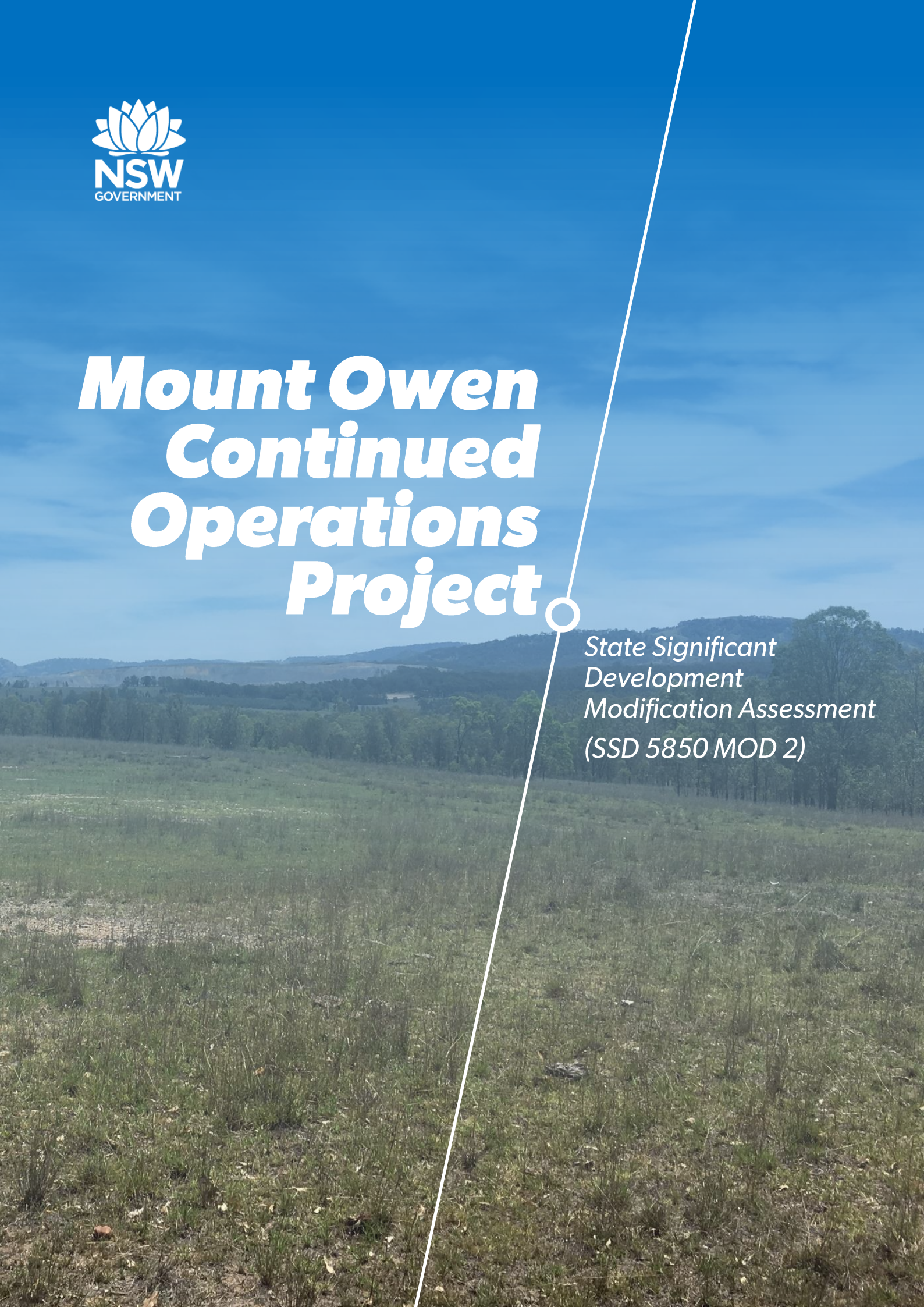

# Mount Owen Continued Operations Project

*State Significant Development Modification Assessment (SSD 5850 MOD 2)*

September 2019



### Cover photo

View of North Pit, Mount Owen Complex.

### Disclaimer



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# Executive Summary

The Mount Owen Complex (the Complex) is an open cut coal mining complex located approximately 20 kilometres northwest of Singleton in the Hunter Valley. The Mount Owen Complex includes the Mount Owen, Ravensworth East and Glendell coal mines.

Mt Owen Pty Ltd, a subsidiary of Glencore Coal Pty Ltd, proposes to modify the development consent for the Mount Owen Continued Operations Project (MOCO Project). The proposed modification involves:

- extending the size and depth of the Mount Owen Mine's North Pit to extract an additional 35 million tonnes of run-of-mine coal over the life of the mine;
- extending the life of the mine by 6 years until 2037;
- extending the approved disturbance area by approximately 46 hectares; and
- minor changes to existing conditions of consent.

The Department has assessed the modification application in accordance with the relevant requirements of the *Environmental Planning and Assessment Act 1979*, with a particular focus on issues relating to air quality (including greenhouse gas emissions), noise, water resources, biodiversity, visual impacts and rehabilitation.

While the Department's assessment has concluded that the proposed modification is unlikely to increase the severity of these impacts, relative to the approved project, it would prolong these impacts by a further six years.

Cumulative air quality impacts were the key issue of concern raised in public submissions, due to Complex's proximity to other coal mining operations, including Bloomfield's Rix's Creek Complex and Yancoal's Ashton Coal Mine, and to the nearby communities of Middle Falbrook and Camberwell.

Due to key policy changes since the approval of the MOCO Project, the proposed modification is subject to more stringent air quality assessment criteria than the approved Project. These contemporary criteria are reflected in the Department's recommended conditions. The Department has also undertaken a comprehensive review of voluntary acquisition and mitigation rights for air quality impacts under the revised *Voluntary Land Acquisition and Mitigation Policy (September 2018)*. The Department has recommended that acquisition and mitigation rights be afforded to 12 privately-owned receivers in Middle Falbrook and Camberwell.

The proposed modification represents a logical 'brownfield' extension of existing mining operations. This extension would facilitate the recovery of previously unrecoverable coal resources, using existing infrastructure and with a relatively minor increase to the disturbance footprint of the approved project.

The proposal would also provide wide-ranging benefits for the local and State economies. Taking into account predicted air quality impacts and greenhouse gas emissions, the proposed modification is predicted to generate a net benefit to New South Wales in the order of $53 million (NPV). The proposal would also provide continued employment at the Mount Owen Mine for a further six years, generating a local economic benefit of approximately $2.4 million per year.

On balance, the Department considers that the proposed modification is in the public interest and should be approved, subject to stringent conditions.

# Contents

# 1. Introduction

The Mount Owen Complex (the Complex) is a large multi-pit open cut coal mining complex located approximately 20 kilometres (km) northwest of Singleton in the Hunter Valley (see **Figure 1**). The Complex is owned by Mt Owen Pty Ltd (Mt Owen), a subsidiary of Glencore Coal Pty Ltd (Glencore). The Complex comprises three open cut mining operations: the Mount Owen Mine (including the North Pit), the Ravensworth East Mine (including the Bayswater North and West Pits) and the Glendell Mine (including the Barrett Pit).

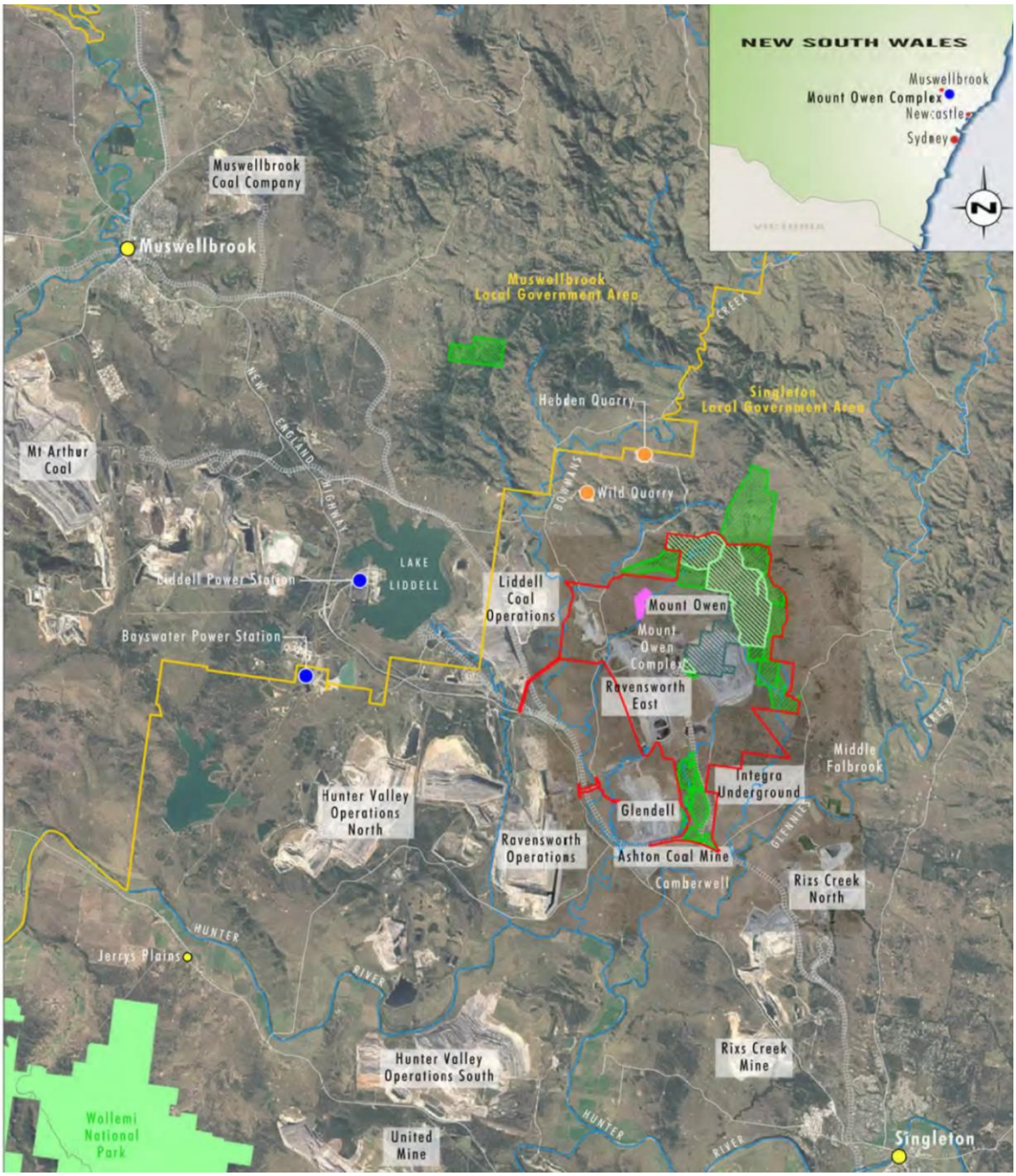


**Figure 1** | Site location

## 1.1 Approval History

Mining commenced at the Mount Owen Mine in 1993. Mining operations have occurred at Ravensworth East since the 1960s. Until late 2016, the two mines operated under separate development consents (DA 52-03-99 and DA 14-1-2004).

On 3 November 2016, the Planning Assessment Commission, as delegate for the Minister for Planning, granted development consent for the Mount Owen Continued Operations Project (MOCO Project) under SSD 5850. The MOCO Project consolidated operations at the Mount Owen Mine and Ravensworth East Mine under a single development consent and extended the scope and lifespan of operations at the two mines. The MOCO Project involves:

- extracting up to 14 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until the end of 2031;
- processing of up to 17 Mtpa of ROM coal at the Mount Owen Coal Handling and Processing Plant (CHPP);
- extending the North Pit by an additional 381 hectares (ha);
- constructing a private rail line;
- extending and upgrading the Mount Owen CHPP and stockpiling facilities; and
- changes to the final landform.

The approved development layout is shown in **Figure 2**. The development consent was subsequently modified in September 2017 to allow the construction of a new water pipeline from the Integra Underground Mine. Further details regarding Modification 1 are provided in **Section 1.3**.

The Glendell Mine continues to operate under a separate development consent (DA 80/952), which permits open cut mining operations until June 2024. However, Glendell Mine utilises the Mount Owen CHPP and rail infrastructure. Operations at the Glendell, Mount Owen and Ravensworth East mines are also jointly managed under Complex-wide environmental management plans and strategies.

## 1.2 Local Context

The Complex is located north of the village of Camberwell. It is also in close proximity to a number of other established coal mining operations, including Glencore's Integra Underground Mine and Bloomfield's Rix's Creek Complex to the southeast, Glencore's Liddell Coal Operations (Liddell) to the west, Glencore's Ravensworth Operations to the southwest, and Yancoal's Ashton Coal Mine to the south. The relationships between the Complex, other nearby mines, and sensitive receivers is shown in **Figure 3**.

In 2014, the NSW Land and Environment Court approved the Ashton South East Open Cut (SEOC) Project (MP 08_0182). The SEOC Project involves the establishment of a new open cut coal mine south of Camberwell. However, the conditions of consent imposed by the Court prevent the Applicant, Ashton Coal Operations Limited (now a subsidiary of Yancoal) from undertaking any development work associated with the project until a particular neighbouring property is acquired or leased. Consequently, it is unclear when, or if, the SEOC Project will proceed.

A State significant development (SSD) application is under assessment for the Rix's Creek South Continuation of Mining Project (SSD 6300). SSD 6300 involves the continuation and expansion of mining operations at Bloomfield's Rix's Creek South Mine, to the southeast of Camberwell, for an additional 21 years. This application was referred to the Independent Planning Commission of New South Wales for determination on 20 June 2019.

## 1.3 Relationship with Integra Underground Mine

The Complex partially overlays mine workings associated with Integra Underground (see **Figure 2**). In December 2015, Integra Underground was acquired by HV Coking Coal Pty Ltd (HVCC), a wholly owned subsidiary of Glencore.

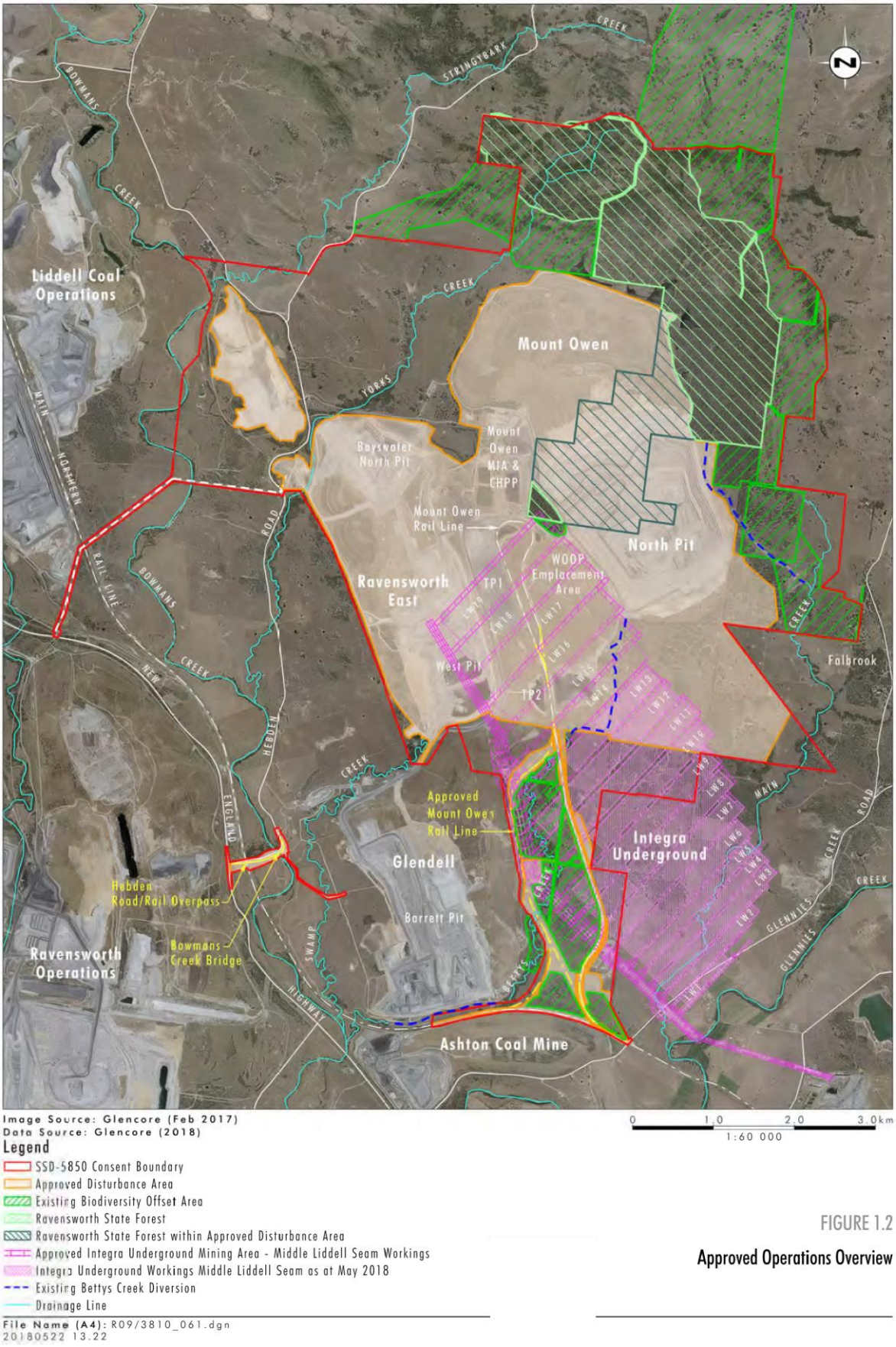


**Figure 2** | Approved development layout and relationship to Integra Underground Mine

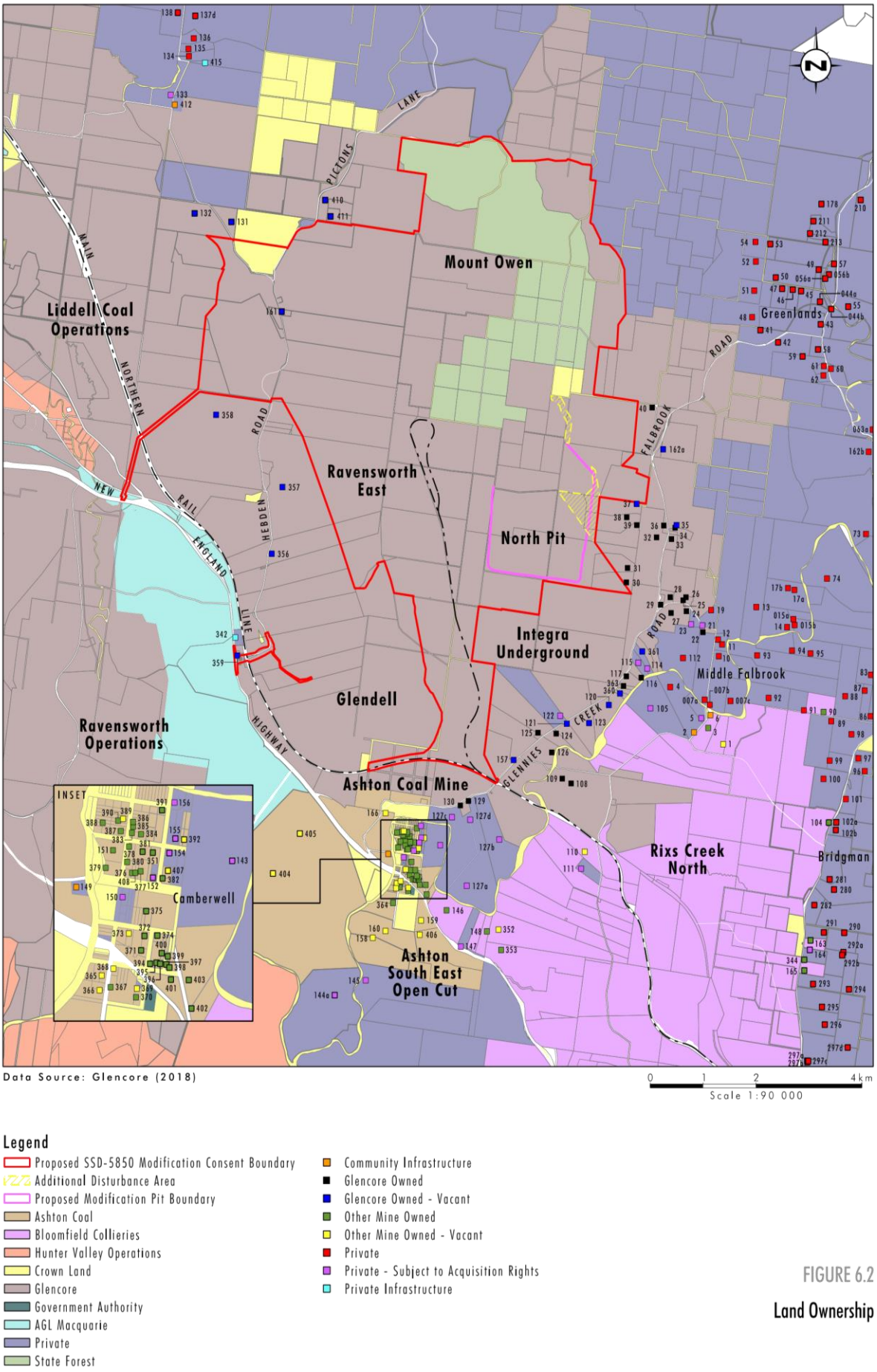


**Figure 3** | Location of nearby mines and sensitive receivers

SSD 5850 has been previously modified (MOD 1) to allow the construction of a water pipeline from Integra Underground to the Complex, to incorporate the underground mine into Glencore's Greater Ravensworth Area Water and Tailings Scheme (GRAWTS).

Glencore's acquisition of Integra Underground and its associated mining tenements has provided opportunities to recover coal resources which were previously inaccessible. Until recently, the depth and lateral extent of mining in Mount Owen Mine's North Pit was constrained by nearby mining tenements associated with Integra Underground. With the two facilities now under shared Glencore ownership, Mt Owen is now seeking to extend the North Pit in order to optimise potential resource recovery under the MOCO Project.

# 2. Proposed Modification

On 31 July 2018, Mt Owen submitted a modification application under s 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Modification 2 (MOD 2) involves:

- extending the size and depth of the North Pit to extract an additional 35 million tonnes (Mt) of ROM coal over the life of the mine;
- extending the life of the mine by 6 years until 2037;
- extending the approved disturbance area by approximately 46 ha; and
- minor changes to existing conditions of consent.

The key proposed changes are summarised in **Table 1** below. The proposed modification area is shown in **Figure 4**. A detailed description of the modification is provided in the Statement of Environmental Effects (SEE) that accompanied the application (see **Appendix A**).

**Table 1** | Comparison of approved and proposed developments

| Component | Approved development | Proposed modified development |
|---|---|---|
| Mine Life | 2031 | 2037 |
| Coal Products | Thermal and semi-soft coking coal | No change |
| Annual Extraction Rate (ROM Coal) | Up to 10 Mtpa at Mount Owen Mine and 4 Mtpa at Ravensworth East | No change |
| Annual Processing Rate (ROM Coal) | Up to 17 Mtpa at the Mount Owen CHPP | No change |
| Total Resource Recovery (ROM Coal) | 257 Mt | Additional 35 Mt |
| Mining Depths | Approximately 300 metres (m) to Hebden Seam | Approximately 380 m (no change to target seams) |
| Disturbance Area | 2534 ha | Additional 46 ha (1.8 percent increase) |
| Mining Method | Truck and excavator | No change |
| Capital Investment Value | $153 million | Additional $15 million |
| Workforce | Up to 660 at Mount Owen Mine and 260 at Ravensworth East | No change to workforce numbers, however, employment at Mount Owen |

| | | |
|---|---|---|
| | | Mine would be extended by an additional 6 years |
| Operating Hours | Continuous operations 24 hours per day, seven days per week | No change |
| Blasting | • Up to 2 blasts per day, with an average of 8 blasts per week at Mount Owen Mine<br>• Up to 2 blasts per day, with an average of 5 blasts per week at Ravensworth East<br>• Blasting generally permitted between the hours of 9 am and 5 pm Monday to Saturday. A maximum of 12 blasts per year may be undertaken between 7 am and 9 am Monday to Saturday | No change |
| Product Transport | • Rail transport via the Mount Owen Rail Loop or conveyor to the Bayswater and/or Liddell Power Stations<br>• Transportation of up to 2 Mtpa of ROM coal/crushed gravel via conveyor to Liddell Coal Mine and/or Ravensworth Coal Terminal | No change |
| Water Management | • Surface water managed under the GRAWTS<br>• Flood attenuation works at Yorks Creek | • Additional disturbance area to be incorporated into the GRAWTS<br>• Flood attenuation works at Yorks Creek no longer required |
| Mining Waste Management | • Overburden emplacement up to a maximum height of 230 m<br>• Tailings emplacement in the West Pit, in-pit tailings cells in the North Pit, the Bayswater North Pit (BNP) void or transfer under the GRAWTS | • No change to approved maximum height<br>• Tailings to be transferred to Liddell via the GRAWTS (subject to separate approval); supplemented by emplacement/storage in the West Pit and in-pit emplacement in the North Pit<br>• If the transfer of tailings to Liddell is not approved, tailings would be deposited in the BNP void |
| Rehabilitation & Final Landform | • Progressive rehabilitation<br>• Final landform to incorporate micro-relief<br>• Two final voids (BNP and North Pit) | • No changes to previous commitments regarding progressive rehabilitation or incorporation of micro-relief<br>• No change to the number of final voids (BNP and North Pit)<br>• Changes to approved rehabilitation schedule, to account for extended mine life and additional overburden<br>• Changes to final landform, including the size and depth of the North Pit final void |

There are two proposed disturbance areas associated with the modification, as shown in **Figure 4** below. The northern area comprises a section of the existing Bettys Creek Diversion, which pre-dates the MOCO Project. No changes to the diversion are proposed. However, Mt Owen is seeking flexibility to undertake water management works within this area, as needed, in order to improve integration with the proposed final landform.

The southern area represents the proposed extension of the North Pit. Much of the proposed extension area is located within the approved disturbance area for the project. The proposed disturbance area is shown in yellow hatch in **Figure 4**. Comparative cross-sections of the approved and proposed pits are shown in **Figure 5**.

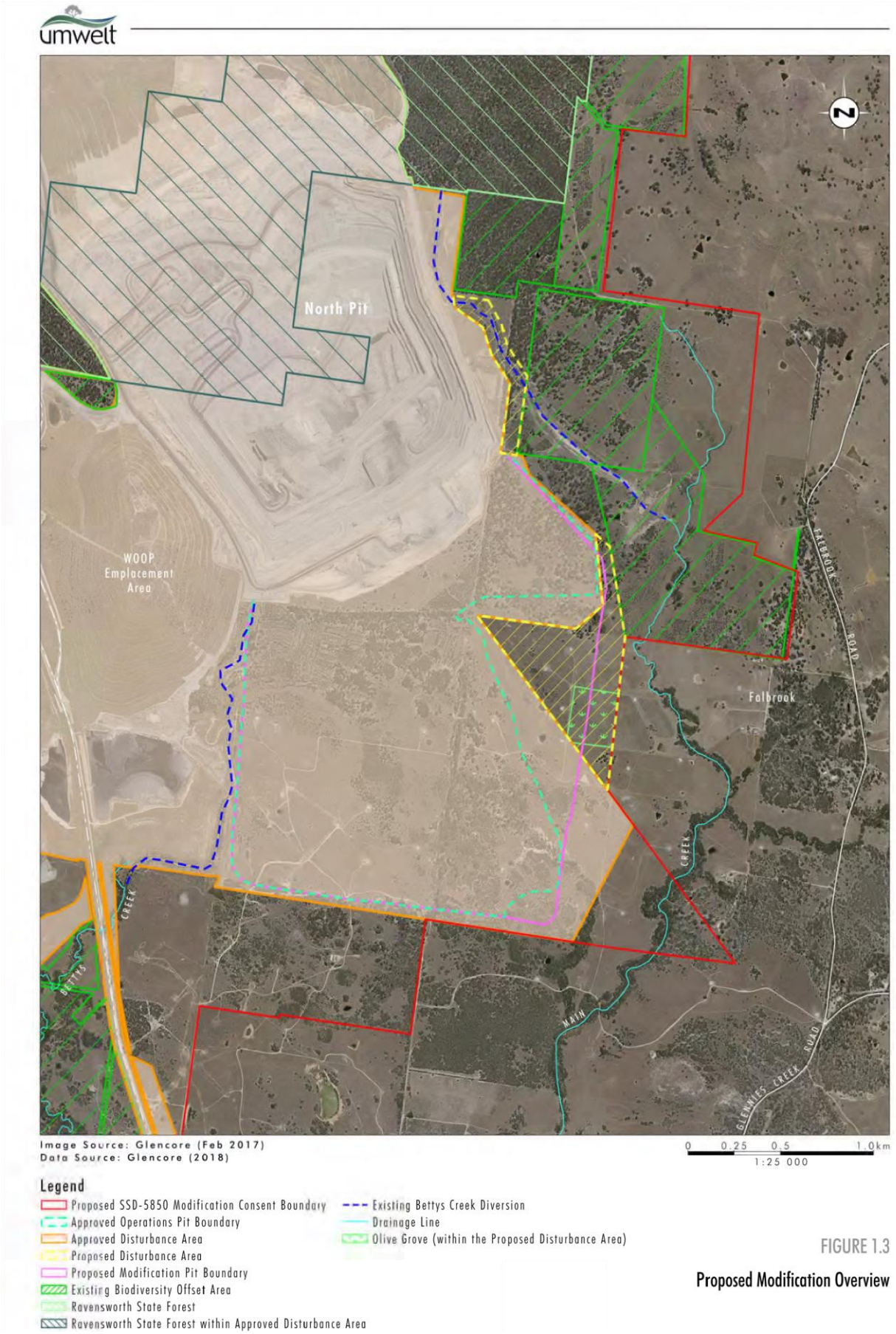


**Figure 4** | Proposed modification area

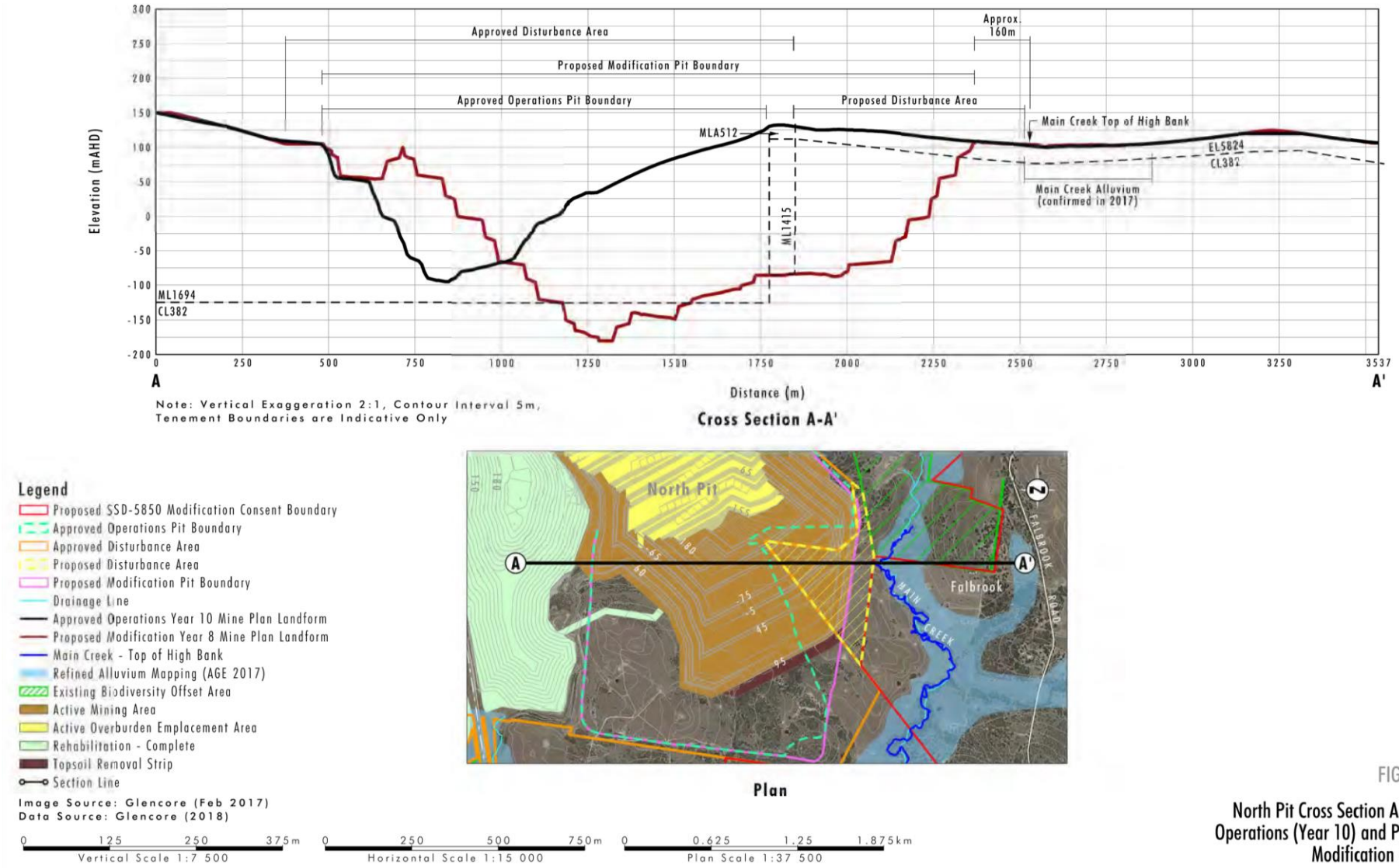


**Figure 5** | Comparative cross sections (approved and proposed)

The proposed changes to conditions of consent relate to existing requirements for flood mitigation and the salvage of Aboriginal artefacts.

Firstly, Mt Owen is seeking to amend existing conditions regarding flood mitigation works on Yorks Creek. Mt Owen has proposed an alternative strategy to address potential flooding issues, and therefore submits that these conditions are no longer relevant. This issue is discussed in detail in **Section 5.3.2**.

Secondly, Mt Owen is seeking to modify existing Aboriginal cultural heritage management conditions, in order to allow salvaged Aboriginal artefacts to be stored at a central storage facility in the Wollombi Brook Voluntary Conservation Area (VCA) at the Bulga Mining Complex, rather than a purpose-built facility at the Mount Owen Complex. This issue is discussed in detail in **Section 5.7**.

Mt Owen submits that the proposed modification would maximise resource recovery at the Complex, and provide continued employment for the existing workforce, without substantially increasing the environmental or social impacts of the approved project. The economic benefits of the proposed modification are discussed further in **Section 5.7**.

## 2.1 Mine Planning

The North Pit targets coal seams within the Jerrys Plains and Vane Subgroups of the Wittingham Coal Measures. The Jerrys Plains Subgroup includes the Ravensworth and Bayswater Seams. The Vane Subgroup includes the Lemington, Pikes Gully, Arties, Liddell, Barrett and Hebden Seams (see **Figure 6**).

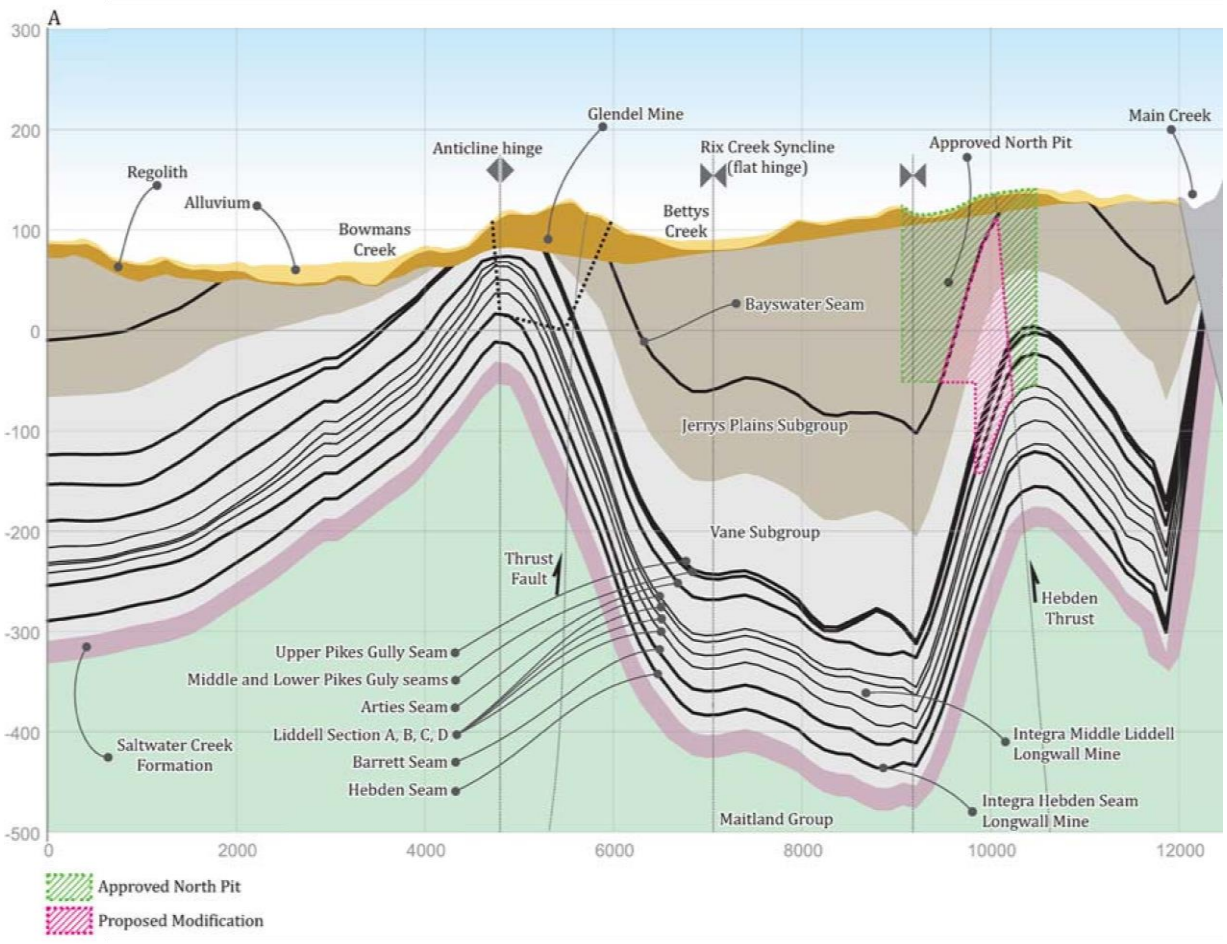


**Figure 6** | Target coal seams

The MOCO Project, as approved, involves coal extraction down to the Hebden Seam, approximately 300 m below the original ground surface. The proposed modification would allow deeper extraction of the Hebden Seam, to a maximum depth of 380 m below the ground surface. As the coal seams dip to the west, the modified pit shell would incorporate a series of steps, with mining down to the Hebden Seam in the east, where the seam is shallowest. In the western area of the pit, where the Hebden Seam is too deep to be economically extracted, the pit floor would step up to the Lemington Seam.

Mt Owen would continue to maintain a minimum vertical separation distance of 250 m between the North Pit floor and the Integra Underground mine workings, for safety reasons. Glencore has also established procedures to manage potential blasting impacts on the Integra Underground workings. These are discussed in **Section 5.2.2**.

Mining operations within the modification area are proposed to commence in mid to late 2019.

# 3. Statutory Context

## 3.1 Scope of Modification

The modification application seeks to modify SSD 5850 in accordance with section 4.55(2) of the EP&A Act. Under section 4.55(2)(a), SSD 5850 cannot be modified unless the consent authority is satisfied that the modified proposal is substantially the same as the development for which consent was originally granted.

The proposed modification involves extension of the approved mine life and expansion of an approved open cut pit which would increase the overall disturbance area by 1.8 percent. As shown in **Table 1**, most key aspects of the approved development would remain unchanged. The proposed modification would not increase the approved annual extraction or production rates, alter mining methods or product transportation or extend the approved hours of operation. Consequently, the Department is satisfied that the modification is within the scope of section 4.55(2) and may be determined accordingly.

## 3.2 Consent Authority

The Minister for Planning and Public Spaces is the consent authority for the application. However, the Executive Director, Energy and Resources may determine the application under the Minister's delegations of 11 October 2017 and 26 June 2019, as there were fewer than 25 public objections, Singleton Council (Council) did not object to the proposed modification, and neither Mt Owen nor Glencore have disclosed any reportable political donations.

## 3.3 Environmental Planning Instruments

A number of environmental planning instruments apply to the modification, including:

- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (the Mining SEPP);
- *State Environmental Planning Policy (Infrastructure) 2007;*
- *State Environmental Planning Policy No. 44 – Koala Habitat Protection*; and
- *Singleton Local Environmental Plan 2013.*

The Department has considered the proposed modification against the relevant provisions of these instruments. The Department has also considered Mt Owen's consideration of relevant instruments in its SEE. The Department considers that the proposed modification can be carried out in a manner that is generally consistent with the aims, objectives and provisions of these instruments.

## 3.4 Objects of the EP&A Act

The consent authority must consider the objects of the EP&A Act when making decisions under the Act. The Department has assessed the proposed modification against the current objects of the EP&A Act. The objects of most relevance to the decision on whether or not to approve the proposed modification are found in section 1.3 of the Act. They are:

- Object 1.3(a): *to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources*;
- Object 1.3(b): *to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment*;
- Object 1.3(c): *to promote the orderly and economic use and development of land*;
- Object 1.3(e): *to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats*;
- Object 1.3(f): *to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)*;
- Object 1.3(i): *to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State*; and
- Object 1.3(j): *to provide increased opportunity for community participation in environmental planning and assessment*.

The Department is satisfied that the proposed modification encourages the proper management and development of resources (Object 1.3(a)) and the promotion of the orderly and economic use of land (Object 1.3(c)). The proposal would optimise resource recovery under SSD 5850, while utilising Mt Owen's established infrastructure and workforce.

The Department has considered the principles of ecologically sustainable development (ESD, Object 1.3(b)) in its assessment of the proposed modification. The Department considers that the proposed modification may be carried out in a manner that is consistent with the principles of ESD. The Department's assessment has sought to integrate all significant environmental, social and economic considerations. In particular, the Department has undertaken a detailed assessment of greenhouse gas emissions associated with the proposed modification (see **Section 5.1.5**).

The Department has carefully considered the environmental impacts of the proposed modification, including potential impacts on the natural, cultural and built environments (Object 1.3(e) and (f)). The key findings of the Department's assessment are summarised in **Section 5**.

The Department publicly exhibited the modification application and consulted with Council (Object 1.3(i) and (j)). The outcomes of the consultation process are outlined in **Section 4**.

## 3.5 Commonwealth Approval

The MOCO Project was determined to be a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to potential impacts on matters of national environmental significance. The Commonwealth Department of Environment and Energy (DoEE) granted approval for the project on 19 January 2017 (EPBC 2013/6978).

The proposed modification was referred to the Commonwealth on 6 November 2017. On 15 December 2017, DoEE determined that MOD 2 is not a controlled action and that no further assessment under the EPBC Act is required.

## 3.6 Other Statutory Requirements

### 3.6.1 Mining Leases

Mt Owen holds four mining leases (ML1355, ML1415, ML1561 and ML1694), two coal leases (CL382 and CL383), and two prospecting authorisations (AUTH268 and AUTH429) relevant to the proposed modification area. Mt Owen also has a pending mining lease application (MLA512) in respect of the modification area. Mt Owen is also preparing a mining lease application over a portion of an existing exploration licence (EL 5824). Mt Owen must obtain the grant of this mining lease under the *Mining Act 1992* prior to commencing mining within the proposed modification area.

### 3.6.2 Site Verification Certificate

The proposed modification area extends beyond the boundaries of Mt Owen's existing surface mining leases. Pursuant to Clause 50A of the *Environmental Planning and Assessment Regulation 2000*, Mt Owen applied for a Site Verification Certificate (SVC) to confirm that the proposed modification area does not contain Biophysical Strategic Agricultural Land (BSAL). SVC 8624 was issued on 28 August 2017.

During the assessment process, it was identified that a 7 ha area of land within the proposed modification area had been omitted from Mt Owen's SVC application. Consequently, Mt Owen submitted a separate SVC application in relation to that omitted area (SVC 10009). SVC 10009 was issued on 5 June 2019.

### 3.6.3 Environment Protection Licences

Glencore holds individual Environment Protection Licences (EPLs) under the *Protection of the Environment Operation Act 1997* for each of the three mines at the Complex. Mount Owen Mine and Ravensworth East Mine currently operate under EPLs 4460 and 10860, respectively. No significant variations to these EPLs would be required as a result of the modification, however, the premises boundary of EPL 4460 would need to be amended to incorporate the proposed modification area.

# 4. Engagement

The Department exhibited the modification application and SEE (see **Appendix A**) from 9 August 2018 until 5 September 2018. The documents were made available on the Department's website and at the offices of the Department, Council and the Nature Conservation Council.

The Department advertised exhibition of the SEE in the *Singleton Argus* and *Hunter Valley News* on 8 August 2018. The Department also notified all community members and special interest groups who previously made

submissions regarding the MOCO Project. Finally, the Department notified relevant Government agencies (including Council) of the exhibition and requested their comments on the proposal.

The Department considers that the notification process met the requirements of the EP&A Act and the EP&A Regulation.

## 4.1 Summary of Submissions

The Department received a total of 26 submissions in response to the exhibition, including:

- 11 government agency submissions;
- 3 public and Special Interest Group (SIG) submissions in support of the proposal; and
- 12 public and SIG submissions objecting to the proposal.

Copies of all submissions are included in **Appendix B.**

## 4.2 Key Issues – Government Agencies

The **Biodiversity and Conservation Division** within the Department (BCD) requested additional information regarding impacts on biodiversity, flooding and Aboriginal cultural heritage.

BCD requested additional figures to support the biodiversity assessment and noted that the SEE did not include a detailed biodiversity offset strategy for the proposed modification. Following its review of the Response to Submissions (RTS), BCD advised that it was satisfied with the biodiversity assessment and provided recommended conditions with respect to the offset strategy. These requirements are reflected in the Department's recommended conditions. This issue is discussed further in **Section 5.4**.

BCD requested additional information to support the proposed changes to flood mitigation at Yorks Creek. Mt Owen subsequently provided additional modelling data to illustrate the changes to peak flood depth and velocity at the Hebden Road creek crossing as a result of Mt Owen's proposed alternative flood mitigation strategy. BCD accepted the results of the additional modelling and advised that no further flooding assessment was required. This issue is discussed further in **Section 5.3.2**.

BCD also provided advice regarding Aboriginal cultural heritage matters. In particular, BCD recommended that the site's Aboriginal Heritage Management Plan (AHMP) be updated to incorporate the proposed modification area. BCD also recommended that AHIMS Site #37-3-1172 be salvaged and that protective fencing be installed around AHIMS Site #37-3-0687 prior to commencing work in the modification area. In its RTS, Mt Owen indicated that it would prefer to salvage rather than protect #37-3-0687 on the basis that it is likely to be indirectly impacted by the modification. BCD subsequently advised that this site cannot be salvaged as it is located well outside the proposed disturbance area. This is reflected in the Department's recommended conditions. Aboriginal cultural heritage matters are discussed further in **Section 5.7**.

**Council** noted that the proposal would increase the approved disturbance area and extend the impacts of mining operations on the local community by an additional six years.

In conjunction with SSD 5850, Mt Owen committed to provide $1.024 million to fund local economic development initiatives, Aboriginal cultural events, community infrastructure and sponsorships. On 23 February 2017, Mt Owen entered into a Voluntary Planning Agreement (VPA) with Council to provide the agreed funding on an incremental basis over a ten-year period. Given the scope of the proposed modification, Council requested

that funding commitments under the current VPA value be reviewed, commensurate with the impacts of the modified development. Following discussions with Council in late 2018, Mt Owen agreed to increase its original funding offer to $1.250 million. Council accepted the general terms of Mt Owen's offer and an amended planning agreement is currently being formalised. The Department has recommended conditions requiring that the amended agreement be finalised within six months of determination of MOD 2 in accordance with the general terms of Mt Owen's offer.

Council also expressed concern that a detailed final land-use strategy for the site has not yet been developed. Council stressed the need for a post-mining strategy which is consistent with both regional and local strategic planning objectives and provides a high degree of certainty for the community that a sustainable post-mining land use is achievable. Following its review of the RTS, Council reiterated these concerns and requested that new conditions be imposed requiring Mt Owen to prepare a detailed Mine Closure Plan. The Department has recommended additional conditions in this regard.

The **Crown Lands Group** within the Department (DPIE – Crown Lands) noted that Mt Owen is required to enter into a Compensation Agreement or Access Arrangement under the *Mining Act 1992* prior to undertaking any mining or exploration activity within any Crown land or Crown road reserves. The Department has recommended conditions in this regard.

The **NSW Dams Safety Committee** (DSC) advised that any proposed works involving prescribed dams (ie the North Void Tailings Dam and Rail Loop Tailings Dam) would require the DSC's endorsement. The Department notes that no changes to those dams are proposed under MOD 2. The DSC further noted that capping designs for both dams need to be endorsed by the DSC. The Department's recommended conditions include a requirement for Mt Owen to consult with the DSC in the preparation of the Rehabilitation Management Plan for the site.

The **Division of Resources and Geoscience** (DRG) within the Department noted that the proposed modification would enable the efficient recovery of coal resources and provide an economic benefit to the State. However, DRG raised concerns regarding discrepancies between the SEE and economic data provided separately to DRG for the purposes of its Resource & Economic Assessment (REA). DRG requested clarification from Mt Owen in this regard. Subsequent discussions were held between Mt Owen and DRG in November 2018 in order to resolve these issues. The Department notes that no substantive changes to the information in the SEE were required.

DRG also noted that part of the proposed extension area does not have a current surface mining lease. DRG advised that a mining lease application would need to be submitted and granted prior to commencing any mining activities in that part. This is discussed further in **Section 3.6.1**.

DRG also asked to be consulted regarding the location of any proposed biodiversity offset areas, in order to minimise potential resource sterilisation. Mt Owen has committed to consult with DRG, should a land-based offset strategy be pursued.

Following its review of the RTS, DRG did not raise any further concerns in relation to the proposed modification.

The **Environment Protection Authority** (EPA) requested further information with respect to air quality, noise, water and waste management. Following its review of the RTS, the EPA advised that the majority of its concerns

could be addressed by modified conditions of consent. However, the EPA requested further information to demonstrate that:

- all predicted additional exceedances of the air quality criteria could be addressed; and
- the proposed noise monitoring methodology would allow noise generated by the Mount Owen Mine to be clearly distinguishable from other mine-related noise sources in the area.

Mt Owen submitted additional information regarding these matters in April 2019. After reviewing this information, the EPA advised that its concerns had been sufficiently addressed and provided recommended conditions with respect to air quality, noise and water management. These matters are discussed further in **Sections 5.1**, **5.2** and **5.3**, respectively.

The **Heritage Council of NSW** (Heritage Council) advised that the proposed modification would not impact on any registered State Heritage items. The Heritage Council concluded that, if the modified development is carried out in accordance with Mt Owen's approved Historic Heritage Management Plan, then no further input from the Council would be required.

**Hunter New England Population Health** (NSW Health) raised concerns with respect to the cumulative air quality impacts of mining operations in the area, noting that maintaining air quality goals within the Hunter Valley is particularly challenging during drought periods. NSW Health also noted that current assessment criteria for particulate matter (PM) are likely to be lowered by 2025 and expressed concern that the MOCO Project may not be able to comply with future air quality standards. In response, Mt Owen provided further details regarding its air quality management and mitigation measures. Mt Owen also noted that the 2025 air quality goals are not reflected in current legislation and guidelines and the air quality assessment for the proposed modification has been undertaken in accordance with all current legislation and guidelines.

Following its review of the RTS, NSW Health reiterated its concerns, noting that while the incremental contribution of the modified development to local $PM_{10}$ concentrations would be relatively minor (particularly in Camberwell), the proposed modification would exacerbate existing air quality issues in the locality, and increase the public health risk to nearby residents. In response, Mt Owen submitted that the predicted impacts of the proposed modification are consistent with the approved MOCO Project. Air quality impacts are discussed further in **Section 5.1**.

NSW Health also provided advice regarding recommended conditions for noise management. These recommendations are discussed further in **Section 5.2.3**.

The **NSW Resources Regulator** did not raise any concerns regarding the proposed modification, considering that sustainable rehabilitation outcomes can be achieved under the proposal, and any identified risks could be suitably managed via the conditions of Mt Owen's mining leases.

**NSW Roads and Maritime Services** did not raise any concerns regarding the proposed modification, noting that it would have no impact on the State road network.

**Subsidence Advisory NSW** (SANSW) noted that any development within the Patrick Plains Mine Subsidence District would require an approval under Part 3 of the *Coal Mine Subsidence Compensation Act 2017*. This is reflected in the Department's recommended conditions.

The **Water Group** within the Department (DPIE Water) did not raise any objections regarding the proposal. However, DPIE Water recommended that Mt Owen be required to install a low permeability barrier wall in the event that mining operations in the North Pit intercept Main Creek's alluvial aquifer. Mt Owen has accepted this recommendation (see **Section 5.3.4**) and this requirement is reflected in the Department's recommended conditions.

DPIE Water advised that Mt Owen would be required to obtain the necessary licences for the taking of groundwater from the Glennies Creek Water Source, noting that it may not be possible to secure such licences under the relevant Water Sharing Plan. In response, Mt Owen noted that the predicted groundwater take for the modified development would be less than previously predicted in the EIS for the MOCO Project. Mt Owen also provided further detail regarding its proposed water licensing strategy, which includes the potential diversion of catchment areas from the Jerrys Water Source to the Glennies Water Source, the purchase of Water Access Licences, or a combination of these options. Following its review of the RTS, DPIE Water did not raise any further concerns regarding water management and recommended conditions with respect to groundwater monitoring and water licensing. These matters are discussed further in **Section 5.3.4**.

The **Forestry Corporation of NSW** (FCNSW) did not make a formal submission in relation to the proposed modification. However, Mt Owen consulted with FCNSW as the approved mining area is partially located within the Ravensworth State Forest (see **Figure 2**). Mt Owen submitted correspondence from FCNSW advising that it has no objections to the proposed changes to the final landform.

FCNSW also requested that, following the conclusion of mining and rehabilitation, Mt Owen give serious consideration to an alternative tenure for the affected area of the Ravensworth State Forest (ie national park or State conservation area) in order to preserve remnant vegetation. The Department has recommended conditions requiring Mt Owen to consult with FCNSW and BCD in the preparation of the Mine Closure Plan.

## 4.3 Key Issues – Community/SIGs

### 4.3.1 Objections

The Department received 12 submissions objecting to the proposed modification, including nine from the general public and three from SIGs. The key issues raised in these submissions are summarised in **Figure 7**.

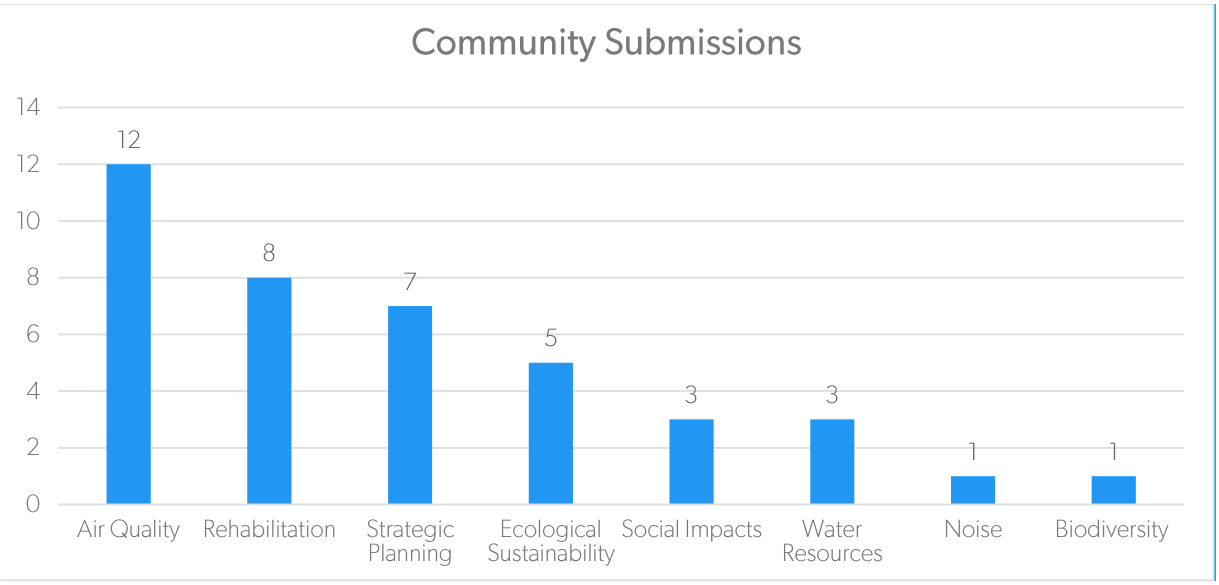


**Figure 7** | Key issues raised in community submissions

Air quality impacts were the key issue of concern for the community. The submissions expressed strong concerns regarding the cumulative air quality impacts of mining operations in the locality and associated health effects. The submissions also raised concerns with respect to dust accumulation on solar panels and in rainwater tanks and questioned the effectiveness of existing measures to mitigate air quality impacts in the area. Several submissions also questioned the current allocation of voluntary acquisition rights, particularly in the village of Camberwell.

In response to these concerns, the Department requested a more detailed assessment of cumulative air quality impacts, including an analysis of the proportionate contribution of the MOCO Project to PM concentrations in the locality, having regard to the *Voluntary Land Acquisition and Mitigation Policy* (VLAMP September 2018). The Department's assessment of air quality impacts is summarised in **Section 5.1**.

Mine rehabilitation was also a key issue of concern for the community. The submissions objected to the inclusion of voids in the final landform and stressed the need for adequate security to ensure that rehabilitation obligations are fulfilled. The Department notes that two final voids were approved as part of SSD 5850. This issue was given detailed consideration in the Department's assessment of the MOCO Project and therefore does not need to be considered in depth in this report. The Department also notes that the *Mining Act 1992* and the conditions of Mt Owen's mining leases require the provision of appropriately sized rehabilitation bonds, and no additional conditions in this regard are considered necessary. However, the Department has undertaken a detailed assessment of changes to the mine's approved final landform associated with MOD 2, including proposed changes to the size and depth of the North Pit void. The findings of this assessment are summarised in **Section 5.6**.

The submissions also highlighted the need for greater strategic planning to reduce reliance on fossil fuels and phase out coal mining in the Hunter Valley, stressing the importance of ESD principles in response to climate change. The Department has integrated ESD principles into its evaluation of MOD 2, particularly with respect to greenhouse gas emissions (see **Section 5.1.5**).

Several submissions also raised concerns regarding the social impacts of the proposal. In particular, residents expressed frustration regarding the cumulative air quality impacts of mining operations and associated loss of amenity. One submission stated that surrounding residents feel trapped in their homes, unable to open windows or drink clean water from their rainwater tanks. Another submission stated that residents are 'seeing their much-loved homes becoming inhospitable and unsaleable… at the same time as their health deteriorates.' Social impacts are discussed further in **Section 5.7**.

The submissions also raised concerns regarding water management, particularly the management of saline water within the final void. Water management within the final landform is discussed further in **Sections 5.3** and **5.6**.

Finally, the submissions also raised concerns regarding noise and biodiversity impacts. The submissions questioned the accuracy of the noise assessment and stressed the need for suitable noise monitoring and mitigation and/or land acquisition to address impacts. The submissions also expressed concerns regarding the proposed increase to the mine's disturbance area and the associated loss of fauna habitat. Noise and biodiversity impacts are discussed further in **Sections 5.2** and **5.4**, respectively.

### 4.3.2 Support

The Department received three submissions in support of the proposal. Two of these submissions were provided by members of the general public and the third was provided by the Hunter Business Chamber. These submissions highlighted the economic benefits of the proposed modification and of mining operations in the Hunter Valley

more broadly. In particular, the submissions noted that the proposal would provide continued employment for the Complex's existing workforce of up to 660 employees.

## 4.4 Response to Submissions

Mt Owen provided an RTS on 21 December 2018. The RTS was subsequently made available on the Department's website. The document was also forwarded to relevant agencies for comment. A copy of the RTS is included in **Appendix C**.

Mt Owen subsequently provided additional information on 5 April 2019 and 15 May 2019, in response to further requests from the Department, EPA, BCD, DPIE Water and NSW Health (see **Appendix D**).

# 5. Assessment

In assessing the merits of the proposed modification, the Department has considered the:

- EIS for the original development application;
- conditions of consent for the project, as subsequently modified;
- MOD 2 application, SEE and additional information provided by Mt Owen;
- community and agency submissions; and
- relevant environmental planning instruments, policies and guidelines.

The Department considers that the key assessment issues relate to air quality, noise, water resources, biodiversity, visual impacts and rehabilitation.

## 5.1 Air Quality

The SEE included an Air Quality Impact Assessment (AQIA) prepared by Jacobs, in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2016* (Approved Methods 2016).[1] The AQIA applied an updated model, in an effort to more accurately predict the air quality impacts of the proposed modification. The AQIA was supplemented by additional assessment provided in the RTS (see **Appendix C**) and additional information provided by Mt Owen (see **Appendix D**).

### 5.1.1 Existing Air Quality Environment

The AQIA provided a detailed analysis of the existing air quality environment within the surrounding locality, based on monitoring data collected between 2012 and 2016. The AQIA indicates that cumulative 24-hour average $PM_{10}$ concentrations exceeded 50 $\mu g/m^3$ at all seven nearby monitoring sites on at least one day during that five-year period.[2] The monitoring site which is most influenced by activities at Mount Owen Mine is SX10, located approximately 2 km southeast of the North Pit. Between 2012 and 2016, the total number of days per year exceeding the 50 $\mu g/m^3$ ranged from 8 to 26, with the peak occurring in 2013. This peak is likely linked to bushfires which occurred in mid to late 2013.

[1] The original air quality assessment for the MOCO Project was based on the now superseded Approved Methods 2005. The current air quality criteria under SSD 5850 are based on the 2005 document.
[2] Under SSD 5850, compliance with the 24-hour average $PM_{10}$ criterion is measured incrementally, rather than cumulatively. As such, these results do not represent an exceedance of the existing air quality criteria under the development consent.

Annual average $PM_{10}$ concentrations have remained below the EPA's previous (ie 2005) 30 µg/m$^3$ assessment criterion at all monitoring sites. However, the newer Approved Methods 2016 impose a more stringent criterion of 25 µg/m$^3$, which must be applied in the Department's assessment of MOD 2. The AQIA indicates that, while annual average $PM_{10}$ concentrations in the immediate vicinity of the Complex have generally remained below 25 µg/m$^3$, $PM_{10}$ levels in the village of Camberwell have consistently exceeded 25 µg/m$^3$ (see **Figure 8**).

There is limited data available with respect to $PM_{2.5}$ concentrations in the locality. The nearest $PM_{2.5}$ monitoring site is located in Camberwell and is part of BCD's Upper Hunter Air Quality Monitoring Network. While SSD 5850 is not currently subject to any performance criteria for $PM_{2.5}$, the Approved Methods 2016 impose a 24-hour average criterion of 25 µg/m$^3$ and an annual average criterion of 8 µg/m$^3$. Recorded $PM_{2.5}$ concentrations in Camberwell exceeded this 24-hour criterion on two days between 2012 and 2016. Annual average $PM_{2.5}$ concentrations generally remained below 8 µg/m$^3$, except in 2013, when significant bushfires occurred.

Deposited dust levels exceeded the EPA's annual average cumulative criterion of 4 g/m$^2$/month at five monitoring sites in Falbrook and Camberwell in one or more years between 2012 and 2014. No exceedances were recorded in 2015 or 2016.

### 5.1.2 Operational Impacts

*Approach to modelling*

The original air quality model for the MOCO Project was based on meteorological conditions during 2011/2012. The MOD 2 AQIA used meteorological data from 2014, as this year was considered representative of wind patterns in the locality (predominantly from the southeast and northwest) and below average rainfall. The model incorporated all available monitoring data from 2014 to establish a dataset reflecting the hourly fluctuation of PM concentrations throughout the day. The AQIA also included a revised emissions inventory for the project, which aimed to more accurately reflect operations at the Complex.

The AQIA conservatively assumed that the Ashton SEOC Project and the Rix's Creek South Continuation of Mining Project would be in operation from 2020 onwards. The AQIA also assumed that all nearby mines would be operating at maximum production in all modelled years.[3] A range of proactive mitigation measures, such as water spraying were incorporated into the modelling. Mt Owen also currently implements a range of reactive operational controls to minimise air quality impacts, including relocating or shutting down equipment during adverse conditions. However, these reactive measures were not incorporated into the modelling. Based on these inclusions and exclusions, while the AQIA considers a worst-case air quality scenario, it probably overstates the actual cumulative impacts of the proposal.

The AQIA included four modelled scenarios: 2014 (based on operations prior to the approval of SSD 5850), Year 2 (2020), Year 8 (2026) and Year 15 (2033). The modelled years represent the worst-case impacts of the proposed modification, ie when the Complex would be operating at full capacity (Year 2) and when dust-generating activities would be closest to sensitive receivers to the southeast (Year 15). The AQIA also modelled the combined impact of operations at Mount Owen Mine (incorporating MOD 2) and Ravensworth East, noting that mining in the BNP is expected to conclude by Year 8.

[3] The AQIA also assumed that operations at the Glendell Mine will cease in 2021. However, the Department is currently assessing a modification application (DA 80/952 MOD 4) for a minor pit extension which would allow mining operations to continue until at least 2023.

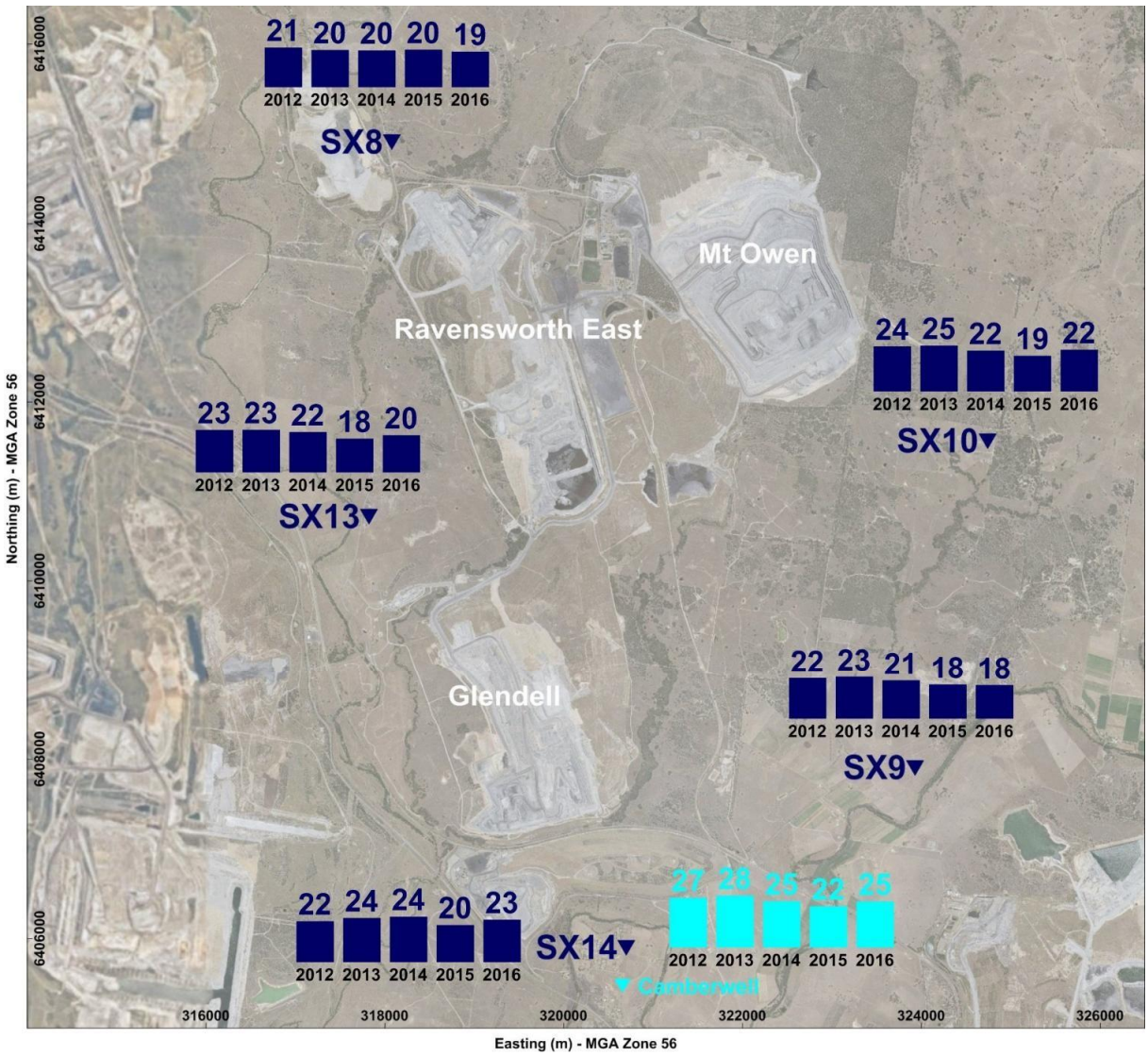


**Figure 8** | Annual average $PM_{10}$ concentrations (2012-2016)

*Model Validation and Peer Review*

The AQIA compared modelled 24-hour average $PM_{10}$ concentrations with actual monitoring data for 2014, in order to evaluate the performance of the updated model. Modelled predictions tended to under-predict $PM_{10}$ levels, particularly in Camberwell, where the maximum measured concentration was 80 $\mu g/m^3$, compared with a predicted concentration of 53 $\mu g/m^3$. The AQIA noted that this discrepancy illustrates the difficulty in predicting short-term PM concentrations, as well as the highly variable nature of daily $PM_{10}$ concentrations in the locality.
The model performed better in predicting annual average $PM_{10}$ concentrations, which were within 1-2 $\mu g/m^3$ of measured results.

The updated model and AQIA were peer reviewed by NH2 Dispersion Sciences. This review concluded that the modelling approach was appropriate and that the AQIA can be considered to be a reliable indicator of future air quality impacts. The EPA did not raise any concerns with respect to the updated model.

*Assessment of Impacts*

Predicted 24-hour average and annual average $PM_{10}$ concentrations for all modelled years are shown in **Figures 9** and **10**.

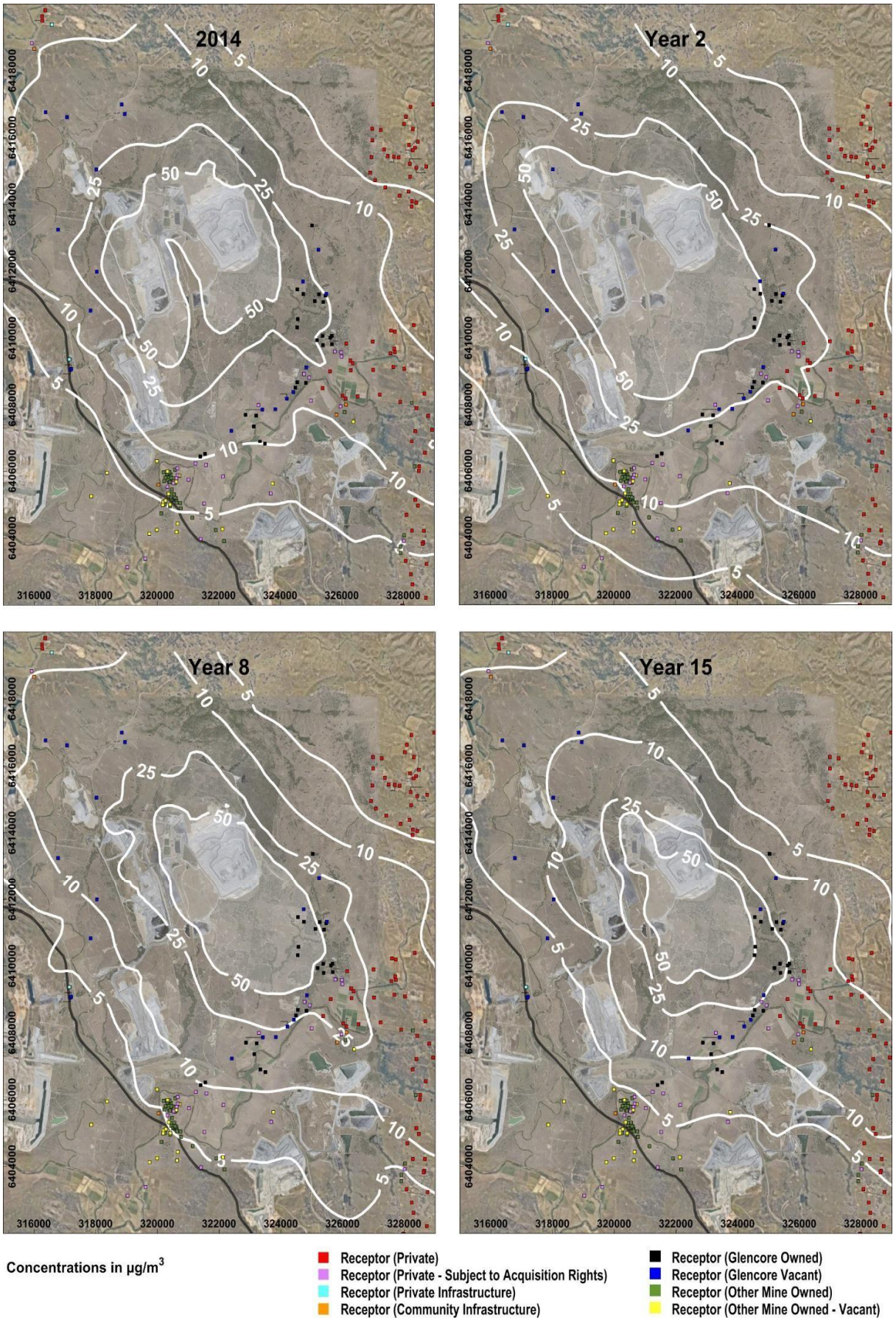


**Figure 9** | Predicted maximum 24-hour $PM_{10}$ concentrations (incremental)

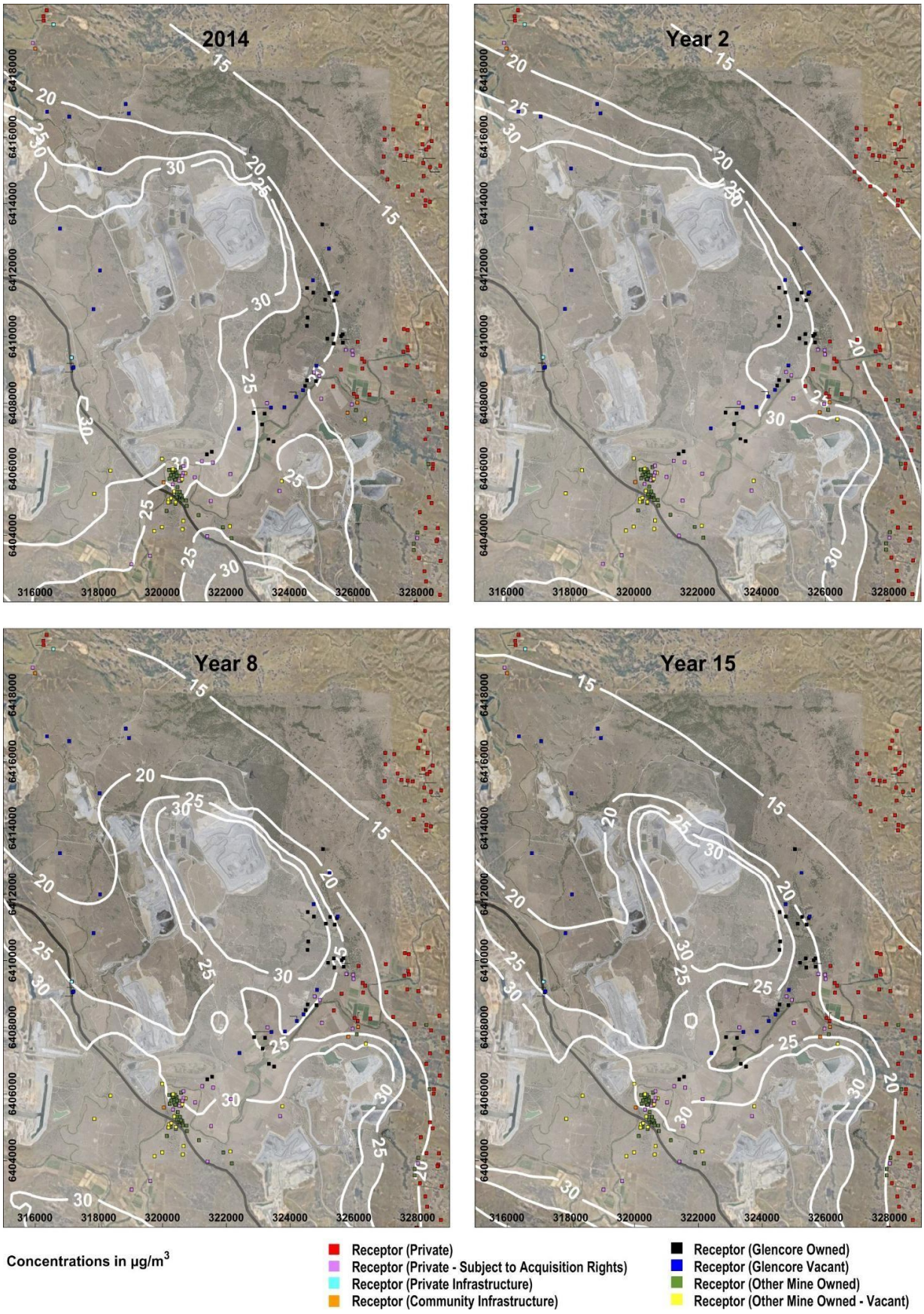


**Figure 10** | Predicted annual average $PM_{10}$ concentrations (cumulative)

Maximum 24-hour average $PM_{10}$ concentrations were predicted to comply with the 50 $\mu g/m^3$ criterion, when assessed on a project-only basis. However, the EPA expressed concern that when assessed cumulatively, the modified operations would result in additional days above 50 $\mu g/m^3$ at 48 privately-owned receivers without acquisition rights. The Department notes that these events would not constitute an exceedance of the air quality criteria under SSD 5850.[4]

Cumulative annual average $PM_{10}$ concentrations in Camberwell were predicted to exceed 25 $\mu g/m^3$ in all modelled years, although the incremental contribution of the MOCO Project is very low (less than 2 $\mu g/m^3$). Annual average $PM_{10}$ concentrations were also predicted to exceed the criteria at six privately-owned receivers in the Middle Falbrook area, to the southeast of the Complex. However, all but two of these receivers (Receivers 4 and 112) are already afforded voluntary acquisition rights under SSD 5850 or under other development consents for nearby mines (see **Section 5.1.3**).

Maximum 24-hour average $PM_{2.5}$ concentrations were predicted to comply with the 25 $\mu g/m^3$ criterion at all privately-owned receivers, when assessed on a project-only basis. Cumulative 24-hour average $PM_{2.5}$ concentrations were predicted to exceed the criterion at a number of privately-owned receivers in the Camberwell area. However, the maximum contribution of the MOCO Project is very low (less than 0.5 $\mu g/m^3$). The modelled isopleths indicate that $PM_{2.5}$ concentrations in this location would be strongly influenced by operations at the Rix's Creek Complex and the Ashton SEOC Project.

Annual average $PM_{2.5}$ concentrations were predicted to exceed 8 $\mu g/m^3$ at 23 privately-owned receivers and 7 vacant land parcels in Middle Falbrook and Camberwell. All but two of these properties (Receivers 4 and 112) are currently afforded acquisition rights under SSD 5850 or under other development consents (see **Section 5.1.3**)

The AQIA indicates that the extent of blast fume impacts would remain consistent with the approved project, as no changes to current blasting frequency or practices are proposed. The AQIA indicates that the modified project could continue to comply with the EPA's 1-hour average nitrogen dioxide criterion (246 $\mu g/m^3$) at all privately-owned receivers, subject to the implementation of Mount Owen's established blast management procedures.

Overall, the AQIA indicates that the air quality impacts of the modified project would peak in Year 2 and steeply decline for the remaining life of the project. This is largely attributable to the modelled conclusion of operations at Glendell Mine in 2021, which would substantially reduce ROM coal haulage and handling at the Mount Owen CHPP.[5] It also reflects a gradual decline in production at the Mount Owen Mine, in the latter years of the modified project.

The AQIA also indicates that, while mining operations could comply with contemporary air quality criteria when assessed in isolation, they would contribute to exceedances of cumulative air quality criteria at a number of privately-owned receivers. The predicted exceedances are primarily due to the imposition of more stringent criteria under the Approved Methods 2016, rather than the impacts of the proposed modification per se.

Following its review of the RTS, the EPA requested further information to demonstrate that the project's contribution to cumulative 24-hour average $PM_{10}$ concentrations could be satisfactorily mitigated. Mt Owen subsequently provided additional information outlining its air quality management system. Mt Owen also

[4] Under SSD 5850, compliance with the 24-hour average $PM_{10}$ criterion is measured incrementally, rather than cumulatively. As such, these predictions would not constitute an exceedance of the existing air quality criteria under the development consent.
[5] The air quality impacts of continued operations at Glendell Mine will be assessed separately under DA 80/952 MOD 4. However, the Department notes that DA 80/952 MOD 4 is of a minor nature and would not alter worst-case predictions in the MOD 2 AQIA, which are based on combined operations in 2020 (Year 2).

reiterated that the air quality impacts of the modified operation would remain consistent with those of the approved MOCO Project. The EPA did not raise any further concerns with respect to air quality.

In its submission, NSW Health noted that it is particularly challenging to achieve air quality goals in the Hunter Valley during drought conditions and stressed the need for a conservative approach to the assessment of air quality impacts. In response, Mt Owen noted that the AQIA is inherently conservative and is likely to overstate the actual impacts of the modified development. Nonetheless, the Department agrees that cumulative air quality impacts from mining require careful management and regulation through applicable planning approvals and EPA licences.

### 5.1.3 Application of the VLAMP 2018

Clause 12A of the Mining SEPP requires a consent authority to consider the VLAMP 2018 when determining modification applications for mining developments. The revised VLAMP applies to 'modification applications that involve increases to the approved dust or noise impacts of a development'.

Mt Owen originally submitted that the VLAMP does not apply to MOD 2, as it would not increase the predicted air quality impacts of the approved project. The SEE includes a comparison of modelled worst-case 24-hour average $PM_{10}$ concentrations for both approved and proposed operations, noting that predicted $PM_{10}$ concentrations would not increase at any privately-owned receiver as a direct result of the modification.

However, the proposed modification would extend mining operations by an additional six years. It would also involve the extraction and processing of an additional 35 Mt of ROM coal and increase the approved disturbance area by 46 ha. Consequently, the Department did not accept Mt Owen's contention that the proposed modification would not increase the air quality impacts of the approved project. As such, the VLAMP must be applied. Mt Owen has accepted the Department's position.

The Department acknowledges that the AQIA provides a conservative assessment of cumulative impacts, which may overstate the actual impacts (eg if nearby mining operations do not proceed or operate at lower than maximum approved production rates). However, the Department must adopt a similarly conservative approach, and apply the VLAMP based on worst-case predicted impacts.

The Department has undertaken a full review of existing acquisition and mitigation rights for privately-owned receivers predicted to experience exceedances of the VLAMP criteria as a result of the modified project. The results of this review are shown in **Table 2**. Receivers who are already afforded acquisition and mitigation rights under SSD 5850, or other development consents for nearby mines already in operation, have been excluded from the Table.

As the AQIA indicates that annual average $PM_{10}$ and $PM_{2.5}$ concentrations would exceed EPA criteria on more than 25 percent of the landholdings for Receivers 4 and 112, and given that the MOCO Project would be responsible for a significant proportion of the total PM concentrations at these locations, the Department has recommended that voluntary acquisition and mitigation rights be extended to both receivers.

The application of the VLAMP in Camberwell is more complex, given that the proportionate contribution of the modified development to $PM_{10}$ concentrations in Camberwell would be very minor and would decrease substantially over time. However, as outlined in **Section 5.1.2**, the village is already subject to elevated PM concentrations as a result of mining and other sources of dust in the region.

**Table 2** | Summary of acquisition and mitigation rights under the VLAMP

| Locality | Receiver | Predicted exceedance | Relevant criterion ($\mu g/m^3$) | Maximum predicted PM concentration (incremental contribution) ($\mu g/m^3$) | Exceedance predicted if Ashton SEOC does not proceed? | Current acquisition/ mitigation rights | Acquisition and mitigation rights recommended under MOD 2? |
|---|---|---|---|---|---|---|---|
| Middle Falbrook | 4 | Annual average $PM_{10}$ (more than 25% of land)* | 25 | 25* (5.4) | Yes | Mitigation rights under Rixs Creek North | Yes |
| | | Annual average $PM_{2.5}$ (more than 25% of land)* | 8 | 8* (0.9) | Yes | | |
| | 112 | Annual average $PM_{10}$ (more than 25% of land)* | 25 | 24* (6.1) | Yes | Mitigation rights under Rixs Creek North | Yes |
| | | Annual average $PM_{2.5}$ (more than 25% of land)* | 8 | 8* (1) | Yes | | |
| Camberwell | 143 | Annual average $PM_{10}$ | 25 | 34 (1.7) | Yes (Year 2 only) | Limited acquisition rights under Ashton SEOC Project (noise trigger only)<br><br>Mitigation rights under Ashton SEOC, Glendell and Rixs Creek North | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ | 8 | 10 (0.3) | Yes (Year 2 only) | | |
| | 144b & 144c | Annual average $PM_{10}$ | 25 | 28 (0.4) | No | Acquisition and mitigation rights under Ashton SEOC Project<br><br>Acquisition rights recommended under Rix's Creek South (SSD 6300) | No – acquisition rights afforded under Ashton SEOC Project, and if that project does not proceed, cumulative PM levels are not predicted to exceed EPA criteria |
| | | Annual average $PM_{2.5}$ | 8 | 9 (0.1) | | | |
| | 150 | Annual average $PM_{10}$ | 25 | 36 (1.4) | Yes (Year 2 only) | Acquisition and mitigation rights under Ashton SEOC Project | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ | 8 | 11 (0.3) | Yes (Year 2 only) | | |
| | 152 | Annual average $PM_{10}$ | 25 | 36 (1.6) | Yes (Year 2 only) | Limited acquisition rights under Ashton SEOC Project (noise trigger only)<br><br>Mitigation rights under Ashton SEOC Project, | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ | 8 | 11 (0.3) | Yes (Year 2 only) | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | Glendell and Rixs Creek North | |
| | 154 | Annual average $PM_{10}$ | 25 | 35 (1.7) | Yes (Year 2 only) | Acquisition and mitigation rights under Ashton SEOC Project | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ | 8 | 11 (0.3) | Yes (Year 2 only) | | |
| | 155 | Annual average $PM_{10}$ | 25 | 35 (1.7) | Yes (Year 2 only) | Acquisition and mitigation rights under Ashton SEOC Project<br><br>Mitigation rights under Glendell and Rixs Creek North | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ | 8 | 10 (0.4) | Yes (Year 2 only) | | |
| | 156 | Annual average $PM_{10}$ | 25 | 35 (1.8) | Yes (Year 2 only) | Acquisition and mitigation rights under Ashton SEOC Project | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ | 8 | 10 (0.4) | Yes (Year 2 only) | | |
| Vacant Land | Lot 4 DP 1166047 | Annual average $PM_{10}$ (more than 25% of land) | 25 | Not calculated | Not calculated | Limited acquisition rights under Ashton SEOC Project (noise trigger only) | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ (more than 25% of land) | 8 | Not calculated | Not calculated | | |
| | Lot 5 DP 1166047 | Annual average $PM_{10}$ (more than 25% of land) | 25 | Not calculated | Not calculated | Limited acquisition rights under Ashton SEOC Project (noise trigger only) | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ (more than 25% of land) | 8 | Not calculated | Not calculated | | |
| | Lot 175 DP 1002770 | Annual average $PM_{10}$ (more than 25% of land) | 25 | Not calculated | Not calculated | Limited acquisition rights under Ashton SEOC Project (noise trigger only) | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ (more than 25% of land) | 8 | Not calculated | Not calculated | | |
| | Lot 106 DP 855187 | Annual average $PM_{10}$ (more than 25% of land) | 25 | Not calculated | Not calculated | Limited acquisition rights under Ashton SEOC Project (noise trigger only) | Yes – however rights under Ashton SEOC Project take priority after the taking up of MP 08_0182 |
| | | Annual average $PM_{2.5}$ (more than 25% of land) | 8 | Not calculated | Not calculated | | |

*Notes:*

- *"noise trigger only" means acquisition rights are based on noise impacts and apply only when specified noise levels are exceeded*
- *an asterisk (*) means that an exceedance of the criteria is predicted over more than 25 percent of the landholding, but not at the residence.*

The Department notes that all privately-owned residences in Camberwell have been granted acquisition rights under one mining development consent or another. While some are afforded acquisition rights under multiple development consents, six residences are only afforded rights under the Ashton SEOC Project (Receivers 143, 150, 152, 154, 155 and 156). These rights are not activated until MP 08_0182 is taken up and, as noted in **Section 1.2**, there is a degree of uncertainty as to when or if this will occur. Furthermore, as shown in **Table 2**, many of these rights are limited and related to noise, rather than air quality impacts. The Department also notes that exceedances of the annual average PM criteria are predicted at a number of private properties, even if the Ashton SEOC Project does not proceed (see **Table 2**). As such, the Department considers that a precautionary approach is required.

The Department has recommended that acquisition and mitigation rights be extended to 12 additional properties. However, any acquisition rights afforded under the Ashton SEOC Project would take priority in the event that the development consent is taken up.

The Department considers that this approach would provide protection for affected landowners in Camberwell who may wish to relocate in the near term. However, over the longer term, obligations under the VLAMP would primarily fall to the mines which are nearer to Camberwell and are far more likely to influence local air quality, as their consents are modified (ie the Ashton SEOC Project, Glendell Mine and both Rix's Creek North and South).

### 5.1.4 Air Quality Management

Existing conditions require Mt Owen to implement all reasonable and feasible measures to:

- minimise the dust emissions of the project;
- to operate a comprehensive air quality management system incorporating both meteorological forecasting and real-time monitoring;
- to coordinate with neighbouring mines to minimise cumulative air quality impacts; and
- to prepare a detailed Air Quality Management Plan (AQMP).

Mt Owen has an established AQMP which applies to the Complex as a whole. The AQMP employs a combination of proactive and reactive management measures to ensure compliance with existing air quality criteria. This includes the use of automated daily forecasting and meteorological monitoring to guide day-to-day operations, real-time $PM_{10}$ monitoring, and an alarm system triggered when $PM_{10}$ concentrations approach the short-term criteria. The AQMP also incorporates a Trigger Action Response Plan (TARP) which is implemented in the event that an alarm sounds. This could include, for example, carrying out additional dust suppression, or relocating or shutting down equipment.

The EPA recommended conditions requiring Mt Owen to fit machinery with PM water suppression devices; minimise excavator drop heights during loading; and use fixed water sprays on coal stockpiles, coal transfer areas and coal loading facilities, where practical. The EPA further recommended that Mt Owen be required to maintain trafficable areas, coal storage areas and vehicle manoeuvring areas in a manner that minimises particulate matter emissions. The Department notes that Mt Owen committed to implement most of these measures in its SEE. Consequently, specific conditions are not considered necessary. Mt Owen also raised concerns that the EPA's recommendation to install PM suppression devices on all 'machinery' was too broad. Following further discussion with the EPA, it was agreed that this condition was not required.

In other respects, the Department considers that the existing conditions provide for the effective management of air quality impacts, subject to the necessary updates to the air quality criteria to reflect the Approved Methods 2016. These updates would also require Mount Owen to implement $PM_{2.5}$ monitoring.

Community submissions raised concerns regarding the accumulation of dust in rainwater tanks and on solar panels. In response, Mt Owen advised that it has established a rainwater tank inspection and cleaning program for all privately-owned residences within 4 km of the mine. All affected properties within the 4 km radius are inspected at least every two years. No specific measures have been proposed with respect to solar panels, however, landowners with mitigation rights would be able to negotiate solar panel cleaning directly with Mt Owen under the recommended conditions. The broad range of dust mitigation measures outlined by Mt Owen in the SEE and the AQMP should also assist in minimising these impacts.

The Department considers that there are limited options for further mitigating dust generated by the mine, noting that the modification would not materially increase emissions, only the duration of those emissions.

### 5.1.5 Greenhouse Gas Emissions

The SEE included an assessment of greenhouse gas emissions (GHGEs) associated with the proposed modification. The SEE indicated that MOD 2 would increase Scope 1 GHGEs by more than 50 percent. The Department raised concerns that the predicted increase in GHGEs had not been adequately justified, having regard to national policy objectives. The GHGE calculations were subsequently revised to reflect newly available gas survey data for the mine, and to apply a less conservative fugitive emissions factor, consistent with previous predictions in the EIS (see **Appendix D**).

**Table 3** provides a comparison of projected emissions for the approved project and the proposed modification. The proposed modification is projected to generate an additional 51,599,000 tonnes of carbon dioxide equivalent emissions (t $CO_2$-e) and increase the project's overall GHGEs by approximately 40 percent. However, the vast majority of GHGEs (approximately 97 percent) would be Scope 3 emissions, generated primarily by product transport and the use of coal products. The predictions indicate that Scope 1 emissions would increase by approximately 20 percent.

**Table 3** | Comparison of projected GHGEs over the extended life of the mine

| Scope | Source | Projected emissions – approved Project (t $CO_2$-e) | Additional emissions – proposed modification (t $CO_2$-e) |
|---|---|---|---|
| Scope 1 (direct) | Diesel use | 1,682,263 | 623,000 |
| | Fugitive emissions | 3,402,126 | 333,000 |
| Scope 2 (indirect) | Electricity | 810,223 | 307,000 |
| Scope 3 (indirect) | Associated with energy extraction and distribution | 303,107 | 70,000 |
| | Product transport | 6,242,423 | 2,313,000 |
| | Materials transport | 24,038 | 9,000 |
| | Product use | 125,188,563 | 47,944,000 |

| | | |
|---|---|---|
| Total | 137,652,743 | 51,599,000 |

The Department has considered the impacts of the proposed modification on GHGEs, having regard to both national and State-level commitments made under the Paris Agreement and NSW Climate Change Policy Framework (CCPF).

Under the 2016 Paris Agreement, the Australian Government made a commitment to reduce national GHGEs by between 26 and 28 percent from 2005 levels by 2030. Australia has committed to achieve this target through initiatives to expand renewable energy sources, support low emissions technologies, improve energy efficiencies and provide corporate incentives to reduce emissions. The CCPF outlines the State's long-term aspirational objectives of achieving net-zero emissions by 2050 and making NSW more resilient to a changing climate.

Importantly, neither the State nor national policy frameworks promote restricting private development in order to meet Australia's commitments under the Paris Agreement. They contain no prescriptive emissions criteria which can be applied in development assessment.

Mt Owen submits that the proposed modification is unlikely to prevent Australia from meeting its commitments under the Paris Agreement, noting that the additional coal sourced from the proposed extension area would likely be exported internationally. Consequently, the additional Scope 3 emissions would not contribute to Australia's total GHGEs. Glencore has also committed to a coal production cap of 150 Mtpa across its global operations. All of Glencore's existing and planned projects (including MOD 2) are included in this cap.

The Department notes that there are clear benefits to maximising coal recovery at the Complex, using existing processing and transport infrastructure, rather than establishing new facilities elsewhere (either in NSW, other States of Australia or internationally).

The Department has considered the impacts of the proposed modification in accordance with clause 14 of the Mining SEPP. Overall, the Department considers that the impacts of the proposed modification are acceptable. The Department has recommended conditions requiring Mt Owen to minimise GHGEs to the greatest extent practicable. These conditions would require Mt Owen to:

- take all reasonable steps to improve the energy efficiency of its operations and to reduce GHGEs generated by the development; and
- include a greenhouse gas component in its updated AQMP.

The Department considers that the modified development can be undertaken in an environmentally responsible manner, subject to implementation of the recommended conditions.

### 5.1.6 Conclusion

The Department has carefully considered the likely air quality impacts of the proposed modification, paying particular attention to cumulative air quality issues in the locality. The Department has undertaken a comprehensive review of existing air quality conditions, having regard to contemporary policies. As a result of this review, the Department has recommended more stringent air quality criteria, and has recommended extending voluntary acquisition and mitigation rights to 12 privately-owned receivers in Middle Falbrook and Camberwell. Overall, the Department considers that the air quality impacts of the proposed modification can be managed under existing and recommended conditions of consent, and an updated AQMP.

## 5.2 Noise and Blasting

### 5.2.1 Noise Impacts

*Existing Noise Management System*

SSD 5850 imposes a strict set of conditions with respect to noise management and monitoring. These conditions require Mt Owen to implement a noise management system, combining predictive meteorological forecasting with real-time noise monitoring, to guide day to day operations at the Complex and maintain compliance with the consent's noise criteria, which are set out in **Table 3**. Receiver locations and noise assessment areas are shown in **Figure 11**.

**Table 3** | Existing noise criteria (dB(A))

| Receiver | Day / Evening / Night $L_{Aeq(15min)}$ | Night $L_{A1(1min)}$ |
|---|---|---|
| 41, 48 | 36 / 35 / 35 | 45 |
| 91 | 37 / 37 / 36 | 45 |
| 14, 92 | 37 / 37 / 37 | 45 |
| 10, 11 | 37 / 37 / 37 | 46 |
| 13[1] | 38 / 38 / 38 | 45 |
| 12, 94, 95, 112 | 38 / 38 / 38 | 46 |
| 111 | 39 / 39 / 36 | 45 |
| 19[1] | 39 / 39 / 39 | 45 |
| 93[1] | 40 / 40 / 40 | 46 |
| 21, 22, 23[2] | 41 / 41 / 41 | 45 |
| 122 | 42 / 42 / 42 | 50 |
| All other residences Area 4 – South | 37 / 37 / 36 | 46 |
| All other residences Area 4 – North and all other residences Area 5 | 37 / 37 / 35 | 45 |
| All other residences Area 6 | 40 / 40 / 40 | 50 |
| All other residences Area 7 | 40 / 40 / 38 | 48 |
| All other residences Area 8 – East | 39 / 39 / 35 | 45 |
| All other residences Area 8 – West | 44 / 44 / 42 | 52 |
| All other residences Area 9 | 48 / 48 / 43 | 53 |
| Other privately-owned residences | 35 / 35 / 35 | 45 |

*Notes:*
[1] *Receivers are also afforded voluntary mitigation rights under SSD 5850*
[2] *Receivers are also afforded voluntary acquisition rights under SSD 5850*

Mt Owen's existing noise management system is detailed in the Noise Management Plan (NMP) for the Complex. Mt Owen currently implements a system of controls in order to maintain compliance with the consent's noise criteria. These controls include constructing noise bunds along haul roads, providing noise attenuation for key plant and equipment, relocating or shutting down mobile equipment during adverse conditions, employing first gear reverse for dozers in exposed locations, moving activities to lower dump sites, reducing truck speed, etc. The Complex has an established warning system to alert mine operators when noise levels are approaching the noise criteria and allow corrective action to be undertaken.

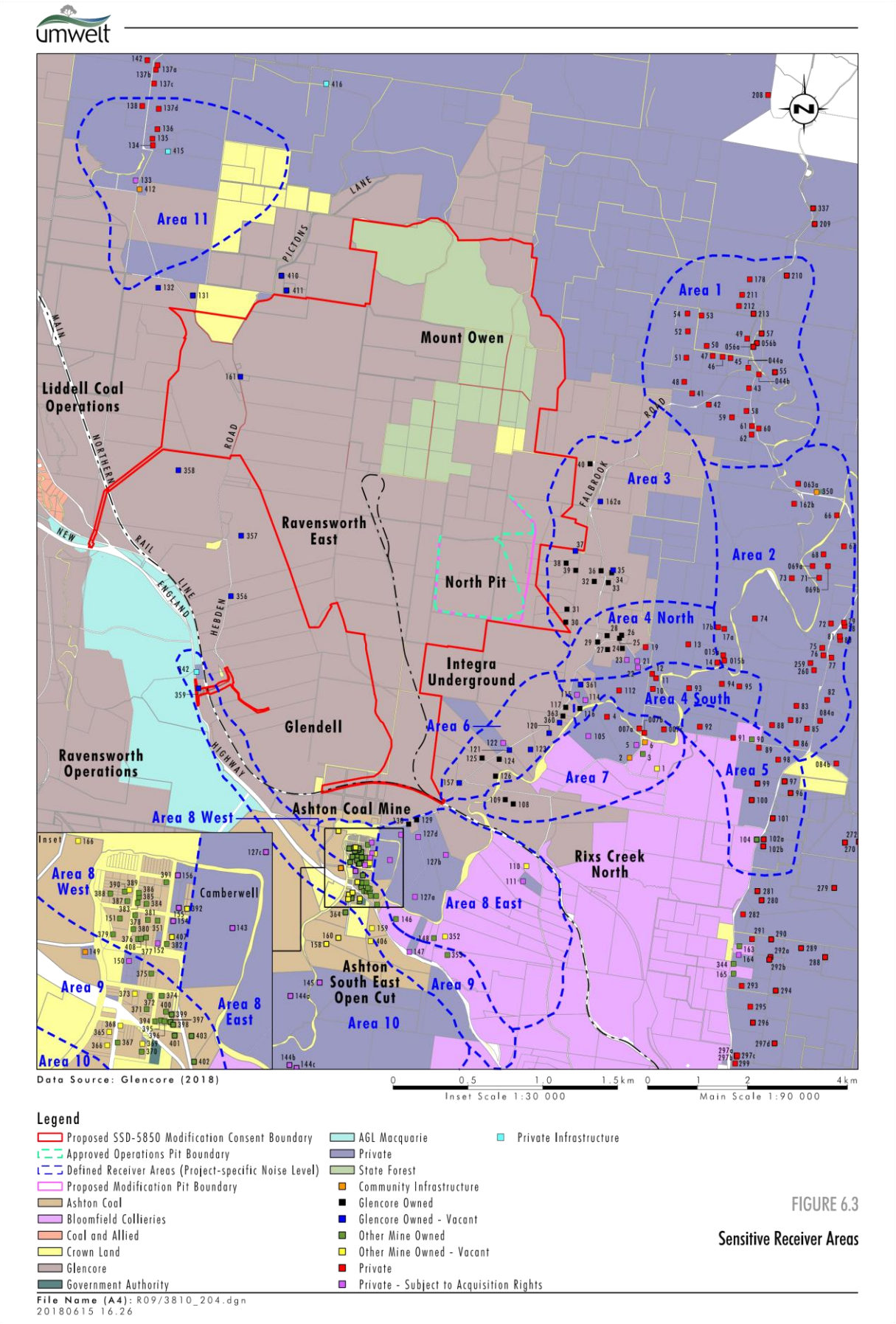


**Figure 11**| Location of sensitive receivers and noise assessment areas

The Department notes that Mt Owen's existing noise management system has proven effective in managing the impacts of the approved operations. To date, no exceedances of the noise criteria have been recorded in respect of the MOCO Project.

The proposed modification would not change the existing noise management system, or the range of control measures which are presently implemented. However, Mt Owen has advised that the proposed modification would change the frequency and intensity with which those controls are required to be implemented.

*Assessment of Noise Impacts*

The SEE included a Noise Impact Assessment (NIA) prepared by Umwelt, in accordance with the *Industrial Noise Policy* (INP).[6] The NIA utilised an Environmental Noise Model (ENM) developed for MOD 2, which incorporated actual monitoring data from the site and meteorological data from 2014, consistent with the AQIA.

The NIA modelled noise impacts generated by the proposed modification in Years 2, 8 and 15. As part of this process, Mt Owen refined its conceptual mine plan so as to minimise impacts to receivers in Middle Falbrook over the extended life of the mine. This involved the redesign of haul roads, incorporation of noise bunds along haul roads and ramps, and the slowing of production in the latter years of mining when activities are closest to receivers.

Noise impacts were modelled under adverse meteorological conditions.[7] The ENM assumed that 90-95 percent of the mobile equipment fleet and all major plant would be operating simultaneously, but also assumed that noise bunds would be constructed along haul roads and ramps and that key plant and equipment would incorporate reasonable and feasible noise control measures.

Where noise levels were predicted to exceed the relevant criteria in **Table 3** at sensitive receivers, additional noise controls were progressively applied in order to achieve compliance. These controls were applied based on a hierarchy, beginning with the shutting down or relocation of ancillary mobile equipment and ending with the shutting down of operations.

The Department notes that the NIA does not prescribe particular controls that must be implemented at the various stages of mining operations. Rather, the NIA is intended to demonstrate that the modified project can comply with the existing noise criteria, by applying the Complex's established noise management practices. Mt Owen would continue to have a degree of flexibility in the day to day management of its operations and in the selection of controls, provided that it maintains compliance with the criteria. The Department supports this approach.

The NIA indicated that the modified development could continue to comply with existing noise criteria, subject to implementation of suitable noise controls. The comparative noise contours for the approved and modified developments are shown in **Figure 12**. This figure shows the worst-case predicted noise impacts for all modelled years, under winter evening/night conditions.

[6] As the NIA was substantially commenced prior to the adoption of the *Noise Policy for Industry* (2017), the proposal has been assessed in accordance with the INP.

[7] Adverse conditions were determined by analysing local meteorological data (wind speed, direction and temperature inversion strength) to calculate a 10th percentile exceedance level (ie the level that is exceeded 10 percent of the time).

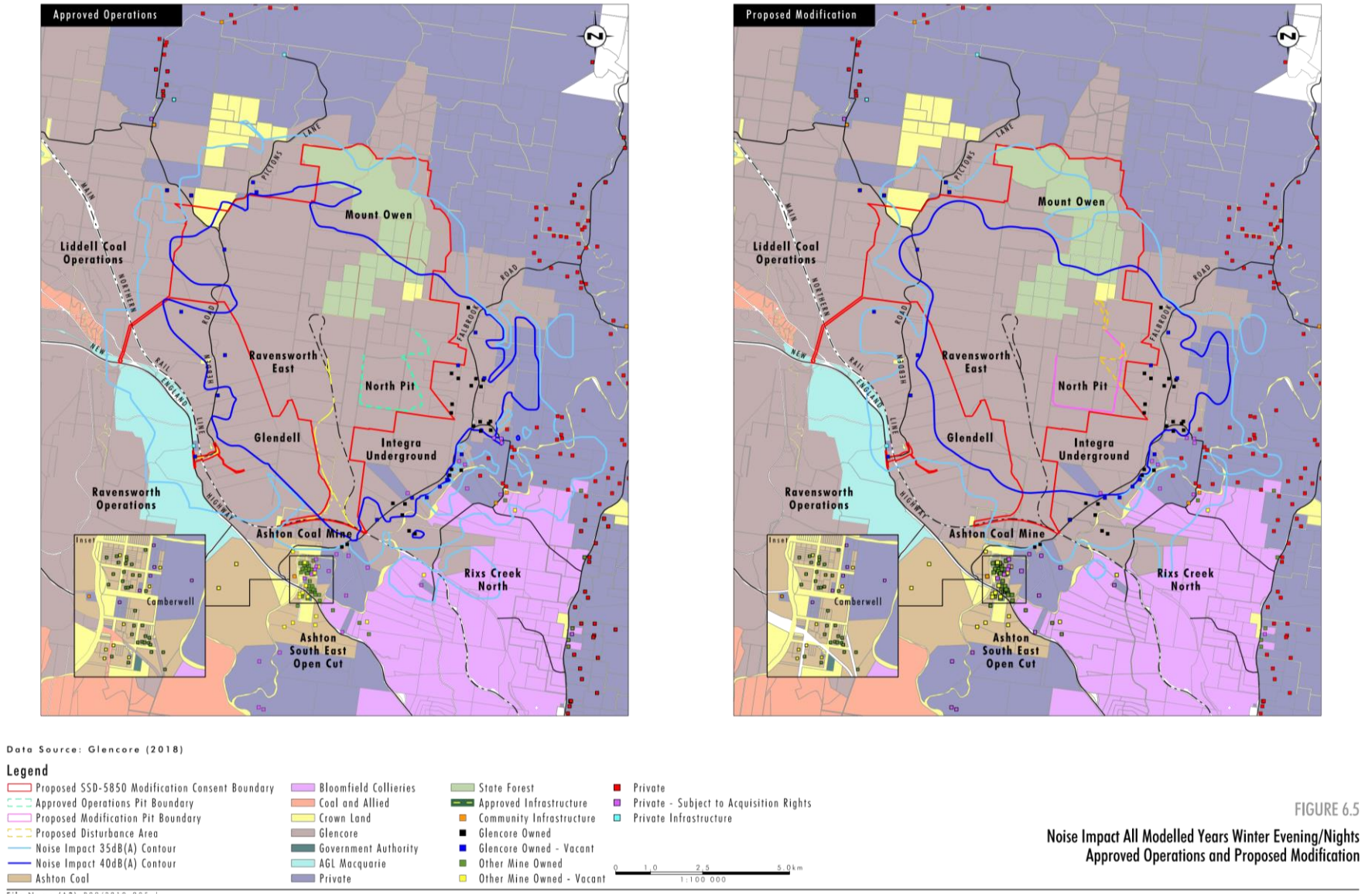


**Figure 12**| Comparison of noise impacts for approved and proposed developments

The NIA also included an assessment of low frequency noise in accordance with Fact Sheet C of the *Noise Policy for Industry* (NPI, 2017).[8] The difference between C-weighted and A-weighted noise levels was predicted to exceed 15 dB at a number of receivers. This indicates that noise generation has the potential to cause greater annoyance at the affected receivers. However, predicted noise levels fall below the low frequency noise thresholds in Table C2 of the NPI. Therefore, the modifying factor corrections do not apply.

The EPA did not raise any concerns with respect to the NIA. However, the EPA requested further details regarding the proposed monitoring methodology. This issue is discussed further in **Section 5.2.3**.

*Cumulative Noise Impacts*

The NIA indicated that the modified project could continue to comply with existing noise criteria. Consequently, the proposed modification is not expected to have any significant impact on cumulative noise levels in the locality. The Department also notes that existing conditions require Mt Owen to use its best endeavours to coordinate its activities with neighbouring operations, including Glendell Mine, Integra Underground and Rix's Creek North, so as to minimise cumulative noise impacts. No additional requirements are considered necessary in this regard.

*Consideration of VLAMP*

The NIA indicated that the modified development can comply with existing noise criteria under SSD 5850 at all privately-owned receivers. The NIA also indicated that the proposed modification would not contribute to any exceedances of the Project Specific Noise Levels by more than 5 dB on more than 25 percent of any parcel of privately-owned land where a residence is located (or would be permitted). Consequently, no changes to existing mitigation or acquisition rights are required.

### 5.2.2 Blasting

The SEE included a Blast Impact Assessment (BIA) prepared by Enviro Strata Consulting Pty Ltd. The proposed modification would not change approved blasting hours or increase the frequency of blasts. However, the proposed extension would require blasting closer to sensitive receivers in the Middle Falbrook area to the southeast of the North Pit.

Existing conditions require Mt Owen to ensure that blasting operations do not exceed particular performance criteria, without the written agreement of affected landowners or infrastructure providers. Existing performance criteria for privately-owned residences are based on the *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (ANZEC), including 95$^{th}$ percentile airblast overpressure and ground vibration limits of 115 dBL and 5 millimetres per second (mm/s), respectively. SSD 5850 also establishes site specific criteria for historic buildings and structures and infrastructure (including public roads and the Integra Underground Mine workings).

The BIA provided ground vibration and overpressure predictions for the proposed modification, applying predictive modelling developed for the original EIS, supplemented by monitoring data collected between December 2016 and October 2017.

The BIA included a number of modelling scenarios with charge masses ranging from 33 to 601 kilograms (kg), consistent with current blasting operations at the Complex. Each scenario provided a worst-case assessment of impacts, with blasting occurring at the edge of the proposed extension area.

Ground vibration was predicted to comply with the existing performance criteria at all privately-owned residences. Overpressure levels of 115 dBL or above were predicted at three locations (Receivers 112, 114 and 122) for larger

[8] The INP applies to the proposed modification in all respects, with the exception of Section 4 ('Modifying factor' adjustments), which has been replaced by Fact Sheet C under the transitional arrangements for the NPI.

charge masses (ie over 222 kg) in Year 15. However, the BIA indicates that these airblast criteria could be met at these locations through the application of deck charges or by blasting smaller benches.

Blasting impacts were predicted to comply with the relevant criteria at all nearby historic buildings and structures and public infrastructure.

*Impacts on Main Creek*

As there are no established blast criteria for drainage lines, the BIA proposed an assessment criterion of 100 mm/s for impacts on Main Creek. At its closest point, blasting may occur 160 m away from the high bank of the creek. Ground vibration levels of up 108 mm/s were predicted at the creek, based on a maximum charge mass of 601 kg. However, the BIA indicated that vibration could meet the proposed 100 mm/s criterion through adaptive blast design. Potential impacts on Main Creek are considered further in **Section 5.3**.

*Impacts on Integra Underground Mine*

The BIA did not include modelling of vibration impacts on the Integra Underground mine workings, on the basis that a minimum separation of 250 m would be maintained between the pit floor and the underground workings, consistent with the approved project. As such, no changes to the original blasting predictions in the EIS are predicted as a result of the modification. The Department notes that ground vibration was previously predicted in the EIS to exceed the 10 mm/s ground vibration criterion for occupied workings immediately beneath the blasting zone. Consequently, Glencore has established procedures for the withdrawal of its workers from affected longwalls during blasting operations.

*Management of Fly Rock*

Mt Owen has established a 500 m exclusion zone around blasting operations, wholly located within Glencore-owned land. The North Pit is located more than 1 km from the nearest public road or privately-owned residence. Consequently, fly rock related risks are considered to be very low.

### 5.2.3 Mitigation and Management

*Noise Management and Monitoring*

The existing NMP includes both continuous and monthly attended noise monitoring at various locations surrounding the Complex. The existing monitoring network includes five fixed and one mobile unattended continuous noise monitors at key receiver locations in Middle Falbrook, Falbrook, Camberwell and Glennies Creek. Mt Owen proposes to relocate two of those monitors, which are currently located on Glencore-owned land, to new locations nearer to receivers in Area 4 North (see **Figure 11**) by 2020. Mt Owen also proposes to install an additional monitor in the vicinity of Receiver 10 (see Area 4 South in **Figure 11**).

The NMP also included attended noise monitoring at five locations, representing the most sensitive receivers. Supplementary attended monitoring may also be undertaken at additional locations in the event that high noise levels are recorded or complaints are made. Minor changes to attended monitoring locations are proposed in order to validate data obtained at the new continuous monitoring sites.

In its submission, the EPA requested that Mt Owen provide an updated monitoring methodology which would allow noise generated by the MOCO Project to be distinguished from other mining operations in the locality. The community submissions also raised concerns regarding the adequacy of existing noise monitoring.

Mt Owen subsequently provided additional information detailing its attended monitoring procedure. The EPA subsequently advised that, while it was generally satisfied with the information provided, given the complex nature of the local noise environment, attended monitoring should be undertaken by a suitably qualified expert. The Department has recommended conditions in this regard.

NSW Health recommended that the complaints management measures in the NMP "include a mechanism that ensures remedial action will occur within an acceptable time-frame should problematic noise generation occur." The Department considers that the existing operating conditions and incident notification and reporting procedures are sufficient to ensure that significant noise issues are rectified in a timely manner. Therefore, no further changes are considered necessary.

The Department considers that the NIA incorporates all reasonable and feasible measures to minimise the predicted noise impacts of the proposed modification. The Department considers that existing conditions provide a robust framework for management of residual noise impacts, and no further changes to conditions are needed.

*Blast Management*

Existing conditions require Mt Owen to implement all reasonable and feasible measures to protect public safety and to minimise blasting impacts on private property, public infrastructure and livestock. Mt Owen is required to prepare a Blast Management Plan (BMP), including a detailed monitoring program to ensure compliance with the blasting criteria, and a safety protocol to manage potential interactions with underground workings at Integra Underground.

Mt Owen's established blasting procedures include adaptive blast design. The Department notes that this is standard practice across the industry to manage blasting impacts and ensure compliance with performance criteria.

Mt Owen has an established notification system which allows private landowners within 3 km of the Mount Owen Mine to register for blast scheduling information. Mt Owen must also make all reasonable endeavours to coordinate the timing of blasts with nearby mining operations (including Glendell and Rix's Creek North) so as to minimise cumulative blasting impacts in the locality.

Mt Owen also has an established blast monitoring network, including five monitoring stations at nearby residences and a further seven stations for nearby heritage structures and infrastructure. Mt Owen has also committed to revise its existing BMP to include regular stability and cracking monitoring following blasting along the highwall adjacent to Main Creek. This is reflected in the Department's recommended conditions.

The Department has not recommended the inclusion of specific blast criteria for Main Creek, on the basis that existing water management conditions prescribe performance measures for the Main Creek alluvial aquifer. No further changes to existing blast management conditions are considered necessary.

### 5.2.4 Conclusion

The Department has carefully assessed the potential noise and vibration impacts of the proposed modification. Subject to the implementation of Mt Owen's proposed mitigation and management measures, the SEE indicates that the modified development can continue to comply with existing noise and blast criteria.

The Department has recommended a number of minor changes to strengthen existing noise and blast management conditions. Subject to these changes, the Department considers that the impacts of the proposed modification can be suitably managed.

## 5.3 Water Resources

### 5.3.1 Surface Water Impacts

The SEE included a Surface Water Impact Assessment (SWIA) prepared by Engeny Water Management.

The Mount Owen Complex is located within the catchments of Bowmans Creek (comprising the Yorks Creek, Swamp Creek and Bettys Creek sub-catchments) and Glennies Creek (including the Main Creek sub-catchment), as shown in **Figure 2**.

The impacts of the proposed North Pit extension would be primarily limited to Main Creek. Mt Owen proposes to maintain a minimum separation distance of 160 m between the North Pit and the top of the Main Creek bank. However, earthworks associated with the proposed modification may occur approximately 20 m from the creek. These earthworks would assist in establishing the final landform and ancillary drainage structures. The modification would also allow earthworks adjacent to the Bettys Creek Diversion, in order to facilitate future rehabilitation.

*Surface Water Management System*

The Complex forms part of the GRAWTS, an integrated water and tailings management system which links Glencore's various mining operations in the area, including the Ravensworth Complex, Liddell Coal Mine and the Integra Underground Mine. The GRAWTS allows Glencore to share water between its facilities, to better manage its regional water balance and to reduce the need for offsite discharges of mine-affected water to the surrounding environment.

The Complex does not have a licensed discharge point (LDP) under its existing EPLs. Consequently, any surplus water is transferred offsite via the GRAWTS, and discharged via an existing LDP at the Ravensworth Complex or the Liddell Coal Mine. Mt Owen proposes to integrate the proposed modification area into its existing surface water management system, including the GRAWTS (see **Figures 13** and **14**).

The proposed conceptual water management system has been designed to capture and store mine-affected surface water runoff during a 1% Annual Exceedance Probability (AEP) 24-hour storm event.

*Site Water Balance*

The SWIA included a comparative site water balance for both approved and proposed operations. The proposed modification is predicted to result in an overall water surplus of 1,217 megalitres (ML) in Year 2. Net water deficits of 1,877 and 821 ML are predicted in Years 8 and 15, respectively. Mt Owen has advised that it holds sufficient Water Access Licences (WALs) to account for this shortfall.

The transition from net water surplus to net deficit is due largely to existing tailings disposal arrangements. Mt Owen is currently permitted to receive and export tailings via the GRAWTS. Over the life of the mine, the volume of tailings received at the Complex would decrease and the volume of exported tailings would increase. Consequently, the availability of water recovered from tailings would decline over time.

*Impacts on Surface Water Flows*

The proposed changes to the final landform would alter the catchment areas for Main Creek and Bettys Creek. The total catchment area for Main Creek would increase by approximately 1.6 percent, while the catchment area for Bettys Creek would reduce by around 1.2 percent, due to the proposed expansion of the North Pit void catchment.

The SWIA included hydrological modelling of stream flows in Main Creek to assess the impacts of mining-induced baseflow losses in combination with the proposed changes to the final landform. The modelling indicated that the proposed modification would have no perceptible impact on stream flows in Year 2. Post-mining baseflow losses were predicted to increase from 4 megalitres per year (ML/yr) to 9 ML/yr. However, overall annual flow volumes within Main Creek were predicted to increase slightly in the final landform from 1,790 ML/yr to 1,810 ML/yr due to the increased catchment. This would equate to approximately 4 fewer dry days, on average, per year. These changes are considered to be minor.

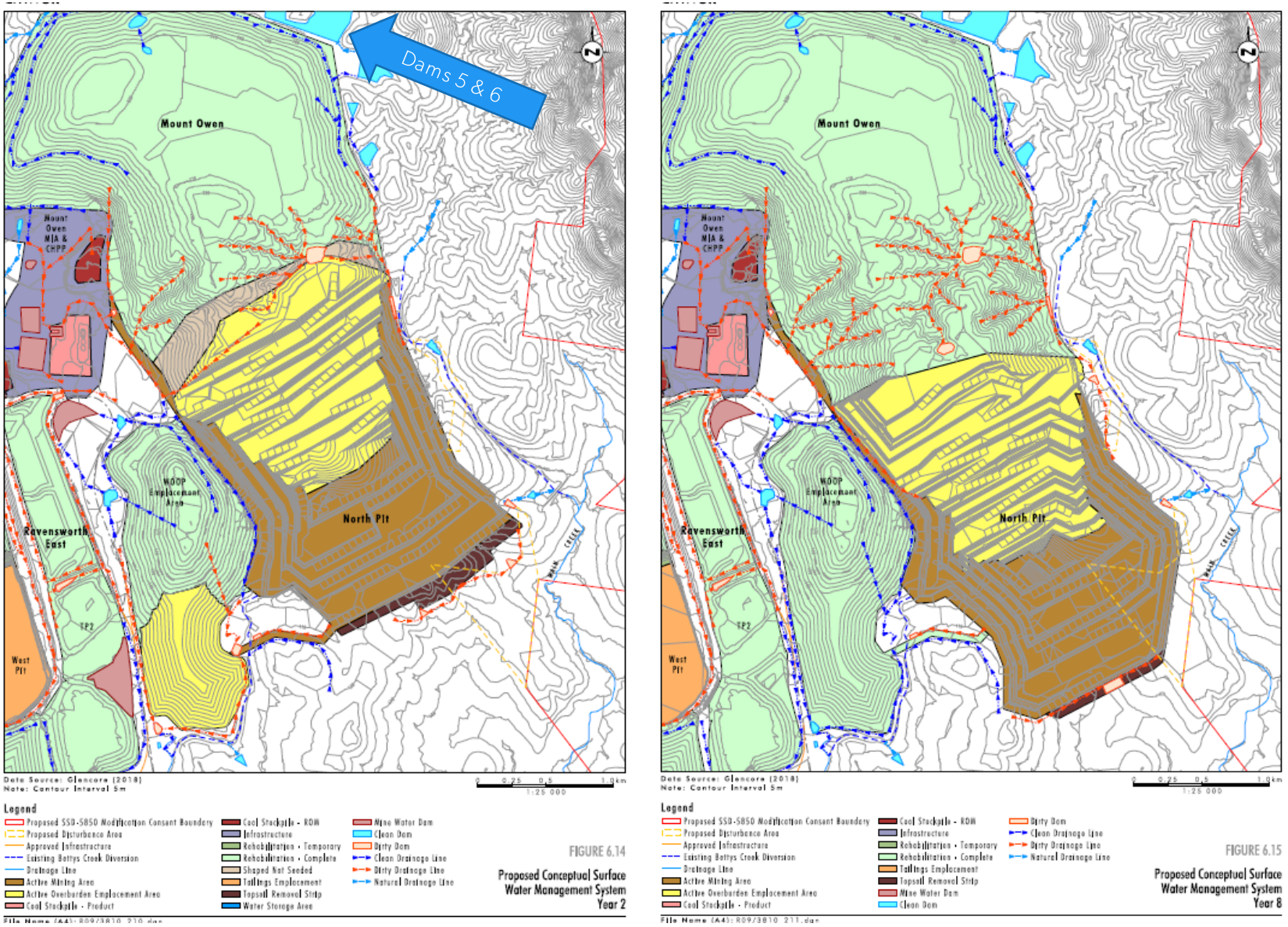


**Figure 13**| Proposed conceptual water management system (Year 2 and Year 8)

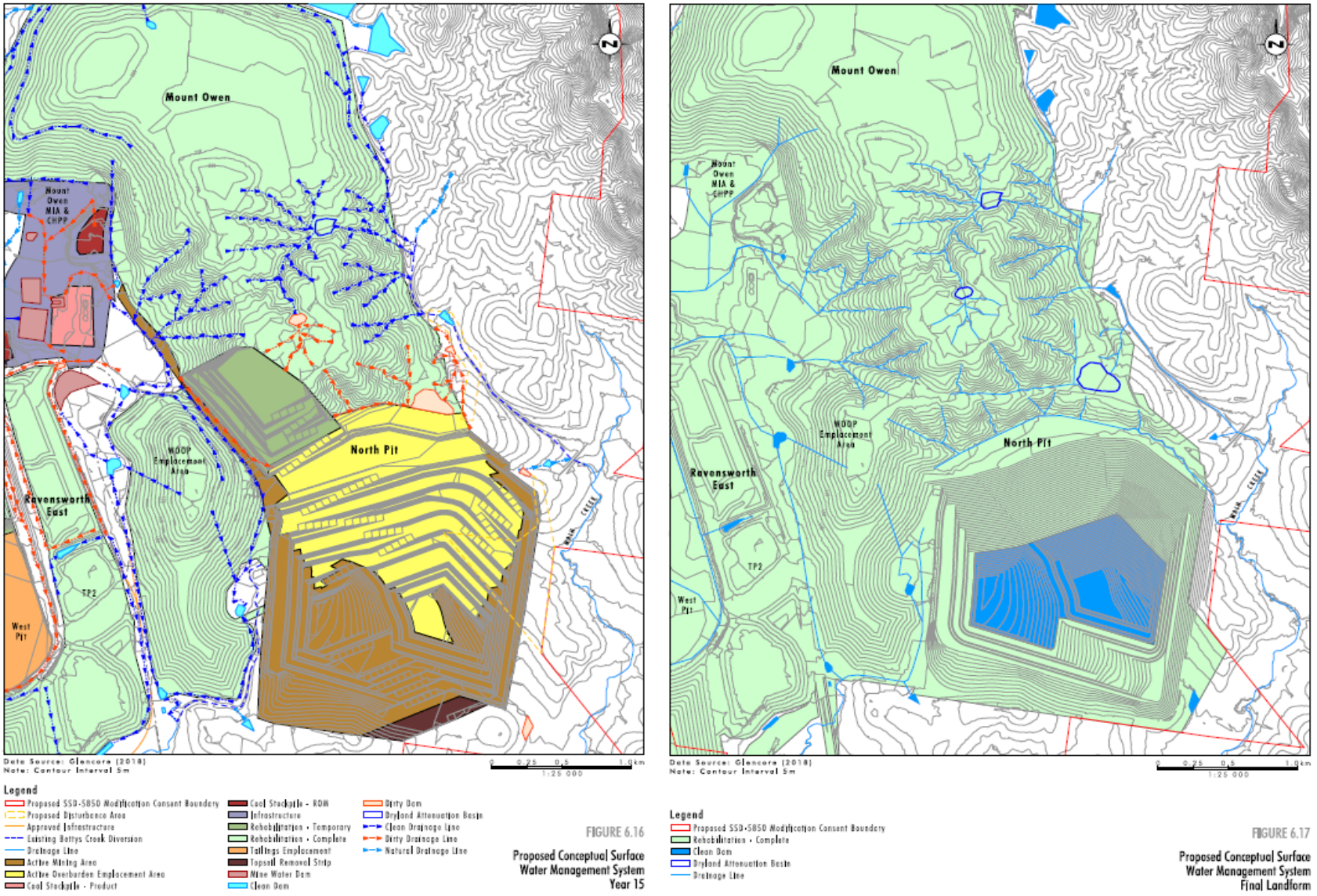


**Figure 14**| Proposed conceptual water management system (Year 15 and Final Landform)

*Impacts on Water Quality*

As no off-site discharges are proposed (except via the GRAWTS), impacts on downstream surface water quality are likely to be negligible. However, the SEE included a Geochemical Assessment (GA) prepared by Environmental Geochemistry International Pty Ltd. The purpose of the GA was to assess geochemical risks associated with the proposed extension of the North Pit, particularly with respect to acid rock drainage (ARD), salinity and metal/metalloid leaching.

The GA indicated that the majority of waste material generated within the proposed modification area is likely to be non-acid forming. However, the GA outlined a series of recommendations, including:

- establishing additional surface water monitoring sites and conducting monthly monitoring for potential ARD effects for at least 12 months; and
- detailed consideration of potential ARD effects in the capping design of all tailings storage facilities.

These recommendations are discussed further in **Section 5.3.4**.

### 5.3.2 Flooding

*Flooding Impacts on Main Creek*

The SWIA included an assessment of potential flooding impacts on Main Creek during a range of flood events, including the 1% and 0.1% AEP events and the Probable Maximum Flood. Flood impacts were modelled for the proposed final landform, when the Main Creek catchment reaches its maximum size.

To protect the North Pit void from inundation during floods up to and including the 0.1% AEP event, Mt Owen proposes to construct a flood levee approximately 250 m long and 1.55 m high on the southeastern edge of the pit. This levee was incorporated into the modelling.

The flood modelling predicted minor increases in Main Creek flood depths immediately downstream of the Bettys Creek Diversion. However, in the middle to lower reaches of the creek, peak flood flows, depths and velocities were all predicted to be consistent with those under the approved project. No flooding impacts on privately-owned properties were predicted as a result of the proposed modification. Overall, the modelling indicates that the proposal would have a negligible impact on the Main Creek floodplain.

*Changes to Yorks Creek Flood Mitigation*

In the EIS for the MOCO Project, Mt Owen committed to undertake mitigation works to address potential flooding in Yorks Creek, in the vicinity of Hebden Road. The relationship between Yorks Creek, Hebden Road and the Complex is shown in **Figure 2**.

Mt Owen's mitigation strategy included modifications to the site's Industrial Dam, located to the west of the BNP near Hebden Road, in order to provide offline detention storage during flood events, and the construction of a new box culvert at the Yorks Creek crossing. The existing conditions require Mt Owen to include detailed plans for the remediation and upgrading of the Industrial Dam and the construction of the culvert in the site's Water Management Plan (WMP).

Mt Owen now proposes to undertake flood mitigation work further upstream, at Dams 5 and 6 (see **Figure 13**). Dams 5 and 6 are established clean water dams which drain along the northwestern edge of the already rehabilitated section of the North Pit emplacement area, to Yorks Creek. These dams will be retained in the final landform (see **Section 5.6.1**).

Mt Owen proposes to change the existing dam outlet structures, to provide an additional 147.4 ML of detention storage. As a result of these changes, Mt Owen submits that downstream mitigation works near Hebden Road would no longer be required.

The SWIA included hydrologic and hydraulic modelling to compare the effectiveness of the approved and proposed mitigation strategies to address flooding near Hebden Road during 1%, 5% and 10% AEP flood events. This was supplemented by additional modelling data provided in the RTS (see **Appendix C**).

The modelling indicated that the proposed changes would have a negligible impact on peak flows, depth and velocity of flood waters in the vicinity of Hebden Road. Nevertheless, the flood hazard category for a 1% AEP event was predicted to increase from 'wading unsafe' to 'damage to light structures'. However, the Department notes that Hebden Road would be impassable during the 1% and 5% AEP flood events, irrespective of the proposed modification. Existing conditions require Mt Owen to install flood warning signs, including depth markers, along Hebden Road. Mt Owen proposes to retain these requirements.

Following its review of the RTS, BCD advised that it was satisfied with the flood modelling and no further assessment was required. The Department considers that Mt Owen's alternative mitigation strategy would satisfactorily address potential flooding issues at the Hebden Road crossing. The Department recommends that existing conditions are modified to reflect the proposed changes.

### 5.3.3 Groundwater Impacts

The SEE included a Groundwater Impact Assessment (GIA) prepared by Australasian Groundwater and Environmental Consultants Pty Ltd.

*Regional Geology*

There are three key stratigraphic units within or adjacent to the proposed modification area: the Jerrys Plains Subgroup, the Vane Subgroup, and the overlying alluvium of Quaternary age.

The Jerrys Plains and Vane Subgroups form part of the Permian-age Wittingham Coal Measures and contain the target coal seams for the North Pit (see **Figure 6**). The hard rock aquifers within these strata are typically low-yielding, with high salinity levels and have been extensively depressurised by mining activity in the locality.

The Quaternary alluvium occurs on the Main Creek floodplain, adjacent to the North Pit. The Quaternary alluvium in the floodplain is up to 10 m thick, with a highly variable saturated thickness ranging from 0 to 9 m. This alluvial aquifer is fed not just by rainfall but also by upward groundwater seepage from the underlying Permian strata. The GIA concludes that the Main Creek alluvial aquifer does not meet the criteria for 'highly productive' aquifers under the *Aquifer Interference Policy* (AIP), due to its high salinity levels and low yield.

The proposed modification would extend and deepen the North Pit, intercepting groundwater within the Permian strata. It would also extend mining up to within 150 m of Main Creek's alluvium.

*Groundwater Modelling*

A three-dimensional numerical groundwater model was developed to assess the impacts of the proposed modification on groundwater resources. Building on the model previously used in the EIS, the updated model incorporated more recently acquired monitoring data and geological information. The model also included approved operations at the Rix's Creek North Mine and Integra Underground Mine, in order to establish a regional flow model for cumulative mining impacts in the locality.

Both the model and GIA were peer reviewed by Dr Noel Merrick of HydroAlgorithmics. This review concluded that the updated model is fit for purpose and that the GIA has been prepared in accordance with best practice.

*Operational Impacts*

The GIA provides a comparison of predicted groundwater impacts under the approved project and the proposed modification.

**Figure 15** shows predicted groundwater inflows into the North Pit, relative to those under the approved project. The incremental impacts of the modification are greatest during the later stages of mining. The maximum predicted inflows as a result of the modification occur in Year 15 (ie 456 ML/yr). This would remain well below the maximum predicted inflows for the approved project and would fall within Mt Owen's current licensed entitlement under the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016*.

To assess potential groundwater drawdown within the Permian strata, the GIA modelled impacts within the Middle Liddell Seam.[9] The GIA indicated that the modified project would generate a drawdown zone of up to 1.5 km around the North Pit (see **Figure 16**). This represents total predicted drawdown over the extended life of the mine.

The Department notes that it is difficult to directly compare drawdown predictions in the GIA with those in the EIS, for two key reasons. Firstly, the groundwater model has been updated and the modelled predictions are not directly comparable. Secondly, the GIA assessed drawdown impacts within the deeper coal seams targeted by the proposed modification, while the EIS focused on the shallower Bayswater Seam.

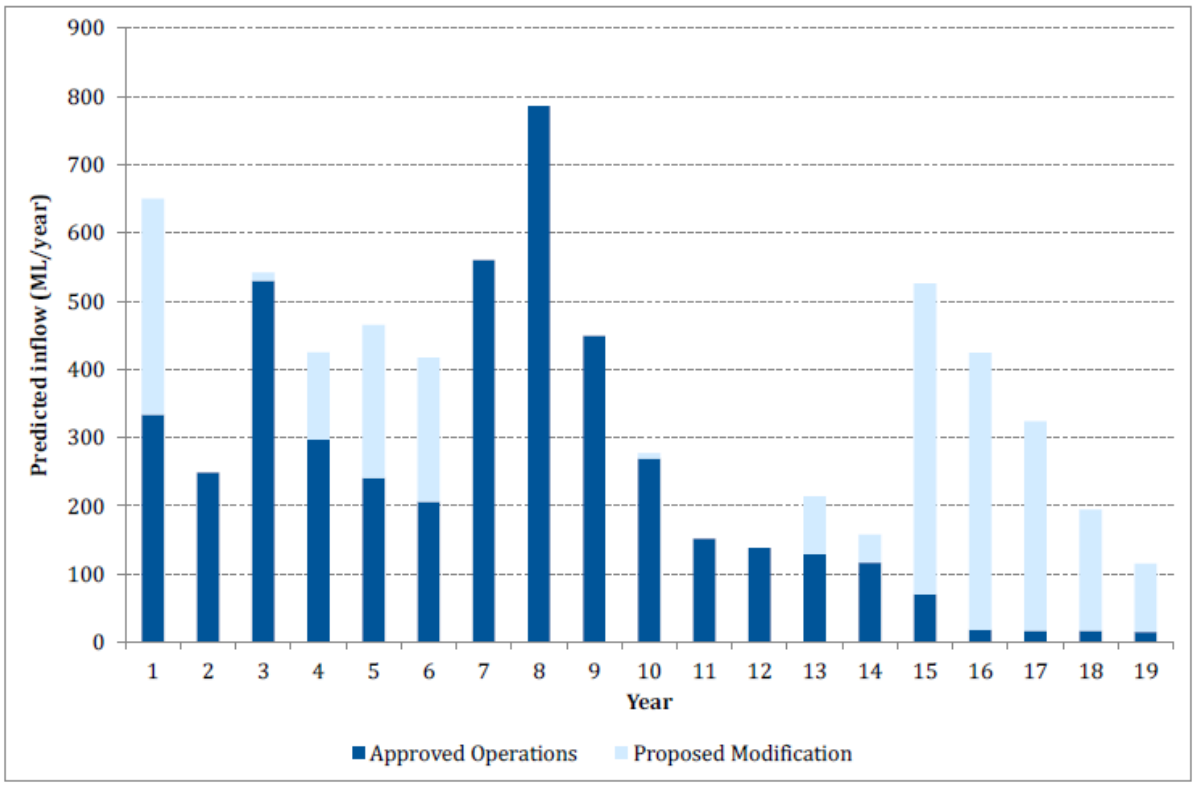


**Figure 15**| Comparison of predicted groundwater inflows in the North Pit

However, in assessing the acceptability of the predicted impacts, the Department has considered the following:

- there are no private groundwater bores located within the predicted drawdown zone;
- groundwater within the Permian strata is of low quality, and is typically unsuitable for stock watering or irrigation; and
- the Middle Liddell Seam is already extensively depressurised due to the cumulative impact of historic and approved mining operations in the locality, irrespective of the proposed modification (see **Figure 16**).

[9] The Middle Liddell Seam was selected for modelling purposes as it is also subject to active mining at the Integra Underground Mine and is therefore representative of cumulative groundwater impacts.

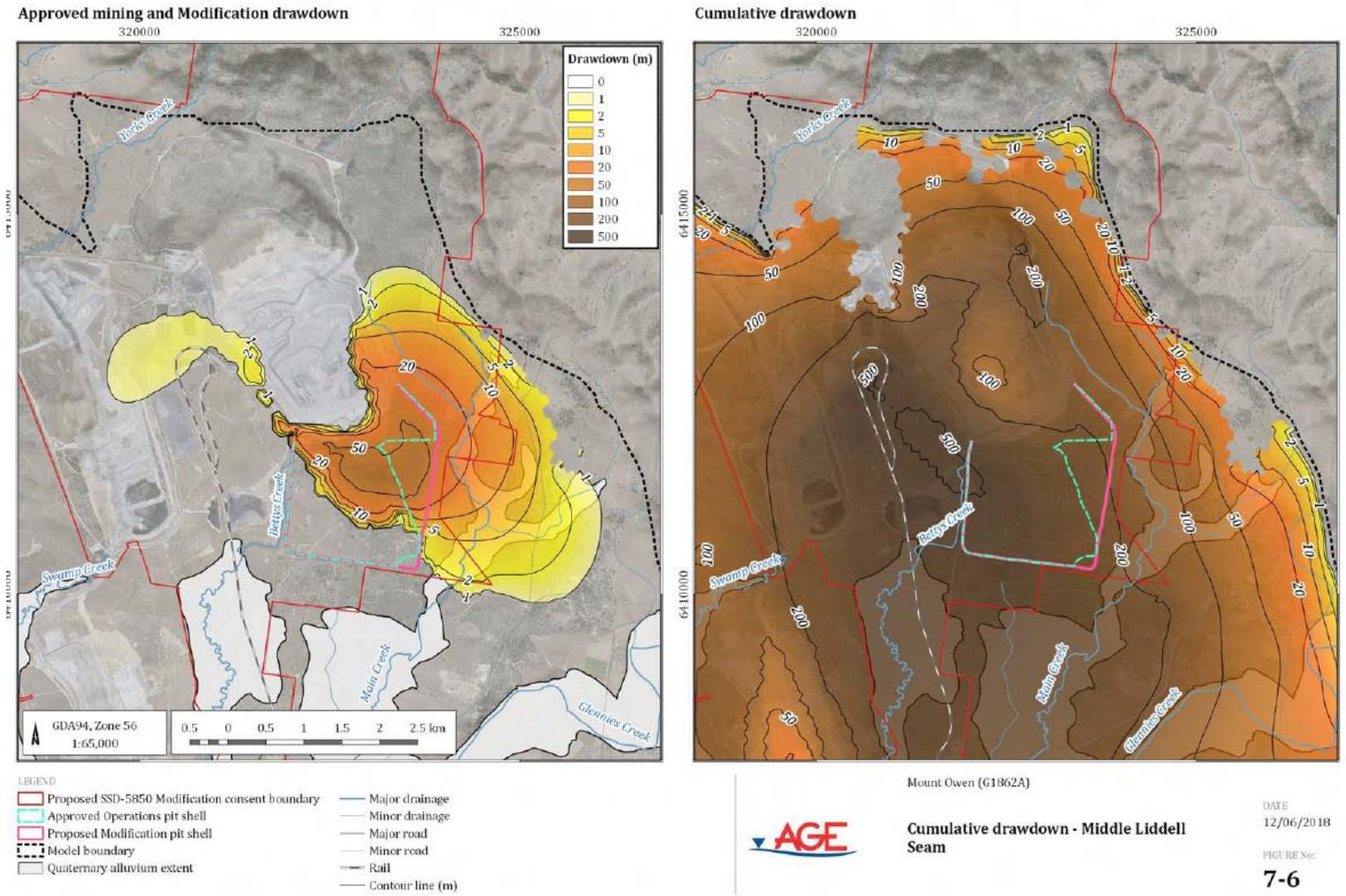


**Figure 16**| Predicted drawdown in the Middle Liddell Seam (modified project and cumulative impacts)

The modified project would not directly intercept the Quaternary alluvium. However, the GIA indicated that minor, indirect impacts are likely to occur as the Permian strata depressurise and the upwelling and downslope flow of groundwater to the alluvium gradually decreases. The maximum net loss of groundwater in the Main Creek alluvium was predicted to be in the order of 3 ML/yr, reflecting both the approved project and the proposed modification.

The GIA predicted two small drawdown zones on Main Creek to result from the modified project, with a maximum predicted drawdown in the order of 0.1 m. This is considerably less than the 3 m drawdown previously predicted in the EIS. This is likely due to the updated model, which indicates that alluvium recharge (from rainfall and flooding) occurs at a faster rate than mining-induced baseflow losses. Notably, the GIA indicated that there would be no detectable drawdown solely as a result of the proposed modification. Cumulative drawdown in the Main Creek alluvium from all mining operations was predicted to range from 0.1 m to 0.5 m, which is also likely to be undetectable in practice.

The SEE also included an assessment of potential impacts on groundwater dependent ecosystems (GDEs). There are potential GDEs within the Main Creek riparian zone, including *Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley* and *Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions*.[10] However, given the limited extent of the predicted drawdown, impacts on these communities are likely to be negligible. No stygofauna were identified within the Main Creek alluvium. Stygofauna were identified downstream within the Glennies Creek alluvium; however, this aquifer would not be impacted by the proposed modification.

The SEE also included a technical review of potential blasting impacts on Main Creek and its alluvium. The proposed modification would allow mining up to 160 from the top of the creek bank and 150 m from the edge of the alluvium. The proposed modification area contains moderately strong rock strata. Consequently, the SEE indicated that rock fracturing would be limited to a zone of approximately 12 m around the blasting area. On this basis, the SEE concluded that the risk of damage to the bank and alluvium of Main Creek would be low or negligible.

Notwithstanding the conclusions of the technical review, DPIE Water recommended that Mt Owen be required to install a low permeability barrier in the event that mining operations inadvertently intercept the alluvial aquifer. This requirement would be triggered, for example, if significant seepage is observed on the eastern highwall or if a notable decline in alluvial water levels is detected in nearby monitoring bores. This is reflected in the Department's recommended conditions (see **Section 5.3.4**).

DPIE Water also raised concerns that Mt Owen does not hold sufficient Water Access Licences under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009* to account for the predicted take of 3 ML/yr from the Glennies Creek Water Source (which incorporates Main Creek). DPIE Water also raised concerns that there are insufficient licences available for the Glennies Creek Water Source to account for the predicted water take.

In its RTS, Mt Owen noted that the predicted water take would be less than previously predicted in the MOCO Project's EIS. Mt Owen also noted that it currently holds a surplus of entitlements in relation to the Jerrys Water Source and that any shortfall may be addressed through the diversion of catchment areas from the Jerrys Water Source to the Glennies Creek Water Source. Mt Owen also advised that all necessary licences would be obtained prior to any taking of groundwater. DPIE Water did not raise any further concerns in this regard. This is discussed further in **Section 5.3.4**.

[10] *Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions* is listed as an Endangered Ecological Community under the *Biodiversity Conservation Act 2016*

*Post Mining Impacts*

Following the conclusion of mining, groundwater would gradually fill the North Pit void. The updated water balance model indicates that the water level in the final void would stabilise at approximately -65 m Australian Height Datum (AHD) after 320 years. The final water level would be approximately 120 m to 140 m below pre-mining groundwater levels.

The GIA included an assessment of water losses to alluvial aquifers during the post-mining recovery period. The long-term reduction in groundwater flow to the alluvial system is predicted to peak at around 35 ML/yr, approximately 500 years post-mining. Losses attributable to the proposed modification are predicted to peak at 13 ML/yr, approximately 800 years post-mining. During the recovery period, drawdown within the Quaternary alluvium is predicted to be generally less than 0.1 m, which would be indistinguishable from seasonal fluctuations.

Salinity within the void lake would gradually increase over time, due to evaporation, reaching a total dissolved solids (TDS) level of 5,200 milligrams per litre (mg/L) at equilibrium. This would be categorised as 'moderately saline' and would be consistent with previous predictions in the EIS (see **Section 5.6.1**). The EPA raised initial concerns that water from the void lake may recharge the Permian strata and increase salinity levels in the hard rock aquifers. The EPA therefore recommended ongoing monitoring following the conclusion of mining. In response, Mt Owen noted that, due to the steep hydraulic gradient between the final void and the Permian strata, salinity in the void lake would not pose any risk to the groundwater system. Rather, the void lake would act as a permanent groundwater sink (ie groundwater would flow into the void rather than away from it). However, Mt Owen has committed to undertake groundwater monitoring in accordance with the site's WMP during rehabilitation and mine closure.

### 5.3.4 Management and Mitigation

*Surface Water Management*

Existing conditions require Mt Owen to develop detailed plans, design objectives and performance criteria in the site's WMP for the emplacement of tailings and potentially acid forming material. The Department has also recommended conditions requiring Mt Owen to update the surface water monitoring program in line with the recommendations of the GA.

The EPA also recommended conditions requiring Mt Owen to:

- ensure that its operations comply with section 120 of the *Protection of the Environment Operations Act 1997* and the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002*; and
- immediately report any known discharges from the site to the EPA.

These requests are reflected in the Department's recommended conditions.

*Flooding*

Existing conditions require Mt Owen to monitor and report on downstream flooding impacts. This would include monitoring the effectiveness of the modified flood mitigation strategy for Yorks Creek. The Department has recommended conditions requiring Mt Owen to include detailed plans and performance criteria for the proposed North Pit flood levee (see **Section 5.3.2**) in the site's updated WMP.

*Groundwater Management*

Under existing conditions, Mt Owen must comply with specific groundwater performance measures. For example, Mt Owen must ensure that mining operations have a negligible impact on the Main Creek and Glennies

Creek alluvial aquifers, in terms of water levels and quality and impacts on other groundwater users. The site's WMP must also include:

- detailed performance criteria to assess compliance with these performance measures;
- a groundwater monitoring program; and
- a protocol for responding to any exceedances of the performance criteria.

DPIE Water recommended that the WMP is updated to include a Trigger Action Response Plan (TARP) to identify, monitor and respond to potential impacts on Main Creek's alluvial aquifer. This would include a protocol to install a low permeability barrier, if required. The Department has recommended conditions in this regard.

DPIE Water also recommended conditions requiring Mt Owen to obtain all necessary licences for the taking of groundwater (see **Sections 4** and **5.3.3**). However, the Department notes that there are existing conditions with respect to water licensing and no changes are considered necessary.

The EPA initially requested a revised groundwater monitoring plan, including additional monitoring bores to replace those located within future mining areas (ie SMO023, SMC002 and SMO28). In response, Mt Owen noted that the three bores were approved for removal as part of SSD 5850. Mt Owen also noted that these bores do not monitor the Main Creek alluvium, which is effectively monitored by nested bores recently installed in the vicinity of the creek. The EPA accepted Mt Owen's response and advised that no changes to existing groundwater conditions are required.

### 5.3.5 Conclusion

The Department considers that the impacts of the proposed modification on water resources have been appropriately identified and assessed in the SEE. The Department considers that the proposed modification is unlikely to significantly increase the surface water, groundwater or flooding impacts of the approved project. The Department considers that these impacts can continue to be managed under existing and modified conditions and an updated WMP, incorporating a TARP.

## 5.4 Biodiversity Impacts

The SEE included a Biodiversity Assessment Report (BAR), prepared by Umwelt. The proposed modification is a 'pending or interim planning application' under clause 27 of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*. Consequently, the BAR was prepared in accordance with the *NSW Framework for Biodiversity Assessment* (FBA) and the *NSW Biodiversity Offsets Policy for Major Projects* (Offsets Policy).

The BAR incorporated both desktop analysis and targeted field surveys to identify potential threatened and migratory species, endangered populations and threatened ecological communities within the proposed modification area.

### 5.4.1 Impact Assessment

The proposed modification area comprises a mixture of derived native grassland, native forest and woodland, disused olive grove plantation, previously cleared land and exotic vegetation. The BAR identified three separate plant community types (PCTs) which would be impacted by the proposed modification (see **Figure 17**). The proposed modification would directly impact:

- 43.30 ha of PCT 1601 - *Spotted Gum – Narrow-leaved Ironbark – Red Ironbark Shrub – Grass Open Forest Slopes of the Central and Lower Hunter*;
- 1.45 ha of PCT 1692 – *Bull Oak Grassy Woodland of the Central Hunter Valley*; and
- 0.20 ha of PCT 1731 – *Swamp Oak – Weeping Grass Grassy Riparian Forest of the Hunter Valley*.

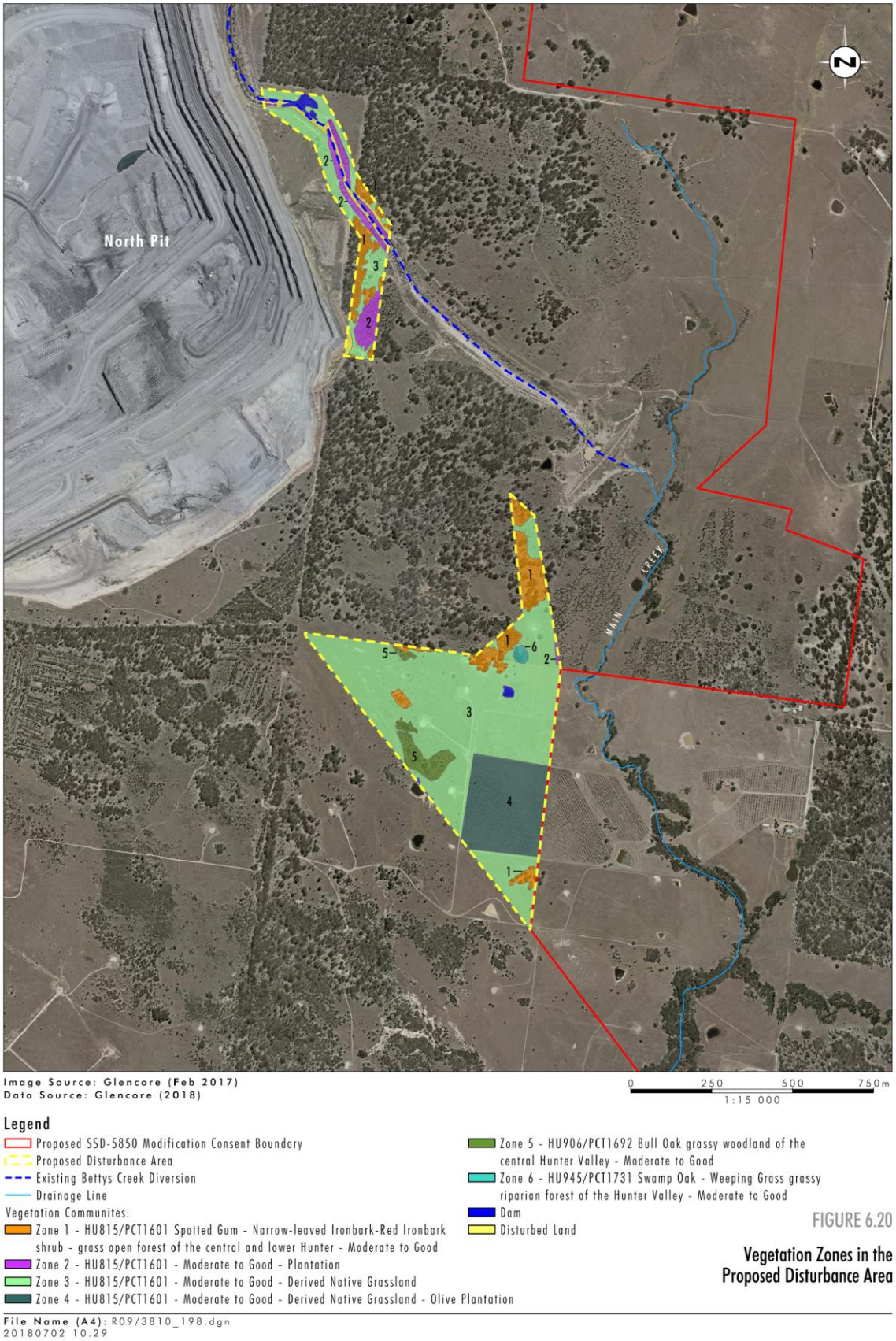


**Figure 17**| Plant community types within the modification area

Zones 1 and 2 of PCT 1601 are commensurate with the *Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions* endangered ecological community (EEC), which is listed under the *Biodiversity Conservation Act 2016* (BC ACT). These zones have a combined area of 7.19 ha. The other PCTs identified above are not listed under the BC Act or the EPBC Act.

No threatened flora species were identified during the field surveys. One species-credit fauna species, the Brush-tailed Phascogale (*Phascogale tapoatafa),* was recorded in the proposed modification area. The Brush-tailed Phascogale is listed as vulnerable under the BC Act. The proposed modification area would disturb approximately 8.84 ha of suitable eucalypt woodland and forest habitat for this species.

The proposed modification may also have indirect impacts on surrounding biodiversity values. Potential indirect impacts include fugitive light emissions, dust, noise, alterations to surface water and groundwater flow regimes, and weed and pest infestation. Measures to minimise these indirect impacts are discussed in **Section 5.4.2** below.

### 5.4.2 Avoidance, Mitigation and Management

The proposed modification avoids disturbance of riparian habitat on the Main Creek floodplain, thereby maintaining habitat connectivity along the southeastern boundary of the Complex. As discussed in **Section 5.3.3**, no detectable impacts on riparian corridors, including potential GDEs, are predicted.

Mt Owen has also proposed a range of measures to minimise the residual biodiversity impacts of the proposed modification, including:

- undertaking pre-clearance surveys to avoid impacts on native fauna, including the Brush-tailed Phascogale;
- salvaging habitat resources (including tree hollows, fallen timber and boulders) and collecting seed and topsoil from disturbed areas for rehabilitation purposes;
- managing dust, noise and night-lighting impacts, as outlined in **Sections 5.1**, **5.2** and **5.5**, respectively;
- ongoing weed and pest management; and
- ongoing erosion and sedimentation control.

Existing conditions require Mt Owen to prepare a detailed Biodiversity Management Plan (BMP) which includes measures to minimise impacts on native vegetation and fauna habitat, maximise the salvage of resources within the approved disturbance areas and to control weeds, pests and erosion and sedimentation. The BMP must also include a program to monitor and report on any impacts on riparian habitat and/or GDEs. The Department considers that the proposal avoids, mitigates and manages, to the greatest extent practicable, impacts on threatened species and communities.

No changes to existing biodiversity management conditions are considered necessary.

### 5.4.3 Biodiversity Offsets

The proposed modification would require a total of 1062 ecosystem credits and 177 species credits, in accordance with the FBA (see **Table 4**).

**Table 4** | Summary of credits required

| Plant community type/species name | Area of disturbance (ha) | Credits required for modification |
|---|---|---|
| Ecosystem credits | | |
| PCT 1601/HU815 – Spotted Gum – Narrow-leaved Ironbark – Red Ironbark Shrub – Grass Open Forest Slopes of the Central and Lower Hunter | 43.30 | 984 |
| PCT 1692/HU906 – Bull Oak Grassy Woodland of the Central Hunter Valley | 1.45 | 66 |
| PCT 1731/HU945 – Swamp Oak – Weeping Grass Grassy Riparian Forest of the Hunter Valley | 0.20 | 12 |
| **Subtotal** | **44.95** | **1062** |
| Species credits | | |
| Brush-tailed Phascogale | 8.84 | 177 |
| **Subtotal** | **8.84** | **177** |

To offset the impacts of the proposed modification, Mt Owen proposes to use one or more of the following mechanisms available to it under the Biodiversity Offsets Scheme:

- a land-based offset (or offsets) conserved in perpetuity under a Biodiversity Stewardship Agreement;
- purchasing credits through the open credit market; and
- payment into the Biodiversity Conservation Fund (BCF).

Mt Owen has identified a potential offset site in Falbrook, to the northeast of the modification area. The subject land is owned by Mt Owen. Initial credit calculations provided in the RTS indicate that the Falbrook site would satisfy all of the credit requirements for the proposed modification, except the 12 credits required for PCT 1731. Mt Owen could address this shortfall by paying into the BCF or purchasing credits from the open market.

BCD expressed some concern that Mt Owen's credit calculations have not been verified and insufficient information has been provided to assess the suitability of the Falbrook site under the Offsets Policy. However, Mt Owen has requested a degree of flexibility with respect to the final offset strategy, noting that a land-based offset may not ultimately be pursued.

Therefore, the Department has recommended conditions requiring Mt Owen to prepare a detailed Biodiversity Offset Strategy prior to commencing any surface disturbance in the proposed modification area. If Mt Owen chooses to establish a land-based offset, credit calculations would need to be verified by BCD to ensure that the proposed offset area meets the requirements outlined in **Table 4**. Mt Owen would also be required to retire the necessary credits within 24 months of commencing work within the modification area. BCD has agreed to the Department's recommended conditions.

### 5.4.4 Conclusion

The Department considers that the biodiversity impacts of the proposed modification have been appropriately assessed in the BAR. The Department considers that the proposal avoids, to the greatest extent practicable, impacts on threatened species and communities. The Department also considers that the proposed mitigation and management measures are reasonable and appropriate. Overall, the Department considers that the impacts of the proposed modification are relatively minor can be suitably managed under existing and modified conditions, an updated BMP and a detailed Biodiversity Offset Strategy.

## 5.5 Visual Impacts

### 5.5.1 Assessment of Impacts

The EIS previously identified a number of key viewing locations which were most likely to experience visual impacts as a result of the MOCO Project. Changes associated with the proposed modification are only expected to be visible at two of these vantage points (Viewing Locations 3 and 5), located southeast of the Complex.

*Overburden Emplacement*

*Viewing Location 3*

Viewing Location 3 is a private residence (Receiver 95), located approximately 4.5 km southeast of the North Pit (see **Figure 3**). The SEE (**Appendix A**) provides a comparison of the approved and proposed landforms in Year 8, Year 15 and following mine closure.

Views of active mining areas are largely screened at this location, however, the North Pit overburden emplacement area (OEA) is visible. The key visual impact due to the proposed modification would occur in Year 8, as the North Pit OEA would be approximately 0.5 km closer to the residence, and a larger section of the active emplacement area would be visible. However, the Department notes that the height of the emplacement area would not change and emplacement activities would remain approximately 4 km away. By Year 15, the majority of the OEA would be rehabilitated, although a small section of the active overburden area would remain visible. In the proposed final landform, the finished emplacement area would appear slightly larger than in the approved final landform. However, the height and shape of the landform would remain consistent with the natural landscape.

*Viewing Location 5*

Viewing Location 5 is a public vantage point, located at the intersection of Middle Falbrook Road and Glennies Creek Road.

**Figure 18** provides a comparison of the current views from Viewing Location 5, as well as the projected views in Year 10 of the approved project, and Year 8 of the modified project. **Figure 19** shows the projected views in Year 15 of the modified project and a comparison of the approved and proposed final landforms from this location.

The proposed modification would increase the visibility of the North Pit OEA and the Western Out Of Pit (WOOP)[11] emplacement area in Years 8 and 15. While rehabilitation of the OEAs would be well progressed by Year 15, a larger section of the North Pit active emplacement area would remain visible, along with sections of the active mining area. In the final landform, the North Pit OEA would be slightly more prominent, however, it would remain generally consistent with approved final landform and the surrounding landscape.

To minimise the visual impacts of the proposed modification on the public domain, Mt Owen proposes to establish a vegetated screen on mine-owned land adjacent to Falbrook Road. The Department considers that visual impacts in this location can be suitably mitigated through the establishment of the proposed screen. The Department has recommended conditions requiring Mt Owen to undertake screen planting by the end of 2020 and to maintain the screen over the life of the mine.

[11] The WOOP emplacement area is located to the west of the North Pit. The progressive establishment of the WOOP emplacement area is shown in **Figures 13** and **14**.


**Figure 18** | Comparative photomontage from Viewing Location 5 (Year 8)


**Figure 19** | Comparative photomontages from Viewing Location 5 (Year 15 and final landform)

*Lighting Impacts*

The locality surrounding the Complex is prone to night-time light glow, emanating from nearby mining operations, train headlights, and the Bayswater and Liddell Power Stations.

Approved mining operations within the North Pit contribute to this glow effect. Mt Owen currently implements a range of measures to mitigate these impacts, including the use of directional fixed lighting and the placement of mobile lighting in shielded locations. Mt Owen has committed to continue implementing these measures, so as to minimise the impacts of the proposed modification on nearby residents and road users.

The Department considers that the proposed modification is unlikely to significant increase the severity of these impacts. The Department also considers that these impacts could be appropriately managed under existing conditions and Mt Owen's established mitigation strategies.

### 5.5.2 Conclusion

The Department considers that the visual impacts of the proposed modification have been adequately assessed and the proposed mitigation measures are appropriate.

Existing conditions require Mt Owen to implement all reasonable and feasible measures to minimise fugitive light emissions and to shield views of mining operations from public roads and nearby residences. Existing progressive rehabilitation conditions would also require Mt Owen to revegetate emplacement areas in a timely manner, thereby reducing the visual impacts of the proposed modification.

The Department has also recommended conditions which would require Mt Owen to establish the proposed vegetated screens prior to the progression of the mining activities to the southeast. Overall, the Department considers that the visual impacts of the proposed modification can be suitably managed under existing and modified conditions.

## 5.6 Rehabilitation

### 5.6.1 Proposed Final Landform

**Figures 20** and **21** provide a comparison of the approved and proposed final landforms. The key proposed changes to the final landform are also summarised in **Table 5**.

The proposed modification would not change the number or location of approved final voids or increase the maximum height of the approved OEAs. The proposed final landform would continue to incorporate micro-relief features to aid integration with the surrounding landscape. However, the modification would expand the North Pit and WOOP emplacement areas. It would also result in a larger, deeper final void in the North Pit, with a substantially lower water level at final equilibrium.

The proposed final landform would incorporate a slightly higher ratio of woodland/open forest to grassland than the approved final landform. The establishment of the final landform, and the reinstatement of a portion of the North Pit OEA as Ravensworth State Forest, would also be delayed in order to accommodate the additional overburden generated by the proposed pit extension. The area which is intended to be reinstated as Ravensworth State Forest is shown in **Figures 20** and **21**.

Indicative cross-sections showing the proposed changes to the final landform and the North Pit void are provided in **Figures 22** and **23**.

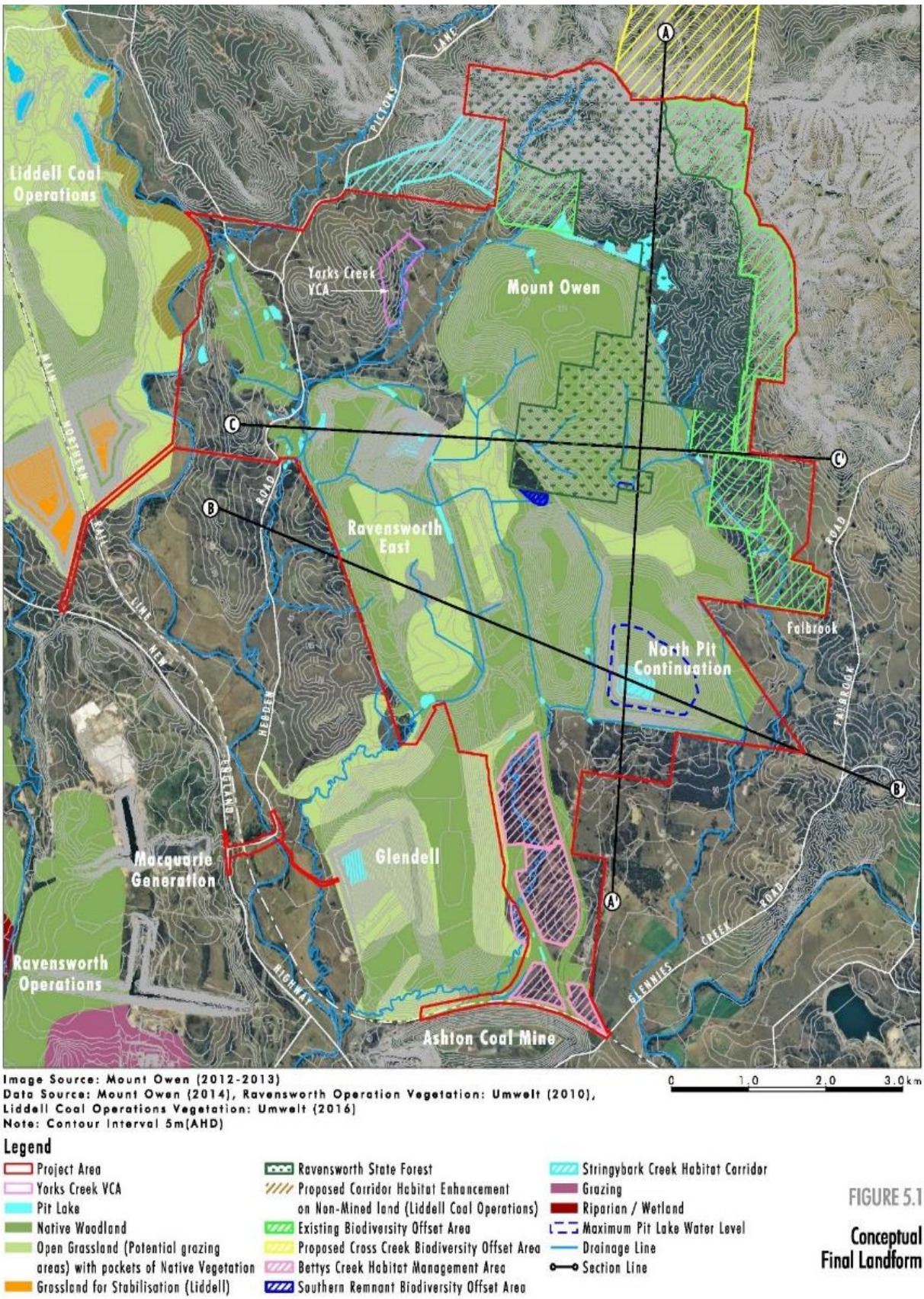


**Figure 20** | Approved conceptual final landform

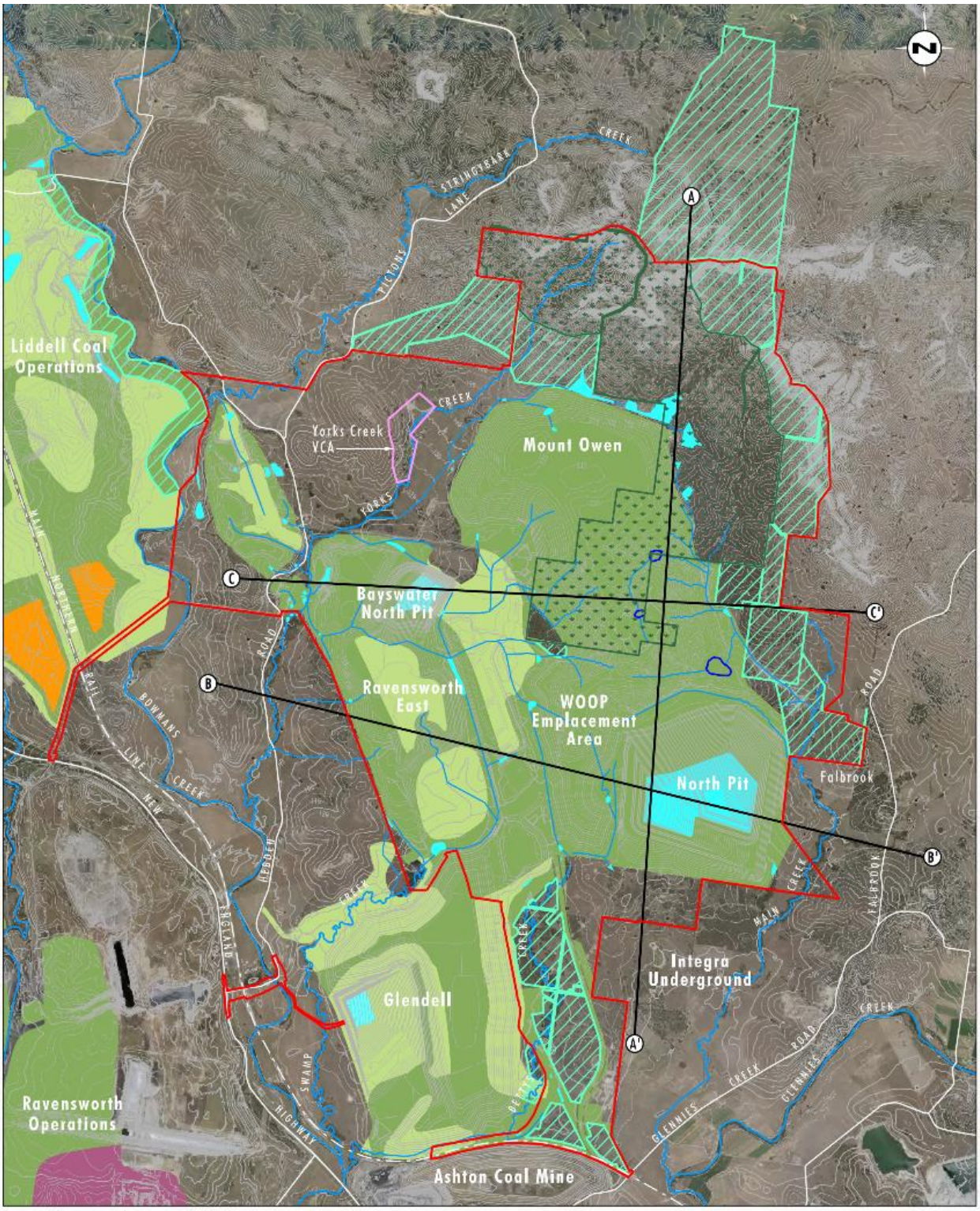


Image Source: Glencore (2017)
Data Source: Glencore (2018), Ravensworth Operation Vegetation: Umwelt (2010), Liddell Coal Operations Vegetation: Umwelt (2016)
Note: Contour Interval 5m(AHD). Equilibrium Water Level shown in North Pit Void.

Legend

- Proposed SSD-5850 Consent Boundary
- Yorks Creek VCA
- Dryland Attenuation Basin
- Water Storage
- Native Woodland
- Open Grassland (Potential grazing areas) with pockets of Native Vegetation
- Grassland for Stabilisation (Liddell Coal Operations)
- Grazing (Ravensworth Operations)
- Ravensworth State Forest
- Biodiversity Offset Area
- Drainage Line
- Cross Section Line

FIGURE 6.10

Proposed Modification
Conceptual Final Landform

**Figure 21** | Proposed conceptual final landform

**Table 5** | Comparison of approved and proposed Rehabilitation Strategies

| | Approved | Proposed modification |
|---|---|---|
| **Changes to North Pit void** | | |
| Retention of highwalls | Western and southern highwalls retained | Western, southern and eastern highwalls retained |
| Maximum slope of highwalls and low wall | Upper benches of southern and western highwalls battered to 15 degrees<br><br>Upper slopes of low wall battered to 18 degrees | Upper benches of southern and eastern highwall battered to 10 degrees and 18 degrees, respectively<br><br>No battering or shaping of western highwall proposed – maximum slope between the pit crest and the first bench approximately 41 degrees<br><br>No change to low wall |
| Vertical distance to spill level (m) | 65 | 155 |
| Water level at equilibrium (m AHD) | 19 | -65 |
| Time to reach equilibrium (years) | 500 | 320 |
| Total dissolved solids (mg/L) at equilibrium | 5,500 | 5,200 |
| Void catchment area (ha) | 282 | 390 |
| **Changes to overall landform** | | |
| Proposed final land use | Mixed woodland and agriculture | No change |
| Woodland/open forest and grassland in final landform | Woodland/open forest: 2,037 ha<br>Grassland:341 ha | Woodland/open forest: 2,163 ha<br>Grassland:337 ha |
| Rehabilitation schedule | Majority of the Ravensworth State Forest area with the North Pit OEA to be rehabilitated by 2027, with the remainder to be completed post-mining | Majority of the Ravensworth State Forest area with the North Pit OEA to be rehabilitated by 2031, except for a 12.5 ha section which would be completed post-mining |

### 5.6.2 Consideration of Alternatives

The SEE included a review of alternatives considered during selection of the proposed final landform, including the full and partial backfilling of the North Pit void. The alternative landform scenarios are outlined in **Table 6** below.

**Table 6** | Consideration of alternative landform scenarios

| Final landform scenario | Description | Consideration | Preferred option? |
|---|---|---|---|
| No Void | North Pit is fully backfilled | - Would require rehandling of approximately 340 million loose cubic metres (Mlcm) of overburden for backfilling<br>- Estimated cost of approximately $2.2 billion<br>- Would delay mine closure by 11 years | No |
| As Approved | North Pit is partially backfilled to resemble the approved final landform | - Would require rehandling of approximately 170 Mlcm of overburden from the WOOP and North Pit OEA<br>- Estimated cost of between $800 million and $1 billion | No |

| | | | |
|---|---|---|---|
| | | - Would delay mine closure by 4 years | |
| No retained highwalls | North Pit is partially backfilled with internal slopes of approximately 18 degrees | - Would require rehandling of 75 Mlcm of overburden from the WOOP and North Pit OEA, which would have been progressively rehabilitated<br>- Estimated cost of $400-$500 million<br>- Would delay mine closure by 7 years | No |
| Western highwall only (external) | Southern and eastern highwalls are reshaped to create slopes of approximately 18 degrees, with the slopes extending beyond the proposed modification area | - Would increase the proposed disturbance area by an additional 31 ha<br>- Would increase the void catchment by 365 ha, with a resulting decrease in the Main Creek catchment area<br>- Would involve the rehandling of approximately 35 Mlcm of overburden<br>- Estimated cost of $150-$200 million<br>- Would delay mine closure by 11 years | No |
| Western highwall only (internal) | Southern and eastern highwalls are reshaped to create slopes of approximately 18 degrees, with all cut and fill retained within the proposed modification area | - Would sterilise approximately 17 million tonnes of ROM coal<br>- Would require blasting of the highwalls and rehandling of approximately 65 Mlcm of overburden<br>- Estimated cost of $300-400 million<br>- Would delay mine closure by an 8 years | No |
| Deeper void; retained western, southern and eastern highwalls | See **Figure 21 and Table 5** | - Minimal re-handling required<br>- Final landform completed within 3 years post-mining | **Yes** |

The alternative scenarios would require significant rehandling of overburden. This would further extend the predicted noise and air quality impacts of emplacement activities and generate additional greenhouse gas emissions. Furthermore, Mt Owen submits that the costs associated with backfilling would render the proposed modification economically unviable.

Relevant government agencies, including DRG, the Resources Regulator, DPIE Water and Council did not raise any concerns regarding the proposed final landform.

The Department notes that Mt Owen no longer proposes to undertake any battering or shaping of the western highwall (see **Table 5**). Mt Owen contends that battering of the western highwall is not feasible, due to the limited space between the North Pit and the WOOP emplacement area. While it is generally the Department's preference to minimise highwall slopes within final landforms, the Department accepts that the rehabilitation of the western highwall is physically constrained by its proximity to the nearby emplacement area and associated access, safety and water management considerations.

Mt Owen has advised that the average slope of the western highwall would be approximately 35 degrees. In the final landform, the highwall would retain a series of large vegetated benches. The Department considers that the appearance of these benches could be improved through detailed landscape design (see **Section 5.6.3**). The Department also notes that the southern and eastern highwalls would be battered to 10 degrees and 18 degrees, respectively (see **Table 5**). On this basis, the Department considers that the proposed changes are acceptable.

The Department also notes that the proposed final landform provides some improvements to the approved final landform, through the incorporation of additional relief features in the final North Pit OEA (see **Figure 21**).

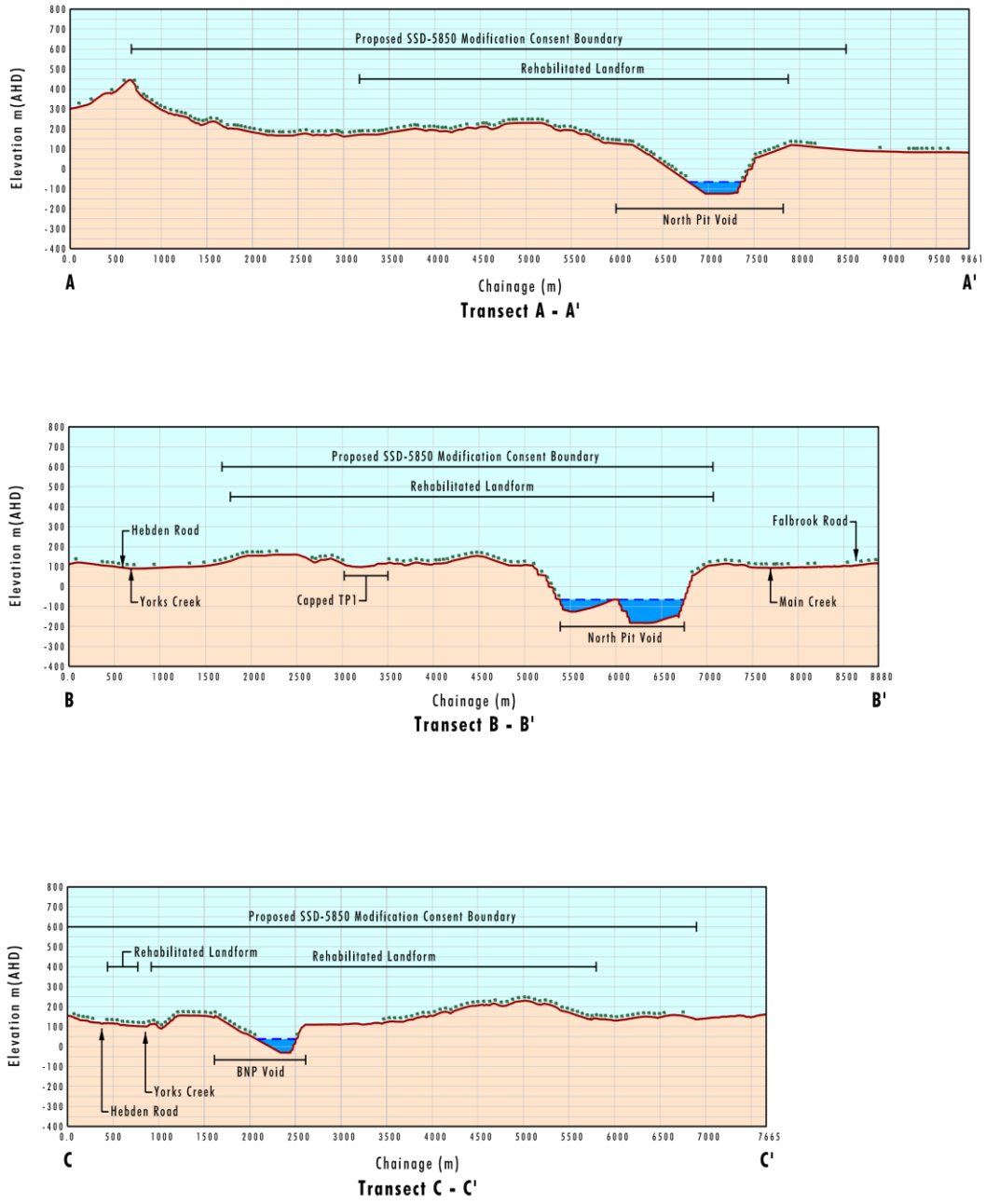


**Figure 22** | Cross-sections of proposed final landform

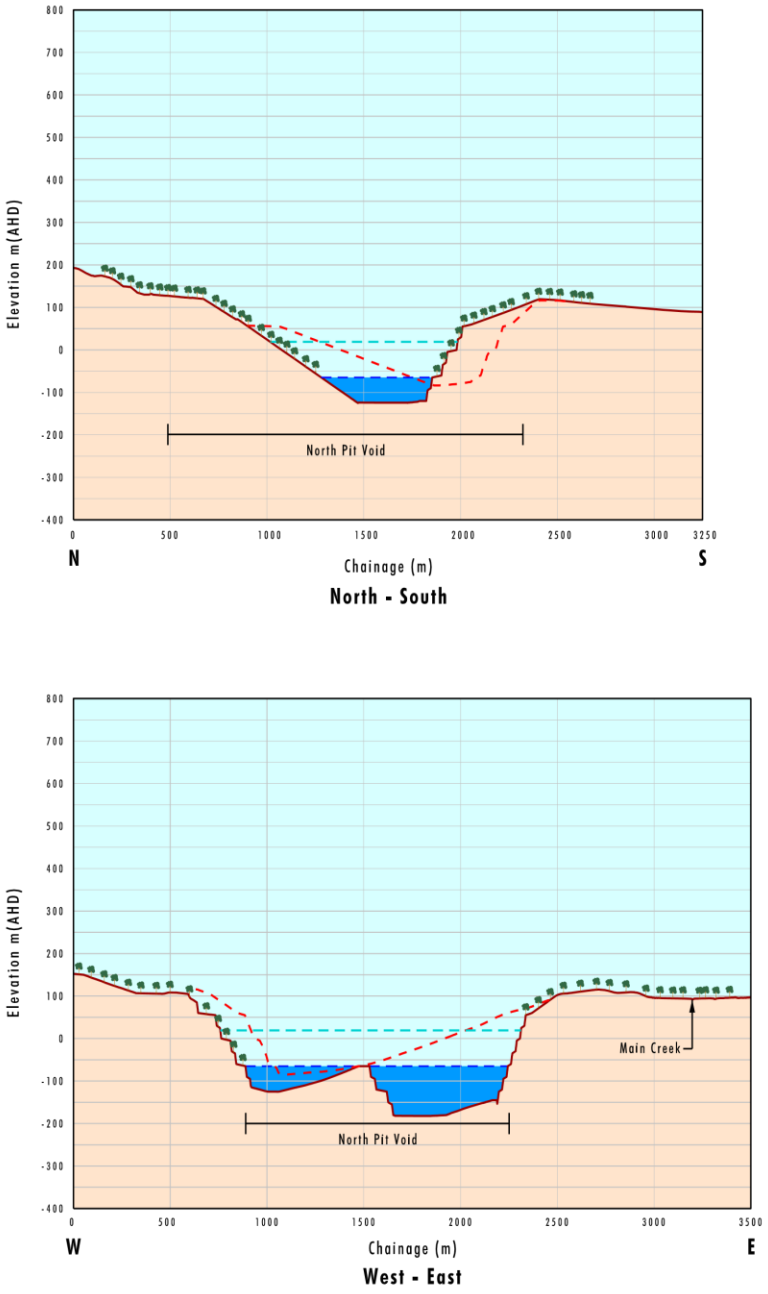


**Figure 23** | Comparison of approved and proposed North Pit final voids

### 5.6.3 Rehabilitation Management

The Department considers that existing conditions provide a robust regulatory framework for the rehabilitation of the site, and as such, no significant changes are required. However, the Department has recommended conditions requiring the preparation of a Mine Closure Plan, at Council's request.

Existing conditions require Mt Owen to prepare a detailed Rehabilitation Strategy and Rehabilitation Management Plan (RMP) for the Complex. These documents must satisfy specified rehabilitation objectives, including:

- creating a safe, stable and non-polluting final landform;
- integrating the final landform into the natural landscape, through the incorporation of micro-relief; and
- minimising, to the greatest extent practicable, the size and depth of final voids.

These documents will need to be updated to reflect the proposed modification. The Department notes that this process will provide further opportunities to develop and refine the final landform and the progressive rehabilitation schedule. The recommended conditions would require Mt Owen to update the site's Rehabilitation Strategy and RMP by 31 December 2019 (to align with the expiry of Mt Owen's current Mining Operations Plan).

The Department has also recommended strengthening the existing rehabilitation objectives for the Complex. The recommended objectives would require Mt Owen to:

- minimise highwall slopes to the greatest extent practicable;
- vegetate benches within the final void with native species of varying heights;
- design the final voids as long-term groundwater sinks to prevent the release of saline water; and
- ensure that water retained on-site is fit for the intended post-mining land use.

The updated Rehabilitation Strategy and RMP would need to demonstrate compliance with these objectives.

Mt Owen has also committed to undertake additional geotechnical investigation to ensure the stability of the eastern highwall in the final landform and to minimise any associated risks to Main Creek. These investigations would be undertaken during the progression of mining and prior to mine closure. Mt Owen has also committed to prepare a detailed drainage design for the low wall, informed by erosion modelling, in order to ensure its long-term stability. This would be detailed in the RMP/Mining Operations Plan closer to mine closure.

### 5.6.4 Conclusion

The Department has carefully considered the impacts of the proposed modification on mine rehabilitation. The Department is of the view that the proposed final landform would remain generally consistent with the approved MOCO Project. The Department also considers that progressive rehabilitation could continue to be managed under existing conditions of consent. The Department's recommended conditions would further strengthen rehabilitation objectives for the final voids and require Mt Owen to prepare an updated RMP and Rehabilitation Strategy for the modified project. The Department and other relevant agencies consider that mine rehabilitation can be appropriately managed under existing and recommended conditions and an updated RMP and Rehabilitation Strategy.

## 5.7 Other Issues

Other issues associated with the modification include impacts on Aboriginal cultural and historic heritage, social and economic impacts, and impacts on agriculture. The Department's assessment of these issues is summarised in **Table 7** below.

**Table 7** | Summary of other issues raised

| Issue | Findings | Recommended conditions |
|---|---|---|
| Aboriginal Cultural Heritage | • The SEE included an Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared by OzArk Environmental and Heritage Management. The ACHAR was prepared in consultation with Registered Aboriginal Parties (RAPs) and Wonnarua Knowledge Holder Groups.<br>• Mt Owen implemented an Aboriginal site salvage program for the MOCO Project in 2017. This included the salvage of surface artefacts at 20 sites, including the majority of recorded Aboriginal sites in the vicinity of the modification area.<br>• The ACHAR identified two remaining recorded sites which would be impacted by the proposed modification. No new Aboriginal sites were identified during field surveys.<br>• AHIMS Site #37-3-1172 is an isolated find (silcrete flake) located in the northern portion of the modification area, near the Bettys Creek Diversion. The ACHAR recommended that the site be salvaged prior to ground disturbance. BCD accepted this recommendation.<br>• AHIMS Site #37-3-0687 is an artefact scatter located 42 m east of the modification area. Mt Owen indicated that this site could be indirectly harmed by future erosion stabilisation works. Consequently, the ACHAR recommended that this site be salvaged. However, BCD has advised that, as the site is located well outside of the modification area, salvage is not appropriate.<br>• BCD recommended that the existing AHMP for the Complex be updated to include agreed mitigation measures for the Aboriginal sites within the modification area.<br>• As discussed in **Section 2**, Mt Owen also proposes to store salvaged artefacts at a central storage facility at the Wollombi Brook VCA rather than establishing a separate facility at the Yorks Creek VCA, located at the Complex.<br>• Mt Owen consulted with RAPs and Knowledge Holder Groups regarding use of a shared storage facility. Stakeholders provided feedback with respect to access and security arrangements, identification and storage of artefacts and the need for future consultation regarding post-mining management of stored artefacts. Glencore has committed to address these issues through the development of a Plan of Management for the Wollombi Brook VCA. | • The Department has recommended conditions requiring Mt Owen to update its AHMP prior to any disturbance within the modification area.<br>• The updated AHMP must include specific measures to protect AHIMS Site #37-3-0687, unless separate approval is obtained from BCD for its salvage.<br>• The recommended conditions would also require Mt Owen to include a protocol in the updated AHMP to consult with the Mount Owen Aboriginal Cultural Heritage Working Group during the development of the Plan of Management for the central storage facility.<br>• The Department considers that the impacts of the proposed modification are minor can be suitably managed under the existing and recommended conditions and an updated AHMP. |
| Historic Heritage | • No listed historic heritage items are located in the proposed modification area.<br>• The NSW Heritage Council did not raise any concerns regarding the proposed modification, provided that all works are executed in accordance with the Historic Heritage Management Plan (HHMP) for the Complex. The HHMP includes procedures to be implemented in the event that unexpected historic heritage items are identified on site. | • The Department's recommended conditions would require Mt Owen to update its HHMP to include the proposed modification area.<br>• The Department considers that any potential impacts on local historic heritage can be suitably managed under existing conditions and an updated HHMP. |

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| Social Impacts | • A comprehensive Social Impact Assessment (SIA) was not undertaken for the proposed modification. Rather, the SEE included a targeted assessment of social impacts, supplemented by the original SIA for the MOCO Project.<br>• The Department considers that this assessment approach is appropriate for the scale of the proposed modification and is consistent with the *Social Impact Assessment Guideline for State Significant Mining, Petroleum Production and Extractive Industry Development*.<br>• Community engagement undertaken for the targeted SIA identified air quality and associated health impacts, noise impacts and blasting impacts as the primary issues of concern for nearby residents. Land management issues (including pest and weed management), biodiversity impacts, and reduction in resident population due to property acquisitions were also of concern.<br>• The Department considers that the proposed modification would not contribute significantly to actual amenity impacts. The SEE indicates that the incremental air quality, noise and blasting impacts of the proposed modification would be minor, subject to the implementation of suitable mitigation measures.<br>• Land management issues are discussed under 'Agricultural Impacts' below. Biodiversity impacts are considered in **Section 5.3**. Biodiversity impacts would be fully offset in accordance with the Offsets Policy.<br>• The Department has recommended conditions extending voluntary acquisition rights to 12 additional properties in Middle Falbrook and Camberwell (see **Section 5.1**). However, the Department notes that should landowners choose to exercise these rights, those residences may still be occupied under a tenancy arrangement. Consequently, the modification would not necessarily lead to a reduction in the local population.<br>• Mt Owen has committed to provide an additional $226,000 in funding for local economic initiatives under a revised Planning Agreement with Council (see **Section 4.2**).<br>• Mt Owen has an established Stakeholder Engagement Strategy for the Complex. This strategy is reviewed annually. Mt Owen has also committed to undertake a community survey every three years, to inform ongoing engagement activities over the life of the project. | • The Department has recommended updated conditions to minimise potential impacts on amenity, including strengthened conditions with respect to noise and air quality.<br>• The Department has recommended conditions requiring Mt Owen to finalise its revised Planning Agreement with Council within six months of determination of MOD 2.<br>• The Department considers that the social impacts of the proposed modification (including amenity impacts, potential population reduction and land management issues) would be suitably managed under existing and modified conditions of consent. |
| Economic Impacts | • The SEE included an Economic Impact Assessment (EIA) prepared by Deloitte Access Economics. The EIA included a cost benefit analysis (CBA) and local effects analysis (LEA) prepared in accordance with the *NSW Government's Guidelines for the economic assessment of mining and coal seam gas proposals* (2015).<br>• The CBA analysis indicated that the proposed modification would have incremental benefits in the order of $74.6 million, and incremental costs of $22.1 million, in net present value (NPV) terms. | No conditions considered necessary |

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| | • The proportionate benefits and costs to NSW were estimated at $62.9 million and $10.1 million, respectively. This equates to a net economic benefit to NSW of $52.9 million (NPV).<br>• The proposed modification is predicted to generate approximately $59 million (NPV) in royalties for the NSW Government.<br>• Under the approved project, the existing workforce at the Mount Owen Mine is predicted to peak at 660 full-time equivalent (FTE) employees in 2019 and gradually decline over the remaining life of the mine (ie to around 250 FTEs by 2030). Under the proposed modification, the maximum workforce (ie 660 FTEs) would be maintained until 2030, when mine production begins to ramp down. Workforce numbers are then predicted to decline from 548 FTEs in 2031 to 58 FTEs in 2036. The LEA indicates that the extended employment of local workers as a result of the modification would generate a local economic benefit of around $2.4 million per year.<br>• The primary costs to the community relate to GHGEs and PM emissions. These costs were estimated at $17.7 million and $4.4 million (NPV), respectively, including GHGE costs borne outside of NSW. The LEA indicates that the annual air quality costs of the proposed modification on the immediate locality would equate to $463,000 per year for the duration of mining operations.<br>• A number of other project-related costs, including visual impacts and impacts on water resources and heritage values, were assessed qualitatively. The EIA indicates that these non-quantified externalities would need to generate costs of around $5 million per year (in real terms), to offset the projected benefits of the proposed modification. This is considered highly improbable.<br>• The CBA included a detailed sensitivity analysis, incorporating a number of variables, including changes to coal export prices. Under all scenarios, the proposed modification was predicted to result in a net economic benefit to NSW. | |
| Agricultural Impacts | • The proposed modification area does not contain BSAL (see **Section 3.6.2**).<br>• A detailed Agricultural Impact Statement (AIS) was included in the EIS for the MOCO Project. This assessment concluded that the approved disturbance area contained soils with low to moderately low fertility and had limited value as grazing land. As the modification area shares similar characteristics, a detailed AIS was not undertaken for the modification.<br>• The Department notes that land management issues were raised during community engagement for the proposed modification. Existing conditions require Mt Owen to include detailed measures to control weeds and feral pests in the BMP. These requirements would also extend to the modification area. | No conditions considered necessary |

# 6. Evaluation

The Department has assessed the modification application in accordance with the relevant requirements of the EP&A Act. The Department has carefully considered the potential impacts of the modification on the natural and cultural environments, and on nearby residents.

While the Department's assessment has concluded that the proposed modification is unlikely to increase the severity of environmental and social impacts in the surrounding locality, relative to the approved project, it would prolong these impacts by a further six years.

The Department recognises that cumulative air quality impacts are a key issue of concern for the Middle Falbrook and Camberwell communities. The Department has recommended more stringent air quality criteria to reflect contemporary standards. The Department has also undertaken a comprehensive review of voluntary acquisition and mitigation rights for air quality impacts under the VLAMP. As a result of this review, the Department has conservatively recommended that acquisition and mitigation rights be afforded to 12 privately-owned receivers in Middle Falbrook and Camberwell. The Department notes that these measures are intended to protect local residents from the cumulative impacts of mining operations in the locality, rather than any significant impacts resulting from the proposed modification.

The proposed modification would also increase the approved GHGEs of the project by approximately 40 percent. While these impacts are significant, these impacts must be weighed against the potential benefits of the proposal. The proposed modification would facilitate the recovery of previously unrecoverable coal resources, using existing infrastructure and without substantially increasing the disturbance footprint of the approved project.

The proposal would also provide wide ranging benefits for the local and State economies. Taking into account predicted air quality impacts and GHGEs, the proposed modification is predicted to generate a net benefit to NSW of approximately $53 million (NPV). The proposal would also provide continued employment at the Mount Owen Mine for up to 660 people and generate a local economic benefit in the order of $2.4 million per year.

On balance, the Department considers that the proposed modification is in the public interest and should be approved, subject to strict conditions.

The Department has recommended conditions to manage the impacts of the proposed modification, particularly with respect to air quality impacts, GHGEs, impacts on water resources and biodiversity, and mine rehabilitation. The Department considers that the impacts of the modified project can be appropriately managed under the proposed modified conditions and an updated suite of management plans.

The Department has drafted a recommended Notice of Modification for SSD 5850 (see **Appendix F**) and a consolidated version of the development consent, as it is proposed to be modified (see **Appendix G**). The Department has also taken the opportunity to update various conditions to align with the Department's current drafting standards. The Department consulted with relevant agencies regarding the recommended conditions and has amended the conditions in response to agency advice.

Mt Owen has reviewed and accepted the recommended conditions.

# 7. Recommendation

It is recommended that the Executive Director, Energy and Resources, as delegate of the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report;
- **determines** that the application SSD 5850 (MOD 2) falls within the scope of section 4.55(2) of the EP&A Act;
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to grant approval to the application;
- **modifies** the consent SSD 5850; and
- **signs** the attached approval of the modification (**Appendix F**).

Recommended by:

2/9/19

**Lauren Evans**
Team Leader
Resource Assessments

Recommended by:

2.9.19

**Howard Reed**
Director
Resource Assessments

# 8. Determination

The recommendation is: **Adopted / Not adopted by:**

4/9/19.

**Mike Young**
Acting Executive Director
Energy and Resources

# Appendices

## Appendix A – Statement of Environmental Effects

https://www.planningportal.nsw.gov.au/major-projects/project/11476

## Appendix B – Submissions

https://www.planningportal.nsw.gov.au/major-projects/project/11476

## Appendix C – Response to Submissions

https://www.planningportal.nsw.gov.au/major-projects/project/11476

## Appendix D – Additional Information

https://www.planningportal.nsw.gov.au/major-projects/project/11476

## Appendix E – Community views for Draft Notice of Decision

| Issue | Consideration |
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| *Air quality*<br>• Cumulative impacts of mining operations and associated health effects and loss of amenity<br>• Accumulation of dust in rainwater tanks and solar panels<br>• Effectiveness of existing monitoring and mitigation measures<br>• Need for further acquisition and mitigation rights | *Assessment*<br>• The Department has carefully reviewed the Air Quality Impact Assessment (AQIA), in consultation with the Environment Protection Authority (EPA) and NSW Health.<br>• The AQIA indicates that the proposed modification is unlikely to significantly increase the air quality impacts of the approved project. The Department also considers that Mt Owen's existing mitigation and monitoring strategies are reasonable and appropriate.<br>• Nonetheless, the Department recognises that there are existing cumulative air quality issues in the locality, due to the combined impacts of multiple mining operations. Therefore, the Department considers that further safeguards are needed for the protection of local residents, including more stringent air quality criteria and acquisition and mitigation rights for additional receivers in Middle Falbrook and Camberwell.<br>• The EPA has advised that Mt Owen has sufficiently addressed its concerns regarding the proposal. NSW Health has advised that predicted air quality impacts at privately-owned receivers have been addressed by a range of recommended conditions, including additional acquisition rights. However, NSW Health stressed the need to use every opportunity to reduce cumulative air quality impacts. |

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| | *Recommended Conditions*<br><br>Conditions include:<br><br>• Updated air quality performance criteria to reflect the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2016.*<br>• Voluntary acquisition and mitigation rights for 12 privately-owned properties. |
| *Rehabilitation*<br><br>• Incorporation of final voids<br>• Water management in the final landform | *Assessment*<br><br>• The modification application does not seek to increase the number of final voids. The Department considers that the proposed final landform remains generally consistent with the approved final landform.<br>• Existing conditions impose strict obligations with respect to mine rehabilitation and water management in the final landform. The Department has taken the opportunity to further refine and strengthen these obligations.<br>• Relevant agencies, including the Resources Regulator, the Department's Division of Resources and Geoscience and Council, did not raise any concerns regarding the proposed final landform. However, Council recommended that Mt Owen prepare a Mine Closure Plan prior to the conclusion of mining.<br><br>*Recommended Conditions*<br><br>Conditions include:<br><br>• Designing the final voids as permanent groundwater sinks, to prevent the release of saline water into the surrounding environment.<br>• Ensuring that any water discharged from the site is suitable for receiving waters, aquatic ecology and riparian vegetation.<br>• Preparation of an updated Rehabilitation Strategy which establishes clear completion criteria for each component of the final landform, investigates opportunities to refine and improve the final landform (including the final voids) and includes a stakeholder engagement plan to guide rehabilitation and mine closure planning.<br>• Preparation of a detailed Mine Closure Plan which investigates potential post-mining beneficial land uses for the site (including the final voids), in consultation with the community and relevant agencies. |

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| *Strategic Planning and Ecological Sustainability*<br>• Climate change impacts<br>• Need for transition to renewable energy sources | *Assessment*<br>• The proposed modification is projected to generate an additional 51.6 million tonnes of carbon dioxide equivalent emissions and increase the Project's overall GHGEs by approximately 40 percent.<br>• The Department has carefully considered the impacts of the proposed modification, having regard to national and State-level commitments made under the Paris Agreement and the NSW Climate Change Policy Framework.<br>• Neither the State nor national policy frameworks promote restricting private development in order to meet Australia's commitments under the Paris Agreement, nor do they impose any prescriptive emissions criteria which can be applied to development assessment.<br>• The proposed modification would optimise resource recovery at an existing coal mine, with minimal additional environmental impacts, relative to the approved project. On balance, the Department considers that the impacts of the proposed modification are acceptable.<br>*Recommended Conditions*<br>Conditions include:<br>• Preparing an updated Air Quality and Greenhouse Gas Management Plan, including detailed measures to improve energy efficiency and reduce the GHGEs generated by the Project. |
| *Social impacts*<br>• Potential health impacts<br>• Loss of amenity<br>• Difficulty in selling homes | Assessment<br>• The Department has assessed the impacts of the proposed modification with respect to air quality, noise and vibration. The Department considers that the modification is unlikely to significantly increase impacts on health or amenity, relative to the approved project.<br>• Mt Owen has committed to provide an additional $226,000 to the Singleton Community and Economic Development Fund.<br>*Recommended Conditions*<br>• Voluntary acquisition and mitigation rights for 12 privately-owned properties.<br>• Finalising an updated Planning Agreement with Council within six months of the determination of Modification 2. |

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| *Noise*<br><br>• Accuracy of noise assessment<br>• Need for monitoring and acquisition and/or mitigation rights for affected landowners | *Assessment*<br><br>The Noise Impact Assessment (NIA) indicates that the modified development can continue to operate in compliance with existing noise criteria, subject to the implementation of Mt Owen Pty Ltd's existing noise management and mitigation strategies.<br>• The Department considers that the noise impacts of the proposed modification have been appropriately assessed.<br>• Issues relating to acquisition and mitigation rights were raised by the owners of Receiver 112. While no changes to existing rights are applicable on the basis of noise impacts, the Department notes that Receiver 112 will be afforded voluntary acquisition and mitigation rights on the basis of air quality impacts.<br>• The EPA did not raise any concerns regarding the NIA. However, the EPA recommended that noise monitoring be undertaken by a suitably qualified acoustic expert.<br><br>*Recommended Conditions*<br><br>Conditions include:<br><br>• Developing a detailed noise monitoring protocol, in consultation with the EPA.<br>• Noise monitoring to be undertaken by a suitably qualified acoustic expert. |
| *Biodiversity*<br><br>• Increase in mining footprint<br>• Loss of habitat | *Assessment*<br><br>• The proposed modification has been assessed in accordance with the *NSW Framework for Biodiversity Assessment*.<br>• The proposed modification would disturb 44.95 hectares of native vegetation, including 7.19 hectares of an endangered ecological community listed under the *Biodiversity Conservation Act 2016*. These impacts are to be offset in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*.<br>• The proposed modification would increase the approved disturbance footprint for the project by less than two percent.<br>• The Department considers that the proposed modification avoids, to the greatest extent practicable, impacts on threatened species and communities. The Department also considers that residual biodiversity |

impacts can be appropriately mitigated, managed and offset.

- The Department's Biodiversity and Conservation Division did not raise any concerns regarding the biodiversity impacts of the proposal.

*Recommended Conditions*

Conditions include:

- Developing a detailed Biodiversity Offset Strategy prior to commencing works associated with the proposed modification and making suitable arrangements for the long-term security of biodiversity offsets within 12 months of commencing works.

## Appendix F – Notice of Modification

## Appendix G – Consolidated Consent