MOUNT THORLEY COAL MINE
ABBEY GREEN EXTENSION MODIFICATION
(DA 34/95 Mod 5)

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1 BACKGROUND

The Mount Thorley-Warkworth (MTW) mine complex is located approximately 9 kilometres (km) southwest of Singleton in the Hunter Valley (see Figure 1).

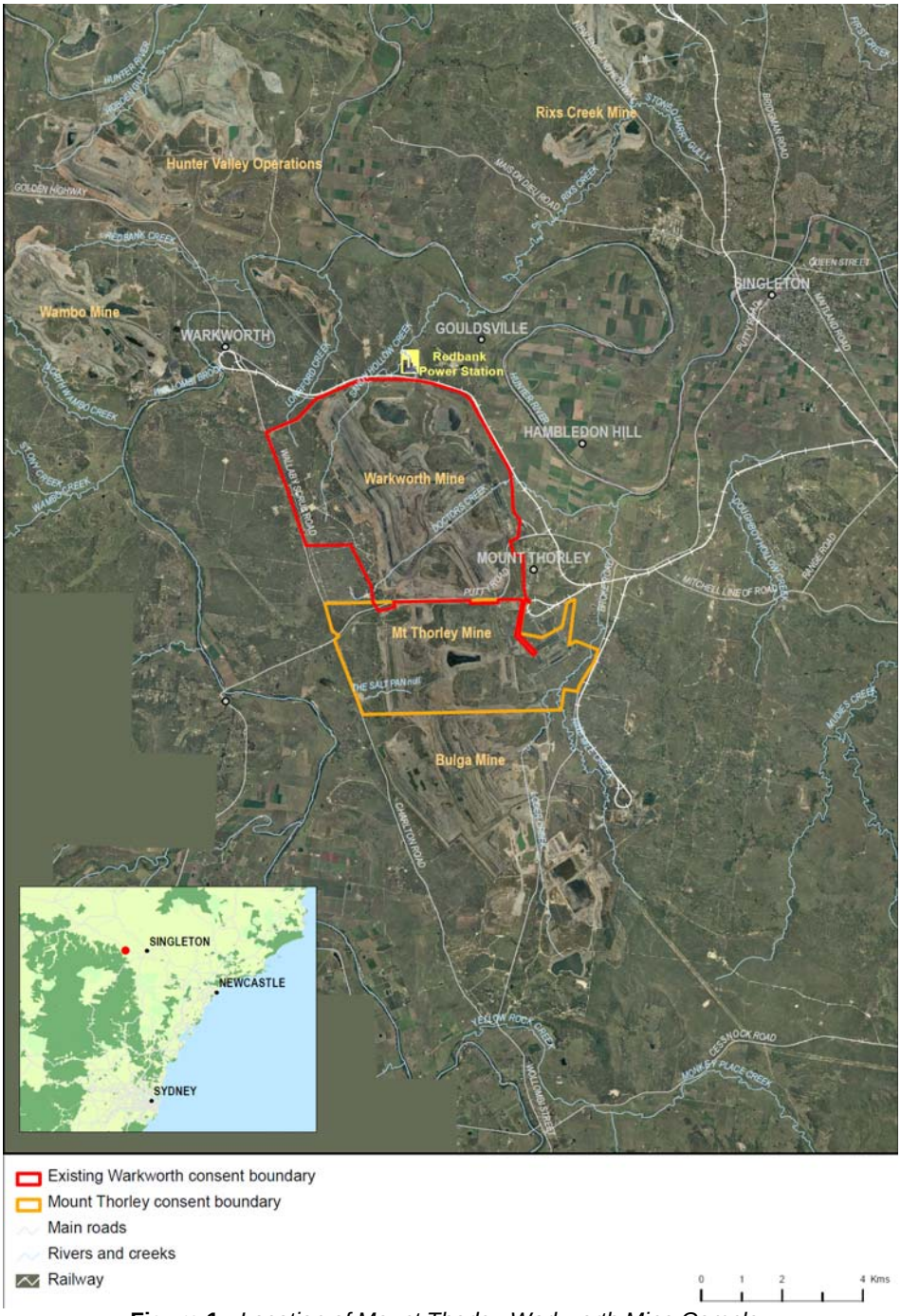

Figure 1: *Location of Mount Thorley-Warkworth Mine Complex*

The MTW mine complex is comprised of two open cut coal mines (see Figure 1):

- the Mount Thorley mine, where coal extraction is gradually moving westwards towards Charlton Road; and
- the Warkworth mine, where coal extraction is gradually moving westwards towards Wallaby Scrub Road.

These two mines have a separate, but cross-linked, ownership. Mount Thorley is owned by Mount Thorley Operations (MTO) whereas Warkworth mine is owned by Warkworth Mining Ltd. The mines also have separate development consents/project approvals. Nonetheless, due to the overlapping ownership structure (which is dominated by Coal & Allied Industries Ltd), the two mines have been operated under a single management as an integrated mine complex since 2004. Under these arrangements, the mines share employees and surface infrastructure - and are now connected by a series of haul roads (with bridges over Putty Road), conveyors and pipelines; they also have highly interdependent mining operations with coal, overburden, tailings, and water being moved between the two mines.

Together, the mines have approval to extract up to 28 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, process this coal at either the Mount Thorley or Warkworth coal preparation plants (CPPs), and then rail it to export markets via the Mount Thorley Coal Loader.

A major extension of mining at Warkworth mine was approved by the Planning Assessment Commission on 3 February 2012. The Warkworth Extension Project expands open cut mining by 750 hectares (ha) to the west and extends the life of the mine by a further 11 years, until 2033. Under the approval, existing production levels and continued integration with Mount Thorley mine are maintained. The approval includes conditions for managing impacts from the overall MTW mine complex, including noise and air quality.

The approved operations of both mines are summarised in Table 1.

Table 1: *Approved Operations Mount Thorley-Warkworth Mine Complex*

Aspect	***Mount Thorley***	***Warkworth***
Company	Mount Thorley Operations Pty Limited	Warkworth Mining Limited
Operations	Commenced 1981	Commenced 1981
Consent	DA 34/95, which expires in 2017 DA dated 12 January 1983 DA dated 5 March 1981 (see Figure 4)	MP 09_0202, which expires in 2033
Remaining Life	6 years	21 years
Mining Reserves	Around 37 Mt	> 400 Mt
Mining Areas	1 open cut pit (Loders) and 2 box cuts (Abbey Green North & South), with mining operations moving west towards Charlton Road.	5 open cut pits (North, West, CD, Woodlands and South) with mining operations moving west through Wallaby Scrub Road
Extraction Rate	Approved: up to 10 Mtpa ROM coal Actual in 2009/10: 5.7 Mtpa	Approved: up to 18 Mtpa ROM coal Actual in 2009/10: 6.5 Mtpa
Coal Processing	Coal is processed at the Mount Thorley CPP, which can process up to 10 Mtpa ROM coal	Coal is processed at the: • Warkworth CPP, which can process up to 13 Mtpa ROM coal; and • Mount Thorley CPP
Coal Transport	Coal is transported to the Mount Thorley Coal Loader by haul road and conveyor, and then railed to export markets.	Coal is transported to the: • Mount Thorley Coal Loader by haul road and conveyor, and then railed to export markets • Redbank Power Station by conveyor
Overburden	In-pit emplacement behind advancing mining operations at the Mount Thorley mine	In-pit emplacement behind advancing mining operations at both the Warkworth and Mount Thorley mines
Rejects Disposal	Coarse reject and tailings are disposed of in the Abbey Green North and South pits.	• Coarse reject is placed in the in-pit emplacement areas at both the Warkworth and Mount Thorley mines

Aspect	*Mount Thorley*	*Warkworth*
		• Fine reject (tailings) is stored in tailings facilities on site • Dewatered tailings is transferred to the Redbank Power Station by conveyor • Ash from Redbank Power Station is transferred by pipeline to the tailings storage facilities at Warkworth mine
Infrastructure	• Mount Thorley CPP • Site access roads and internal haul roads • Conveyor from Mount Thorley CPP to Mount Thorley Coal Loader • Vehicle wash bays and water truck fill points • Workshop, stores, and sewage treatment infrastructure • Office building and parking	• Warkworth CPP • Site access roads, internal haul roads, and three approved bridges over Putty Road (two constructed) • Conveyors to the Mount Thorley Coal Loader and Redbank Power Station • Heavy vehicle workshops, washing facilities, bulk oil and fuel storages, general stores and workshop • Coal stockpiles, storage hoppers and crushers • Electricity supply infrastructure • Office building and parking
Water Management	Water management system including process water and sediment dams, water and tailings pipelines and water sharing infrastructure with the Warkworth mine	Water management system including process water and sediment dams, pipelines and water sharing infrastructure with the Mount Thorley and Hunter Valley Operations mines
Biodiversity Offsets	None	• Conserve and enhance 7 biodiversity areas covering at least 4,790 hectares • Contribute funding and resources for restoration of and research on *Warkworth Sands Woodland* and *Hunter Ironbark Woodlands* endangered ecological communities
Rehabilitation	Rehabilitate site to well-treed grazing land. 886 ha rehabilitated across MTW complex as at the end of December 2010	Eventual 2299 ha of on-site rehabilitation, comprising a combination of woodland, open woodland and pasture. 886 ha rehabilitated across MTW complex as at the end of December 2010
Employment	860 (combined)	

The MTW mine complex is located in an area that is dominated by large-scale and intensive mining operations, which have significantly altered the natural landscape since the late 1970s. The closest mining operations to the complex (see Figure 1) include the:

- Bulga open cut and underground mine complex, which is located to the south of the complex and is allowed to extract up to 26.2 Mtpa of ROM coal;
- Wambo open cut and underground mine complex, which is located to the northwest of the complex and is allowed to extract up to 14.7 Mtpa of ROM coal; and
- Hunter Valley Operations (HVO) mine complex, which is located to the north of the complex, and allowed to extract up to 36 Mtpa of ROM coal.

A consequence of all this mining and industrial activity is that most of the land in the vicinity of the complex is owned by mining companies. Nevertheless, it is important to recognise that large tracts of land surrounding these mining operations are used for a range of agricultural activities, with the land along the Hunter River and Wollombi Brook being used for intensive agriculture and the rest of the agricultural land being used primarily for grazing (see Figure 1).

2 PROPOSED MODIFICATION

On 6 January 2010, MTO submitted an application to the Department to modify its principal development consent (DA 34/95) for the Mount Thorley mine under Section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Following legislative changes, MTO then resubmitted this application in November 2010, under Section 75W of the EP&A Act.

MTO proposes to:

- extend the approved Abbey Green North Pit by 75 ha to the west;
- realign a section of haul road; and
- relocate and modify infrastructure, including the water management system.

The proposed modifications are summarised below, shown on Figures 2 and 3 and described in detail in the Statement of Environmental Effects (SEE) supporting the request (see **Appendix E**).

Extend Abbey Green North Pit

The proposed extension of Abbey Green North (AGN) pit by 75 ha would enable MTO to extract 5 million tonnes of ROM coal over a period of 5 years. The proposed extension is located on previously mined land within the approved development consent boundary. ROM coal would be extracted from the previously unmined Warkworth, Bowfield and Mount Arthur coal seams then hauled to the Mount Thorley CPP for processing before being loaded onto trains at the adjacent Mount Thorley Coal Loader and then railed to the Port of Newcastle to be exported.

MTO also proposes to use the final voids of the AGN and Abbey Green South (AGS) pits to temporarily store mine water for use at the MTW complex. When future tailings storage is required, the pit voids would be dewatered and used for storage of tailings from both Mount Thorley and Warkworth mines. This would improve MTW's ability to manage its water balance in the short term and tailings storage in the long term.

Realign Haul Road

MTO proposes to realign a section of haul road to allow for the extended mining footprint and to enable continued coal haulage to the Mount Thorley CPP. Mining of the proposed extension area would remove approximately 37 million bank cubic metres (bcm) of overburden, some of which would be used in construction of the haul road. The majority of overburden would be placed around the east and west embankments of the existing MTO operations dam.

Relocate and Modify Infrastructure

Modifications to MTO's existing water management system would be required to accommodate the extension of mining and the proposed haul road realignment. MTO proposes to enlarge an existing process water dam and construct two small sediment dams. Other infrastructure to be relocated within the approved mine site includes water and tailings pipes, water truck fill points, lighting plants, tyre storage and a light vehicle wash bay.

The modification would not alter the approved mining extraction rate, mine life, mining methods, operating hours, equipment use or employment at the mine.

As shown in Table 1, Mount Thorley mine is currently regulated under three development consents. The development consent boundary and disturbance areas of the respective consents are shown in Figure 4. In order to simplify regulation of the mine, the Department has recommended that the older development consents (dating to 1981 and 1983) are surrendered as part of this modification.

3 STATUTORY CONTEXT

3.1 Legislative Framework

Under Clause 8J(8)(c) of the *Environmental Planning and Assessment Regulation 2000*, a development consent relating to State significant development which was granted by the Minister under Part 4 of the EP&A Act before 1 August 2005 can only be modified under section 75W of the Act. In accordance with clause 12 of Schedule 6A of the EP&A Act, section 75W of the Act as in force immediately before its repeal on 1 October 2011 continues to apply to any such modification. Consequently, Section 75W of the EP&A Act is the appropriate statutory provision under which this modification application must be determined.

The Department considers that the modification application falls within the scope of a request to modify a consent under section 75W, and consequently can be determined. The Department notes:

- the proposed modification is located within the existing development consent boundary;
- there would be no changes to the approved extraction rate, operating hours, coal handling techniques or coal transportation; and
- the approved mine life would not be lengthened.

Although the modification process is taking place under section 75W of the previous Part 3A, any modified consent would remain a development consent under Part 4 of the EP&A Act.

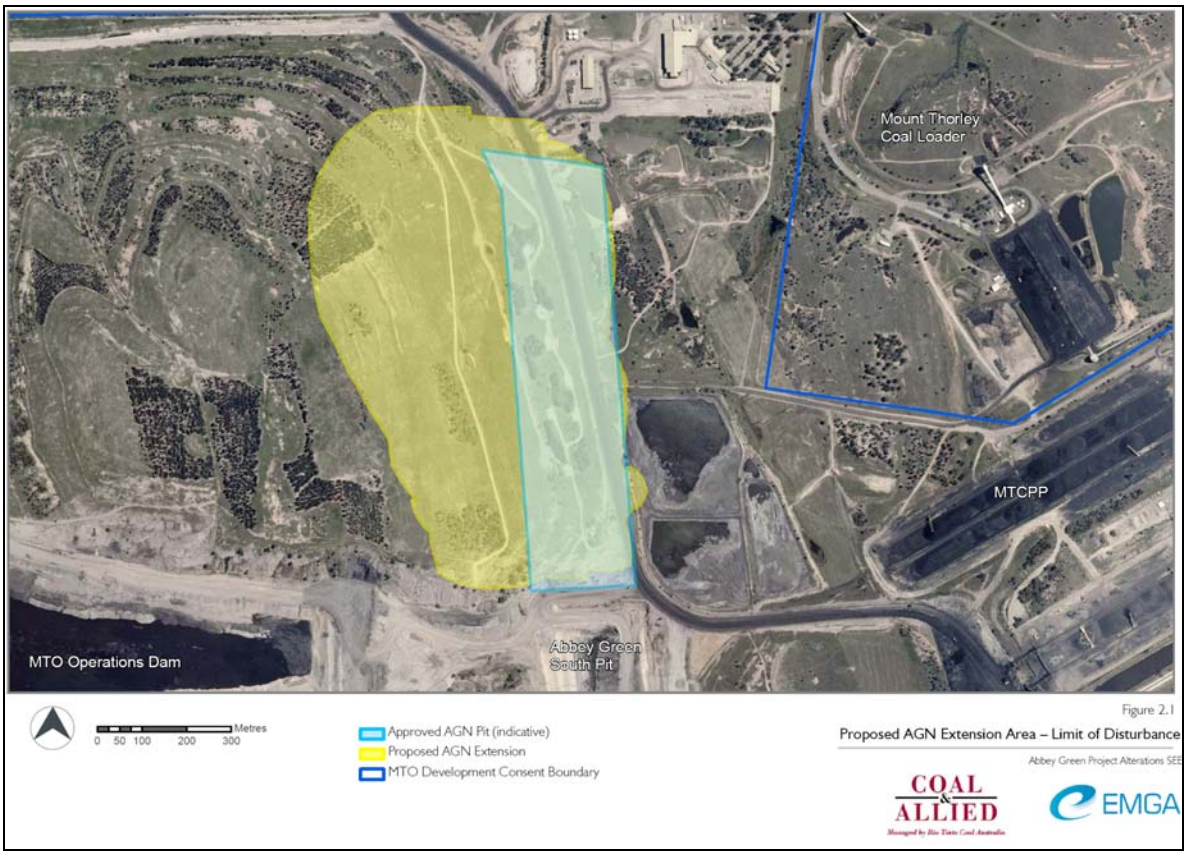

Figure 2: *Proposed Abbey Green North Pit Extension Area (yellow shading)*

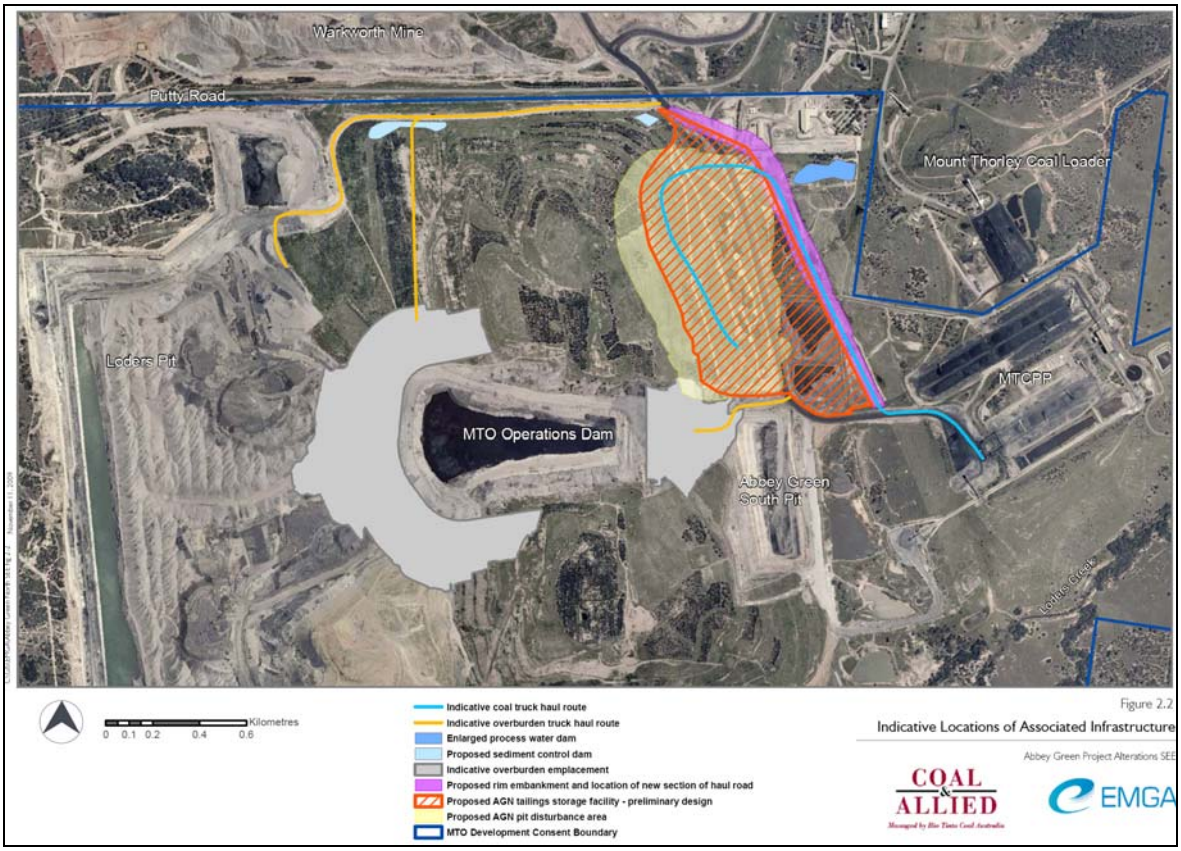

Figure 3: *Proposed Haul Road Realignment, Overburden Emplacement Areas and Tailings Storage*

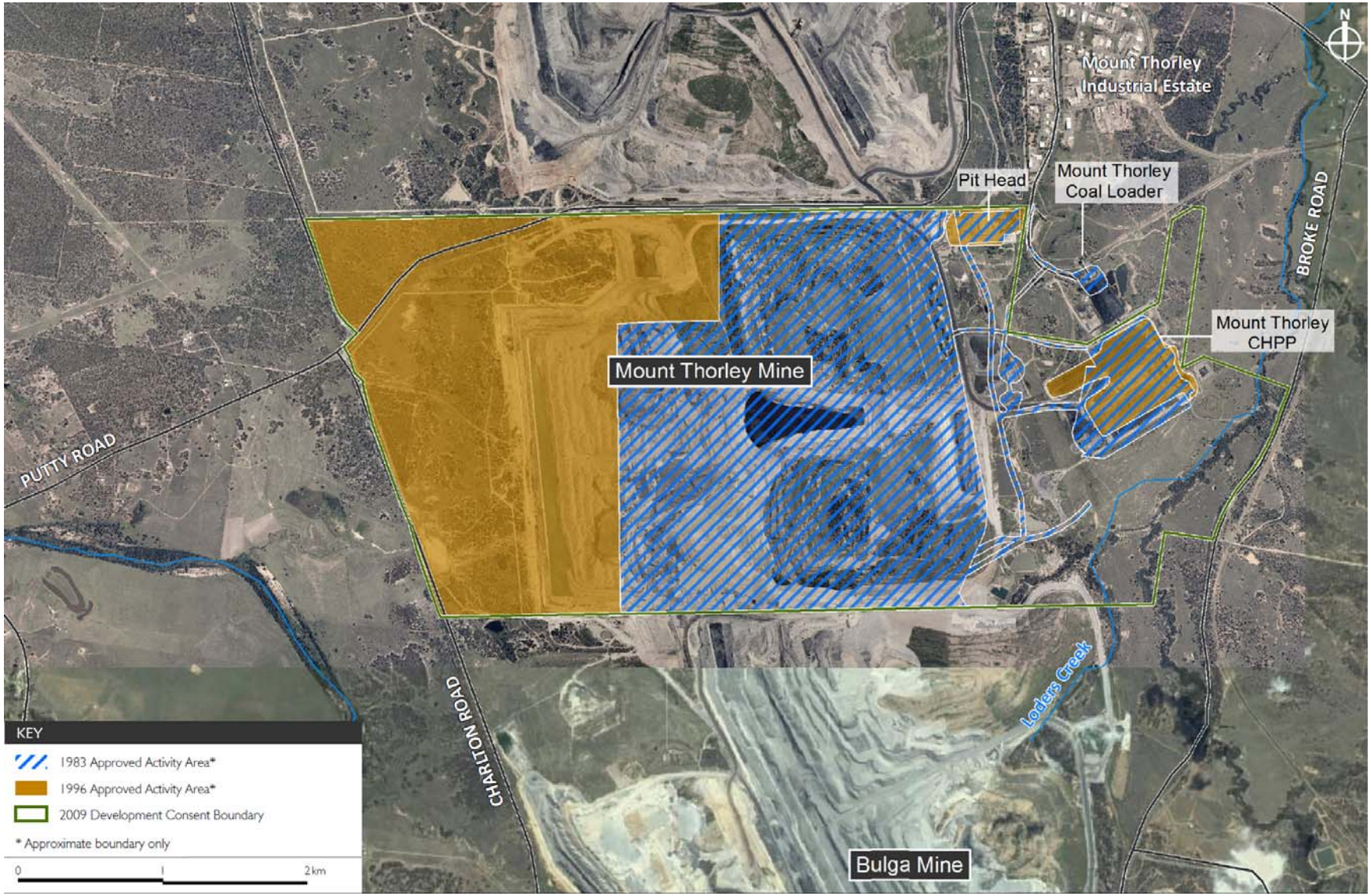

Figure 4: *Development Consent Boundary and Disturbance Areas of All Consents*

3.2 Approval Authority

The Minister was the consent authority for the original development application, and is consequently the approval authority for this modification application. However, the Deputy Director-General, Development Assessment and Systems Performance, may determine the application under the Minister's delegation of 14 September 2011, as:

- less than 25 public submissions were received during the public exhibition period that were in the nature of an objection;
- MTO has not made any reportable political donations; and
- Singleton Council did not object to the proposal.

4 CONSULTATION

Under Section 75W of the EP&A Act, the Department is not required to exhibit the modification application or to undertake consultation. However, the Department:

- publicly exhibited a Statement of Environmental Effects (SEE, see **Appendix E**) for the modification for a 28 day period from 22 January 2010 to 19 February 2010;
- placed a public notice in the *Singleton Argus* newspaper advertising details of the exhibition period; and
- wrote to all persons who lodged a submission in respect of the original 1995 development application and invited them to comment on the modification.

The Department received a total of 12 submissions on the modification (see **Appendix D**), comprising:

- 5 from public authorities; and
- 7 from the community and special interest groups.

A summary of the issues raised in these submissions is provided below.

4.1 Public Authorities

The **Division of Resources and Energy** (DRE) within the Department of Trade and Investment, Regional Infrastructure and Services noted that the proposed modification is a minor variation to the current Mount Thorley mine and that increased rehabilitation requirements could be adequately addressed during DRE's review of the mine's Mining Operations Plan.

The **Office of Environment and Heritage** (OEH) indicated that there was a lack of evidence of consultation with the local Aboriginal community regarding the modification and recommended conditions to ensure Aboriginal cultural heritage values are protected. OEH (now the Environment Protection Authority) also noted that the noise impact assessment had not been completed in accordance with the NSW *Industrial Noise Policy 2000* (INP) and recommended the Department consider whether the existing rights for acquisition in the development consent provided adequate coverage for all impacted receivers identified in the SEE. In addition, correspondence from OEH on the Warkworth Extension Project supported the Department's integrated approach to noise and air quality assessment for the overall MTW mine complex, further described in Section 5.1.

The **NSW Office of Water** (NOW) noted that the SEE generally complies with NSW water statutes and recommended that MTO review its existing Site Water Management Plan to reflect the modification.

The **Roads and Traffic Authority** (RTA), now part of Roads and Maritime Services, and the **Hunter New England Area Health Service** did not object to the modification.

Singleton Council did not make a submission regarding the modification. However, Council commented on the draft conditions indicating that they were comprehensive and consistent with the Warkworth Extension project approval. Council also requested a condition requiring a Voluntary Planning Agreement, consistent with the Warkworth Extension project approval.

4.2 Community and Special Interest Groups

Of the 7 submissions from the general public,

- 4 were from members of the local community and objected to the modification, and
- 3 were from special interest groups, of which 1 objected, 1 did not object and 1 supported the modification.

The main grounds for objection were potential dust, noise and visual impacts, impacts to water resources and rehabilitated areas, as well as the cumulative impacts of mining on nearby residential receivers.

A number of submissions also raised concerns regarding the proposed closure of Wallaby Scrub Road. The closure of Wallaby Scrub Road is not a component of this proposed modification, but is part of the Warkworth Extension Project (now approved). Accordingly, this issue is not discussed further in this assessment.

4.3 Response to Submissions

MTO has provided a response to the issues raised in submissions (see **Appendix C**). The Department has considered the issues raised, and MTO's response to these issues in its assessment below.

5 ASSESSMENT

The Department has considered the key assessment issues of noise, blasting, air quality and water resources below. Other issues are discussed in Table 4.

5.1 Noise

Approach to Assessment

The MTW mine complex operates under separate development consents/project approvals, with separate sets of noise criteria applicable to each of the Mount Thorley and Warkworth mines. For this reason, the noise assessment for the modification considered noise from Mount Thorley mine in isolation and did not include noise from Warkworth mine. However, in practice, the mines are operated as a single integrated complex with shared equipment, infrastructure and resources, and therefore could be considered to represent a single noise source.

Further, the continued operation of the site under two separate sets of noise criteria would continue to allow higher noise levels from the complex as a whole than would otherwise be permitted if MTW was considered as a single source of noise. For these reasons, the Department believes that an integrated, single source approach to assessing noise emissions from MTW is more appropriate.

The Department considered the implications of this approach for both the modification and the Warkworth Extension Project and came to the view that:

- residences to the east and south of the MTW mine complex should be subject to criteria based on existing noise limits for Mount Thorley and Warkworth mines, ensuring the same level of protection from the MTW operations as currently provided, with the knowledge that actual noise levels would reduce as mining moves progressively further away; and
- more stringent whole-of-complex criteria would be appropriate in circumstances where noise impacts were expected to increase over time as a result of proposed mining, this being in the Bulga and Warkworth areas to the west and north.

The Warkworth Extension project approval includes noise criteria for all residences surrounding the MTW complex, based on these principles. Under that approval, noise from mining at both Mount Thorley and Warkworth mines must be managed to meet these criteria. This approach was supported by OEH.

Proposed Modification

Whilst this approach was initially developed to address the proposed extension of mining at Warkworth, it is also appropriate to apply to the proposed modification at Mount Thorley mine. The nearest sensitive receptors to the AGN pit extension include rural residences 2 km to the east, near the Mount Thorley industrial estate, and 2.5 km to the west, near Wollombi Brook and Bulga Village. Representative residences in these areas are shown on Figure 5. The proposed modification has the potential to alter noise emissions from Mount Thorley mine via:

- extending open cut mining further to the west (AGN pit);
- use of the haul road realigned further to the east; and
- overburden emplacement around the western and eastern sides of the MTO operations dam.

The proposed extension of AGN pit would operate for up to five years, with all other mining operations at Mount Thorley mine due to cease in 2017. Mining activities would continue 24 hours a day, consistent with current operations.

Other key noise generating activities in close proximity to the AGN pit include the Mount Thorley Industrial Estate, Mount Thorley Coal Loader and Mount Thorley CPP. These are the primary contributing noise sources for residences to the east.
EMGA conducted noise impact assessments for the modification and the Warkworth Extension Project, which modelled all existing and proposed noise sources from the MTW mine complex. Extensive consultation and further detailed analysis was carried out by EMGA following requests by the Department. The additional analysis considered noise from the MTW complex, cumulative noise from other mines and predicted noise reductions from proposed attenuation measures.

EMGA's assessment of the modification concluded that:

- noise levels at representative residences to the northeast currently exceed the noise criteria in the existing 1996 consent and that the modification would cause these exceedances to increase by between 1-3 dB(A) at most such residences; and
- noise levels at representative residences to the west of the mining complex would remain substantially unchanged, with minor increases of up to 2 dB(A) predicted.

Table 2 shows the predicted noise levels against the criteria adopted by the Department for the MTW mine complex. Reference numbers under both the modification SEE and Warkworth Extension Project environmental assessment for the residences closest to the proposed AGN pit are also shown.

Table 2: *Predicted Impacts of the Modification – Representative Locations*

Residences: (Reference Nos Mount Thorley SEE/ Warkworth EA)	***Representative Receiver Location***	***Mount Thorley Operational Noise Criteria (Night Time) dB(A)***	***Worst Case Predicted Noise Level dB(A), exceedance shown in brackets***	***Impact of Approved Warkworth Extension Project***
2 (153)	Mount Thorley	40	44 (+4)	>5dB (acquisition)
2b (154)	Mount Thorley	40	43 (+3)	other mine owned
3 (150)	Mount Thorley	40	44 (+4)	>5dB (acquisition)
4 (148)	Mount Thorley	41	43 (+2)	>5dB (acquisition)
5(146)	Mount Thorley	42	46 (+4)	>5dB (acquisition)
6 (144)	Mount Thorley	44	47 (+3)	>5dB (acquisition)
16 (149)	Mount Thorley	41	46 (+5)	>5dB (acquisition)
16b	Mount Thorley	41	43 (+2)	other mine owned
17 (151)	Mount Thorley	41	43 (+2)	other mine owned
9 (87)	Bulga East	38	38 (0)	>5dB (acquisition)
15 (97)	Bulga East	38	39 (+1)	>5dB (acquisition)

In comparing noise predictions with the adopted criteria, the modification would result in:

- significant noise impacts (5 dB(A)) for one private residence (149);
- moderate noise impacts (3 - 4 dB(A)) for four private residences (153, 150, 146, 144);
- marginal noise impacts (1 - 2 dB(A)) for two private residences (148, 97); and
- no change for one private residence (87).

Noise associated with the modification would extend over a period of approximately five years, until 2017. Beyond 2017, noise levels are predicted to decrease for residents to the east with the cessation of mining at Mount Thorley. However, as also shown in Table 2, all residences significantly and moderately affected by the proposed modification would also be significantly affected by the approved Warkworth Extension Project and have therefore already been offered "acquisition on request" in the approval for that project.

Table 2 shows that EMGA's assessment only listed a short group of residences, each of which was considered to be representative of a larger group of residences affected by noise from the proposed modification, including at the villages of Mount Thorley and Bulga. While this approach is sound, it has not separately identified *all* residences and properties which may be affected by unacceptable noise impacts. However, all such residences and properties are listed in the recent Warkworth project approval. The Department considers that all residences and properties in Mount Thorley and Bulga that received acquisition and/or mitigation on request rights under the Warkworth approval should receive the same rights under the modified consent for Mount Thorley.

The Department therefore recommends that the Mount Thorley consent should be modified to include:

- acquisition rights for 11 residences and 1 parcel of vacant land, or architectural noise treatments should the residences remain privately-owned; and
- up-front entitlement to architectural treatments (such as double glazing, insulation, air filters, a first flush roof water drainage system and/or air conditioning) for 27 residences.

The modified consent also notes that the obligations for acquisition and/or mitigation are to be met by Warkworth mine for as long as its project approval remains in force and continues to provide for acquisition and/or mitigation at the affected properties. If the Warkworth approval ceases to have effect, then the proposed terms of the modified consent for Mount Thorley would "come into play".

Mitigation

No specific mitigation controls, beyond those currently implemented by MTO, were proposed for the modification. However, a range of mitigation measures have been proposed by Warkworth Mining for the MTW mine complex as part of the Warkworth Extension project, including:

- installation of noise attenuation on the Warkworth CPP;
- progressive installation of noise attenuation on the MTW truck fleet, with 100% attenuated by the end of 2015; and
- implementation of a proactive and reactive noise management system, including use of real time weather data to guide mining and overburden emplacement activities, and proactive mine planning to deal with contingencies such as prevailing weather conditions.

These measures would have the effect of minimising noise emissions from the overall MTW mine complex, and thereby reduce noise impacts for residences. Requirements to implement, validate and report on the effectiveness of these measures are included in the Warkworth Extension project approval, but it is proposed to replicate the majority of them in the modified Mount Thorley consent.

Sleep Disturbance

The noise assessment did not consider the potential for the modification to cause sleep disturbance at nearby residences. Nevertheless, the Department has recommended conditions requiring MTO to comply with a sleep disturbance criterion of 48 dB $L_{A1(1\ minute)}$ at all privately-owned receivers, again consistent with the Warkworth Extension project approval.

Conclusion

The Department concludes that the modification would be a minor contributor to noise emissions from the overall MTW mine complex for the medium term (5 years), until operations at Mount Thorley cease in 2017. The Department is satisfied that the management of noise from the MTW complex has been significantly strengthened under the recent project approval for the Warkworth Extension project. It is appropriate that this suite of conditions is replicated in the modified consent for Mount Thorley. This would provide equivalence between the two consents regarding management of the overall MTW mine complex in respect of:

- acquisition and mitigation rights;
- noise criteria, including operational, acquisition and cumulative;
- attenuation of the MTW truck fleet;
- best management practice;
- real-time noise monitoring system including proactive and reactive management; and
- a noise management plan detailing implementation.

5.2 Blasting

Blasting of overburden material is proposed to expose coal seams in the AGN pit for mining. Impacts from blasting can include structural damage to property and infrastructure, safety risks to people and livestock, nuisance impacts for residences, and blast fumes. MTO proposes to undertake blasting at AGN more than once a day, but only during daylight hours and with meteorological conditions taken into account. Blasts would be designed to meet standard overpressure and ground vibration limits.

EMGA's noise and vibration assessment identified residence 17(151), located 2.2 km from the eastern edge of the AGN pit, as the nearest sensitive receiver. The assessment did not establish overpressure or ground vibration limits specific to individual receivers, but drew on information from a blast study conducted by Blastronics Pty Limited for Mount Pleasant Mine in 1994. This study provided recommended blast charge masses to meet standard overpressure and ground vibration limits at various distances to receivers.

The Department notes that all private properties are located over 500 metres (m) from the mining area, and therefore have a low risk of being affected by flyrock from blasting (ie rock projectiles). However, Putty Road is located within 500 m of the proposed mining area and therefore would

Figure 5: *Representative residences*

require ongoing management to protect the safety of road users during blasting. MTO has not addressed this issue in its SEE. However the Department is satisfied that this can be readily managed according to standard conditions requiring temporary road closures, as it is at many other mines in the Hunter Valley.

The Department accepts that the blasting proposed under the modification can be managed to meet relevant amenity criteria, avoid damage to property and sensitive structures, minimise safety risks, and reduce the risk of emission of significant quantities of blast fumes to acceptable levels. To ensure that blasting impacts are appropriately managed, the Department recommends that the consent be modified to include a suite of contemporary blasting conditions, consistent with those in the Warkworth Extension project approval, to ensure:

- prior to blasting in the AGN pit extension area, MTO prepares and gains the Department's approval of a Blast Management Plan that sets out blast design criteria and management techniques to ensure that blasting complies with standard overpressure and ground vibration criteria at all private properties;
- appropriate limits on blast frequencies and hours;
- additional protection of heritage items;
- residents are notified and kept up to date regarding blasting activities and feedback/ complaint management is facilitated;
- provision of structural property inspections to properties located within 2km of blasting activities;
- repair of damage, where blasting is deemed to have caused structural damage; and
- dust and fume emissions from blasting are minimised.

5.3 Air Quality

Dust emissions from mining activities have the potential to cause health and amenity impacts for nearby receivers. Air quality impacts from the modification and cumulative impacts from other nearby mines were raised as concerns in several submissions.

The modification has the potential to generate additional dust emissions from:

- drilling, blasting, transport and dumping of overburden; and
- extraction, hauling, loading and unloading of coal.

These activities are consistent with current mining methods at the MTW mine complex. Hence, the air quality impact assessment undertaken by PAE Holmes considered the contribution of the modification to dust emissions, in the context of cumulative emissions from the MTW mine complex and other mines. The assessment modelled emissions of total suspended particulates (TSP), particulate matter less than 10 microns in diameter (PM_{10}) and deposited dust for years 3 and 4 of operations under the modification; which represented maximum dust generation. The modelling assumed that the following dust control measures would be in place:

- dust controls fitted to all drill rigs;
- watering of all trafficked areas, active work areas, coal handling areas and other areas susceptible to wind erosion;
- minimising exposed land susceptible to wind erosion;
- progressive rehabilitation of areas disturbed by mining; and
- water sprays on stockpiles.

The modelling predicted that mining associated with the AGN extension would make only a minor contribution to overall dust emissions at the nearest receivers. Residence 6(144), located northeast of AGN, is predicted to experience the highest emissions as a result of the modification (see Table 3). Table 3 also shows recent measured emissions from the MTW mine complex, and relevant OEH criteria.

As indicated in Table 3, predicted emissions solely derived from the proposed modification are very minor and would not exceed OEH's impact assessment criteria. However, analysis of PAE Holmes's predicted cumulative emissions compared with measured emissions (taken from MTW's 2010 Annual Environmental Management Report), indicate some discrepancies. In particular, the SEE predicts annual average cumulative emissions of PM_{10} are 20.7 $\mu g/m^3$, compared with measured emissions of 27.4 $\mu g/m^3$, which is much closer to the OEH criterion of 30 $\mu g/m^3$.

Table 3: *Predicted dust emissions for the Modification (worst-case)*

Location	***Parameter***	***Predicted emissions modification ($\mu g/m^3$)***	***Predicted emissions cumulative ($\mu g/m^3$)***	***Measured emissions * ($\mu g/m^3$)***	***OEH Criteria***
Residence 6 (144) Mount Thorley SEE (Warkworth EA)	TSP (annual average)	1.84	47.1	N/A #	90 $\mu g/m^3$
	PM_{10} (annual average)	1.63	20.7	27.4	30 $\mu g/m^3$
	PM_{10} (24 hour)	10.8	N/A	53 (average)	50 $\mu g/m^3$ (>5days/yr)
	Deposited dust (annual average)	0.095	2.69	3.1	2 g/m^2/mth (increment) 4 g/m^2/mth (total)

- 2010 monitoring data from MTW Annual Environmental Management Report.

No TSP monitoring data available for northeast. Data to the west measured annual average TSP of around 40 $\mu g/m^3$.

It is not clear why PAE Holmes's predicted emissions are roughly 25% below recently measured levels. This could result from a number of causes, such as the assumed future application of dust control measures that were not in fact applied at all times by the mine during 2010. Due to these uncertainties in predictions, the Department considers it imperative that all dust control measures assumed in the modelling are implemented for the duration of mining at Mount Thorley. The modified conditions incorporate this recommendation. Nonetheless, the Department concludes that the air quality impacts of the proposed modification are minor, and would not lead to an exceedance of the OEH criteria for TSP, PM_{10} or deposited dust.

Consistent with the Department's single complex approach to assessing noise impacts from the MTW mine complex, the Department requested a supplementary cumulative air quality impact assessment to determine the relative contribution of both the AGN and Warkworth extensions to cumulative PM_{10} emissions. A supplementary assessment of cumulative PM_{10} (24 hour) was consequently prepared by PAE Holmes, which indicated that three properties in the Mount Thorley area would be moderately impacted, with cumulative PM_{10} (24 hour) emissions above OEH criteria on 5 days a year or less. The estimated contribution of the AGN extension is 11 $\mu g/m^3$ and the Warkworth extension is 64 $\mu g/m^3$. The Department therefore considers that the modification would make only a minor contribution to cumulative PM_{10} (24 hour) exceedances. Approval conditions for the Warkworth Extension Project, which include requirements to install dust mitigation measures at moderately-affected residences and implement a real-time dust management system, will minimise the cumulative dust impacts from the MTW mine complex.

The Department is satisfied that the air quality impacts associated with the modification would be minor and can be adequately managed via recommended conditions of approval. The Department recommends that the consent be modified to include:

- requirements to minimise odour, fume and greenhouse gas emissions;
- both operational and acquisition air quality criteria;
- requirements to implement best management practice for minimising dust and other emissions;
- implement a real-time monitoring system including proactive and reactive management;
- implement and maintain dust mitigation controls, as detailed in the SEE; and
- implement an air quality and greenhouse gas management plan.

5.4 Water Resources

Mining of the proposed extension area has the potential to impact on surface and groundwater resources by affecting surface water flows in local catchments, and causing groundwater inflow into the extended AGN pit. The SEE included a water impact assessment (WIA) undertaken by JP Environmental which also described the water management system for the MTW mine complex.

Water Management System

An extensive water management system exists on-site for managing surface and groundwater inflows. The water management system is integrated across the MTW mine complex, allowing water to be shared across both mines, maximising reuse opportunities and improving workability within the pits.

The water management system comprises a series of water quality control and sedimentation dams which are used for capturing and storing catchment water inflows and groundwater seepage. Water is reused on-site for dust suppression and in the CPP. When required, water is discharged from the site in accordance with an existing Environment Protection Licence and credits held under the Hunter River Salinity Trading Scheme (HRSTS).

The key water management issue for the Mount Thorley mine, including the AGN pit extension, involves keeping the pit sufficiently dewatered, such that mining activities can progress uninhibited. A number of changes are proposed to the site water management system to accommodate the extended AGN pit and to improve water management across the MTW mine complex, including:

- construction of two new sedimentation dams to the north of the AGN pit (16S and 17S);
- enlargement of one existing sedimentation dam (1S);
- decommissioning two existing sedimentation dams (2S and 3S), already approved in a previous modification; and
- when inactive, use of the AGN and AGS pits for temporary storage of mine water from Mount Thorley and Warkworth mines.

Sedimentation dam 9S, approved to be enlarged in 2009, has a storage capacity of 2000 megalitres (ML) and is expected to easily accommodate any increased catchment and groundwater inflows generated by the extended AGN pit. This dam would also be used for storage of water from Warkworth mine.

Surface Water

The AGN pit extension area lies within the catchments of Salt Pan Creek, Loders Creek and Doctors Creek. These are ephemeral water courses that drain to Wollombi Brook and the Hunter River.

The WIA indicates that the loss of 75 ha of catchment area to mining would cause a loss of 120 megalitres per annum (MLpa) of catchment runoff to the Hunter River. This loss would be temporary until such time as the AGN tailings pit is decommissioned and the land is rehabilitated. As this would be integrated with rehabilitation of Warkworth mine, the timeframe is likely to be between 10-20 years. The SEE concluded that catchment losses would be compensated for by a reduction in water drawn from the Hunter River due to expansion of on-site water storage. As discussed above, on site water storage would easily accommodate the additional catchment inflows, negating the need for additional discharge entitlement under the HRSTS.

The assessment also noted that the AGN pit would capture an average of 50 ML per annum of pit surface water inflow. The assessment did not calculate these losses as a percentage of total catchment flows; however the Department considers that they are low and unlikely to impact on access to and use of local water resources.

Groundwater

The primary groundwater systems in the area include alluvial aquifers associated with Wollombi Brook and the Hunter River; and the hard rock aquifers associated with coal seams. The alluvial aquifers have low salinity and are used for irrigation, town water and stock and domestic supply. The nearest registered bore is located approximately 4 km from the mine. The hard rock aquifers are highly saline and are not suitable for these beneficial uses. Groundwater monitoring conducted as part of previous environmental assessments indicates that groundwater generally flows westwards towards Wollombi Brook and is experiencing depressurisation from mining operations at Mount Thorley, Warkworth and Bulga.

The WIA concluded that the modification would not impact on alluvial aquifers and would have minimal effect on groundwater quality. The assessment indicated that there would be a marginal increase in groundwater seepage into the pit, due to the larger area, however the expected volumes are considered to be negligible. It was noted that the predictions of minimal seepage were correct for the recently completed AGS pit, located in close proximity to the proposed AGN pit.

Predicted impacts on groundwater users are expected to be minimal. One public submission expressed concern that impacts on a water supply bore located in the Hunter River alluvium approximately 4 km east of the AGN pit area had not been adequately considered. The Department is satisfied that the assessment has demonstrated that groundwater at Mount Thorley drains to the west and that impacts on alluvial aquifers would be minimal; and considers the existing

groundwater monitoring network to be adequate for detecting any changes in groundwater volumes and quality, such that any impacts on this bore can be detected and appropriately managed.

The Department is satisfied that the potential impacts of the modification on surface water and groundwater resources would be minimal. Nevertheless, the Department has recommended a suite of contemporary water management conditions for the mine, including requiring MTO to update its Water Management Plan, including groundwater monitoring and response plans.

5.5 Other Issues

The assessment raised several other issues which are addressed in Table 4.

Table 4: *Assessment of Other Issues*

Issue	***Potential Impacts***	***Consideration and Conclusions***
Ecology	• Clearing of native vegetation • Impact on threatened species, populations or endangered ecological communities (EECs)	• 75 ha of land would be cleared for mining, largely comprising overburden dumps previously rehabilitated with exotic pasture species and a small area of tree shelter belts (less than 5 ha). There is also a small area of disturbed native grasslands. The area of proposed mining is entirely within the footprint of currently consented disturbance areas. • No threatened species, populations, EECs or migratory species have been recorded in the area to be cleared. • The rehabilitated grasslands and tree shelter belts are not well connected to other vegetated areas, with haul roads located to the north, east and west and the MTO operations dam to the south. The area is considered to be of low conservation significance and therefore unlikely to support threatened species. • The Department considers the biodiversity impacts of the modification to be minimal and does not consider that a biodiversity offset for the clearing of the previously-rehabilitated land is necessary. The Department also notes that a significant biodiversity offset strategy has been developed and approved for the Warkworth Extension Project which includes lands within the Mount Thorley mine site.
Draft Upper Hunter Strategic Regional Land Use Plan	• Potential impacts on Biophysical Strategic Agricultural Land and the Viticulture Critical Industry Cluster	• There is no Biophysical Strategic Agricultural Land (BSAL, as mapped under the draft Upper Hunter SRLUP) within 2 km of the proposed modification. The nearest BSAL is on the flats of the Hunter River, some 3 km to the north. Similarly, the mapped boundary of the Viticulture Critical Industry Cluster under the draft SRLUP is some 3 km to the west of the proposed extraction. • There are no potential impacts on alluvial groundwater (see assessment above) and impacts on groundwater users are expected to be negligible.
Rehabilitation	• Inadequate or unsuccessful rehabilitation, such that objectives are not achieved	• The Warkworth Extension project approval already incorporates a rehabilitation strategy for the MTW mine complex, which focuses on delivering a combination of native woodland comprising EECs, and grasslands across Mount Thorley mine. • The Department considers that rehabilitation of the AGN pit and Mount Thorley mine should be implemented via the rehabilitation strategy for the MTW mine complex, approved for the Warkworth Extension project. The Department has therefore replicated these requirements, including requirements for progressive rehabilitation and a Rehabilitation Management Plan, in the proposed modified consent.
Aboriginal Cultural Heritage	• Disturbance and/or removal of items of Aboriginal heritage significance	• The SEE referenced an Aboriginal heritage assessment conducted in 2001 of the modification area which identified nine Aboriginal sites and three potential archaeological deposits within, or close to, the AGN pit extension. These areas were assessed as low-medium significance and were salvaged in 2004 in accordance with the *National Parks and Wildlife Act 1974.* • However, OEH's submission stated that there was little evidence to support the conclusion that no Aboriginal sites would be impacted by the modification and noted that consultation with the Aboriginal community had not been undertaken. In its response, MTO confirmed that the previous survey and salvage adequately covered the modification area. MTO also noted that consultation had not been undertaken as no sites would be impacted by the modification. • OEH recommended conditions requiring ongoing consultation with the local Aboriginal community and implementation of an Aboriginal Cultural Heritage Management Plan. • Noting that the great majority of the proposed disturbance area has been previously mined and rehabilitated, that it was previously surveyed prior to mining, and that the 9 sites identified were salvaged in 2004, the Department is satisfied that the modification would have minimal impact on Aboriginal heritage. • The project approval for the Warkworth Extension Project also requires a Heritage Management Plan. It is envisaged that a single plan would be prepared to cover the MTW mine complex. Nevertheless, it has incorporated OEH's recommendations into the modified conditions.

Issue	*Potential Impacts*	*Consideration and Conclusions*
Development Contributions	• The modification is a small extension of an existing mine that would not require any new or augmented public infrastructure	• During review of the draft conditions, Council requested a condition requiring a Voluntary Planning Agreement (VPA), consistent with the Warkworth Extension project approval. • Council acknowledged that the modification was relatively minor, however it intends to request that each mining application include a VPA, regardless of its size. • The Department has considered the request and notes that the Warkworth Extension project approval took account of the Mt Thorley-Warkworth complex as a whole, requiring a significant development contribution. • The scope of this modification is small and there is no requirement for new or augmented infrastructure to support its development. Mining associated with the modification would be carried out over a period of 5 years, after which time the AGN pit would be utilised for the Warkworth Extension project. • The Department concludes that the VPA for the Warkworth Extension project approval sufficiently covers the modification and that a separate VPA is not warranted in this instance.
Visual & Lighting	• Reduced visual amenity for nearby residences • Nuisance impacts associated with night lighting	• Two submissions raised concerns regarding the potential visual impacts of the modification. MTO's response indicates that the extended pit, overburden emplacement areas, and infrastructure would be visible from small sections of Putty Road, however visual impacts would be similar to those of the existing development. • The Department is satisfied that visual impacts would be minimal and consistent with existing operations. In addition, the Warkworth Extension project approval requires preparation of a Visual Impact Management Plan to identify residences with significant direct views of the MTW complex and additional mitigation measures that could be implemented. The Department has recommended corresponding contemporary conditions to manage visual impacts, including: • control of site lighting; • a vegetation screen along the boundary of the site that adjoins public roads; • additional visual mitigation for residents, upon request; and • progressive rehabilitation of the site to reduce exposed areas.
Greenhouse Gas (GHG) Emissions	• Increased GHG emissions and contribution to climate change	• The modification would not increase the approved maximum coal production at the mine or extend its approved life. Consequently, there would be no additional GHGs emitted annually, beyond those associated with the approved mine.
Cumulative Impacts	• Incremental impacts, in particular, noise and dust, from all mining activities resulting in unacceptable impacts at residences.	• Community submissions raised concerns over potential cumulative noise and dust impacts on nearby sensitive receivers and the traditional 'quiet rural' nature of the area. • Sections 5.1 to 5.3 address the cumulative noise, blasting and dust impacts of the MTW mine complex. These have been fully addressed in the Department's assessment of the Warkworth Extension project. • The modification would not increase ROM coal production or operating life at Mount Thorley, therefore cumulative impacts would be minimal. However, the Department recommends a range of contemporary conditions to manage cumulative noise, dust and blasting impacts, including co-ordination with other mines to minimise cumulative impacts.

6 RECOMMENDED CONDITONS

The Department has drafted the attached notice of modification to the development consent (see **Appendix A**). The notice of modification would vary the existing consent to the form shown in **Appendix B** (the "consolidated consent"). The recommended conditions not only reflect the modification request, but replace the entire body of conditions in the mine's 1996 consent with a comprehensive set of contemporary conditions that are integrated with the recent approval of the Warkworth Extension Project. Key conditions require:

- noise mitigation offered to 27 residences;
- acquisition upon request offered to 11 residences and 1 parcel of vacant land;
- new noise and air quality criteria for operation, acquisition and cumulative;
- updated operating conditions for noise, blasting and air quality management;
- contemporary conditions to manage impacts on water, Aboriginal heritage and visual amenity; and
- updated conditions requiring progressive rehabilitation and a rehabilitation management plan.

The modified consent also requires the surrender of Mount Thorley's two older development consents (dating to 1981 and 1983). After this surrender, the mine would be managed under a single, modern planning consent; and the overall MTW mine complex would be managed under two such consents which are fully integrated with one another.

MTO has reviewed and accepted the recommended conditions.

7 CONCLUSION

The Department has assessed the modification application, SEE, submissions and MTO's response to submissions in accordance with the relevant requirements of the EP&A Act, including the objects of the EP&A Act and the principles of ecologically sustainable development. It has also considered the environmental assessment and project approval for the Warkworth Extension Project. The assessment has found that the proposed modification would:

- result in a slight increase in noise levels which are unlikely to lead to perceivable differences at any receiver; and
- lead to minor additional dust impacts, but with levels remaining below relevant criteria.

The Department has recommended a number of additional conditions to minimise noise impacts and to manage dust emissions from the mine. With the implementation of these conditions, the Department is satisfied that the impacts of the proposed modification would be adequately minimised and/or managed. The modification would enable resource extraction to be maximised within an existing operational coal mine, with minimal environmental impacts. The Department considers that the benefits of the modification sufficiently outweigh its costs, the proposed modification is in the public interest and should be approved subject to conditions.

8 RECOMMENDATION

It is recommended that the Deputy Director-General, as delegate for the Minister:

- **consider** the findings and recommendations of this report;
- **determine** that the proposed modification is in the scope of Section 75W of the EP&A Act;
- **approve** the application to modify the development consent, subject to conditions, under Section 75W of the EP&A Act; and
- **sign** the attached notice of modification to the development consent (Tagged A).

Felicity Greenway 30/4/12

Felicity Greenway
A/Director
Mining and Industry Projects

1.5.12

Chris Wilson
Executive Director
Major Projects Assessment

2/5/12

Richard Pearson
Deputy Director-General
Development Assessment and Systems Performance

APPENDIX A: NOTICE OF MODIFICATION

Appendices are stored separately on the Department's website at:
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3620

See separate file titled *Notice of Modification*.

APPENDIX B: CONSOLIDATED CONSENT

See separate file titled *Consolidated Consent May 2012*.

APPENDIX C: RESPONSE TO SUBMISSIONS

See separate file titled *Response to Submissions*

APPENDIX D: SUBMISSIONS

Submissions are stored on the Department's website at:
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3620

APPENDIX E: STATEMENT OF ENVIRONMENTAL EFFECTS

See separate documents on the Department's website titled:

- *Statement of Environmental Effects – Main Report*
- *Statement of Environmental Effects – Appendices*