recently approved South Pit Extension Project, and Mt Arthur Coal advises that the audit is currently underway and will be finalised by the end of 2008. The Department is satisfied that audit is being managed as part of the approval for the South Pit Extension Project.

Edderton Road

Edderton Road is a local rural road that generally provides access to adjoining rural properties. The road has relatively low traffic volumes of about 565 vehicles per day.

A 6.5 kilometre section of Edderton Road would be directly impacted by project subsidence. Impacts would be restricted to sections of road approximately 300 to 500 metres in length at any one time, with the resultant road and pavement damage progressively repaired using standard road maintenance techniques. Temporary road diversions within the road corridor would be established to cater for traffic whilst the road is being subsided.

Mt Arthur Coal proposes to manage these temporary diversions and subsidence-related impacts on the Edderton Road in accordance with a Traffic Management Plan prepared in consultation with Council.

The Department and Council are satisfied that the subsidence-related impacts on Edderton Road are unlikely to result in any significant impact to regional traffic flows, and that local traffic management, repair and maintenance can be effectively managed in accordance with an appropriate Traffic Management Plan to minimise local disruptions. The Department has recommended a condition requiring Mt Arthur Coal to develop such a plan for the project.

Rail Traffic

The Mt Arthur mine complex currently has approval for a maximum 18 train movements per day on the Antiene rail spur and Main Northern Rail Line. The project proposes to increase this to 24 movements per day (ie. an increase of 6 movements per day).

The EA, which was undertaken in consultation with the ARTC, indicates that the existing and planned rail infrastructure would accommodate the rail traffic generated by the project.

The EA acknowledges that trains travelling on the Antiene rail spur periodically block the level crossing on Antiene Railway Station Road, which temporarily restricts access for a small number of local residents in the area. Council has recommended a condition restricting Mt Arthur Coal from blocking the level crossing. However, the Department acknowledges that Mt Arthur Coal is not responsible for signaling arrangements on the rail spur, and therefore does not have direct control over temporary blockages on the level crossing.

Notwithstanding, the Department acknowledges the issue and has recommended a condition that would require Mt Arthur Coal to implement all reasonable and feasible measures to avoid blocking the level crossing. This condition would complement Mt Arthur Coal's commitment to liaising with the relevant stakeholders – including ARTC, Anglo Coal, Council and Macquarie Generation – to address this issue.

Conclusion

The Department is satisfied that the road and rail network is capable of accommodating the traffic associated with the project. The Department has recommended conditions requiring Mt Arthur Coal to:

- prepare and implement a detailed Traffic Management Plan to manage subsidence-related effects on Edderton Road;
- restrict rail traffic to a maximum of 24 movements per day for the combined Mt Arthur mine complex; and
- implement all reasonable and feasible measures to avoid blocking of the level crossing on Antiene Railway Station Road.

5.10 Visual Amenity

Issue

The project has the potential to impact on the visual amenity of the locality.

Consideration and Conclusion

The project has limited potential for significant visual impact given that it involves underground mining, however some facilities – including pit top facilities, overland conveyors, haul and access roads, stockpiles, ventilation fans and shafts – would be partly visible from public areas including South Muswellbrook, rural areas to the north-west and south, and commuters on local roads.

Views of major surface infrastructure would be limited by intervening topography and distance (approximately 10 kilometres).

To mitigate the project's visual impacts to sensitive receivers, Mt Arthur Coal proposes to:
- construct and vegetate a 10 metre high bund around the Glen-Munro pit top facilities;
- plant a tree screen to the south-west of the North Saddlers ROM facility, and around the northern edge of the Belmont open cut pit;
- colour visible buildings in natural tones; and
- minimise excessive night glow through considered placement of lighting.

Given the distance to sensitive receivers, intervening vegetation, the existing Mt Arthur mine infrastructure, and the management measures proposed, the Department is satisfied that the project would not result in a significant visual impact to surrounding landusers.

The Department notes that the existing approval for the Mt Arthur North mine includes a number of conditions requiring Mt Arthur Coal to minimise, manage and mitigate visual impacts, including requirements to prepare and implement a detailed Landscape and Revegetation Management Plan. The Department has recommended conditions that would extend these requirements so that they apply to the project.

5.11 Socio-economic Impacts

Issue

The project would generate a large number of jobs and inject considerable capital investment into Muswellbrook and the broader Hunter region, which would have a range of benefits but may also put pressure on public services and facilities.

Consideration and Conclusion

The EA includes a specialist socio-economic assessment undertaken by Coakes Consulting.

The assessment indicates that the project would provide considerable socio-economic benefits to the region and the State, including:

At the mine:
- 470 direct jobs during construction;
- 300 direct jobs during operation;
- $320 million in initial capital investment;

For the Regional and State Economy:
- 913 direct and indirect jobs during construction;
- 546 direct and indirect jobs during operation;
- $3 billion in operational expenditure over the life of the project; and
- $4.4 billion in total direct and indirect contribution to GDP over the life of the project.

The EA includes an assessment of the impact of the project on public services and facilities, which indicates that:
- during construction, there is expected to be sufficient temporary housing available to accommodate the construction workforce;
- during operation, there is expected to be sufficient permanent housing available to accommodate the workforce;
- there is sufficient capacity in education facilities to service the project workforce; and
- health services in the region are at or exceeding capacity to accommodate additional demand.

Mt Arthur Coal notes that it has an existing Community Plan in place that documents the operation's approach to community development opportunities, including community partnerships, sponsorships and other programs. The EA states that Mt Arthur Coal will review the plan to effectively target community contributions, with key areas including health, community services and education and training.

Council did not raise any significant concerns about the socio-economic effects of the project, but recommended that Mt Arthur Coal be required to enter into an agreement with Council to provide a financial contribution for the purpose of community enhancement to address the social amenity and community infrastructure requirements arising from the project.

The Department is satisfied that the socio-economic benefits of the project are likely to far exceed its costs, and is satisfied that the region is able to accommodate the project, subject to a suitable contribution toward community services and facilities. In this regard, the Department has recommended a condition that would require Mt Arthur Coal to enter into a planning agreement with Council, to provide a suitable community enhancement contribution.

6. RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of approval for the project (see Appendix B), and summarised these conditions in Appendix A. These conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the project;
- set standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Mt Arthur Coal has reviewed and accepts the recommended conditions. The Department believes the conditions reflect current best practice for the regulation of coal mines in NSW.

7. CONCLUSION

The Department has assessed the project application, EA, submissions on the project and Mt Arthur Coal's response to submissions and preferred project report, in accordance with the relevant statutory requirements.

This assessment has found that, whilst the project would result in a significant amount of subsidence (up to 5.6 metres) over a large land area, most of the impacts associated with this subsidence are unlikely to be significant, particularly as much of the subsidence affectation area comprises broad grazing land with relatively few improvements and relatively benign environmental constraints.

Notwithstanding, the project would affect some important surface infrastructure, most notably Transgrid's 330/500kV transmission line (an integral piece of the NSW electricity grid) and Edderton Road. Subject to relocation of the transmission line and the ongoing management of subsidence impacts on Edderton Road and other areas, the Department is satisfied that the subsidence-related impacts on these surface features can be effectively managed.

The Department is further satisfied that the subsidence-related impacts on private property and environmental features – including water resources, flora and fauna and heritage – are able to be effectively minimised, managed and/or compensated for. In this regard, the Department notes that Mt Arthur Coal will be required to secure additional Subsidence Management Plan approvals before it commences any operations that may cause subsidence, which will require additional assessment, management planning and community consultation.

With regard to other impacts, the Department notes that the Mount Arthur North development consent provides a comprehensive basis for mitigating, managing, offsetting and/or compensating for these impacts. Accordingly, the Department has recommended conditions that would require Mt Arthur Coal to operate the project in an integrated manner within the context of the Mount Arthur North consent (and South Pit Extension approval), including requirements to comply with existing environmental criteria for the combined operations of the Mount Arthur mine complex, including the project.

Importantly, the Department recognises that the project would provide major economic and social benefits, including that it:

- utilises existing facilities and equipment associated with the Mount Arthur mine;
- is located within an area of intensive existing coal mining activities, in a location that is relatively removed from incompatible land uses;
- would generate an additional 300 direct jobs at Mt Arthur Coal; and

- would generate other socio-economic benefits, including flow-on regional economic benefits, and significant royalty and tax income.

Accordingly, the Department believes that the project represents a logical extension to Mt Arthur Coal's existing mining operations, and that the site is suitable for the project.

On balance, the Department believes that the project's benefits would sufficiently outweigh its residual costs, and that it is therefore in the public interest and should be approved, subject to conditions.

8. RECOMMENDATION

It is RECOMMENDED that the Minister:

- consider the findings and recommendations of this report;
- approve the project application, subject to conditions, under section 75J of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached project approval (see Appendix B).

David Kitto
Director
Major Development Assessment

Chris Wilson
Executive Director
Major Project Assessment

Sam Haddad
Director-General

APPENDIX A - SUMMARY OF CONDITIONS OF APPROVAL

Aspect	*Condition*	*Requirement*
Schedule 2: Administrative Conditions		
Minimising Harm	1	Obligation to minimise harm to the environment
Terms of Approval	2	Requirement to carry out project in accordance with the conditions of consent for the Mount Arthur North mine and the South Pit Extension Project
Limits on Approval	5	Approval for mining restricted to 21 years
	6	Restriction on coal production to 8 million tonnes a year, and 28 million tonnes a year for the Mt Arthur mine complex
	7	Restriction on train movements to 24 movements per day
Environmental Management Plans	12	Requirement to update all EMPs for the Mount Arthur mine to encompass the project.
Planning Agreement	14	Requirement to pay contributions to Council.
Schedule 3: Specific Environmental Conditions		
Acquisition	1	Requirement to acquire the private property predicted to be significantly affected by noise, upon request by landowner
Subsidence	2	Requirement to relocate 330/500kV transmission line
	3	Requirement to prepare comprehensive Subsidence Management Plan
	4	Requirement to prepare End of Panel Reports
Noise	5	Requirement to undertake additional noise mitigation measures on properties predicted to be moderately or significantly affected by noise
Surface and Ground Water	6	Site Water Management Plan
Rehabilitation and Landscape Management	7	Requirements to implement the offset strategy and to progressively rehabilitate the site
	8	Requirement to provide for long term security for the offset areas
	9	Requirement for Conservation Bond
	10	Requirement for transmission line relocation to avoid the Mt Arthur Conservation Area
Heritage	11	Aboriginal Cultural Heritage Management Plan
	12	Non-Aboriginal Heritage Management Plan
Traffic and Transport	13	Traffic Management Plan for Edderton Road
	14	Requirement to avoid blocking the railway crossing at Antiene
Greenhouse Gas	15	Requirement to prepare methane gas capture and utilisation feasibility study as part of Energy Savings Action Plan
Schedule 4: Environmental Management, Monitoring, Auditing and Reporting		
Incident Reporting	1-2	Requirement to report incidents
Access to Information	3-4	Requirement to publicly report environmental management plans/programs/strategies, and monitoring results
Independent Environmental Audits	5	Requirement for independent environmental audit team to include subsidence expert

APPENDIX B – CONDITIONS OF APPROVAL

APPENDIX C – CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

1 SEPP No.33 – Hazardous and Offensive Development

The Department is satisfied that the project is not potentially hazardous or offensive, and that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 33.

2 SEPP No.44 – Koala Habitat Protection

A koala habitat assessment was completed as part of the ecological assessment of the project, and no core koala habitat was identified. The Department is satisfied that the project is unlikely to significantly affect koala habitat, and that the project is generally consistent with the aims, objectives, and requirements of SEPP 44.

3 SEPP No.55 – Remediation of Land

The Department is satisfied that the project area does not have a significant risk of contamination given its historical landuse, and that the project is generally consistent with the aims, objectives, and provisions of SEPP 55..

4 SEPP (Mining, Petroleum Production and Extractive Industries) 2007

Under clause 7 of the Mining SEPP, development for the purpose of underground is permissible with consent on any land.

Part 3 of the SEPP lists a number of matters that a consent authority must consider before determining an application for consent for development for the purposes of mining, including:

- compatibility with other land uses;
- natural resource management and environmental management;
- resource recovery;
- transport; and
- rehabilitation.

The Department has considered all of these matters in its assessment report. Based on this assessment, the Department is satisfied that the project is able to be managed in a manner that is generally consistent with the aims, objectives, and provisions of the Mining SEPP.

5 SEPP (Infrastructure) 2007

Under clause 45 of the Infrastructure SEPP, development in the vicinity of an electricity supply easement is required to be referred to the electricity supply authority for comment. Given that the project affects the Bayswater to Mt piper 330/500kV transmission line, the project has been referred to Transgrid which has made representations on the proposal (as described in the assessment report).

In accordance with clause 104 of the SEPP, the application was referred to the RTA, which subsequently confirmed that it does not object to the project (see assessment report).

6 Hunter Regional Environmental Plan (REP) 1989

The objectives of the Hunter REP in relation mineral resources are contained in clause 39 of the REP, include to:

(a) manage the coal and other mineral resources and extractive materials of the region in a co-ordinated manner so as to ensure that adverse impacts on the environment and the population likely to be affected are minimised,

(b) ensure that development proposals for land containing coal and other mineral resources and extractive materials are assessed in relation to the potential problems of rendering those resources unavailable, and

(c) ensure that the transportation of coal and other mineral resources and extractive materials has minimal adverse impact on the community.

Clause 41(1) of the REP provides that the Minister, in considering the application:

(a) should consider the conservation value of the land concerned and apply conditions which are relevant to the appropriate post-mining or extraction land use,
(b) should, in respect of extraction from river banks or channels, ensure that instability and erosion are avoided,
(c) should consult with officers of the Department of Mineral Resources, and of the Department of Agriculture, to determine appropriate post-mining or extraction land uses,
(d) should ensure the progressive rehabilitation of mined or extracted areas,
(e) should minimise the likelihood and extent of a final void and the impact of any final void, or facilitate other appropriate options for the use of any final void,
(f) should minimise any adverse effect of the proposed development on groundwater and surface water quality and flow characteristics,
(g) should consider any likely impacts on air quality and the acoustical environment,
(h) should be satisfied that an environmentally acceptable mode of transport is available, and
(i) should have regard to any relevant Total Catchment Management strategies.

The Department has considered these matters in its assessment report. Based on this assessment, the Department is satisfied that the project is able to be managed in a manner that is generally consistent with the aims, objectives, and provisions of the REP.

7 Muswellbrook Local Environmental Plan 1985

The permissibility of the project under the Muswellbrook LEP is discussed in the assessment report. As outlined, the subject land is primarily zoned 1(a) (Rural "A" Zone), with a smaller portion zoned 7(L1)(Environment Protection General (Alluvial Areas)).

Mining is permissible with consent in zone 1(a), however it is prohibited in zone 7(L1).

Notwithstanding, the Mining SEPP (see above) makes underground mining permissible with consent on all land.

Further, clause 17 of the LEP provides that underground mining in the 7(L1) zone is permissible where the consent authority is satisfied that the development will not:

(i) destroy or impair the agricultural production potential of the land or, in the case of underground mining, unreasonably restrict or otherwise affect any other development on the surface, or
(ii) detrimentally affect in any way the quantity and quality of water in either subterranean or surface water systems.

Clause 51 further applies to underground mining and requires a consent authority to be satisfied that:

(a) all surface works associated with the development will be confined to land within a zone in which development for the purposes of mining may be permitted with consent,
(b) underground mining will not unreasonably restrict or otherwise affect any other development on the surface, and
(c) underground mining will not detrimentally affect in any way the quantity and quality of water in either subterranean or surface water systems.

The Department has considered these matters in its assessment report. Based on this assessment, the Department is satisfied that the project is able to be managed in a manner that is generally consistent with these matters and the aims, objectives, and provisions of the LEP.

APPENDIX D – MT ARTHUR COAL'S RESPONSE TO SUBMISSIONS AND PREFERRED PROJECT REPORT

See attached CD-Rom

APPENDIX E – SUBMISSIONS

See attached CD-Rom

APPENDIX F – ENVIRONMENTAL ASSESSMENT

See attached CD-Rom