INVINCIBLE COLLIERY (07_0127 MOD 4)
CULLEN VALLEY MINE (200-5-2003 MOD 2)
MODIFICATIONS

1. INTRODUCTION

Coalpac Pty Limited (Coalpac) owns and operates the Invincible Colliery and Cullen Valley Mine, located approximately 25 kilometres (km) northwest of Lithgow in the Lithgow Local Government Area (see Figure 1).

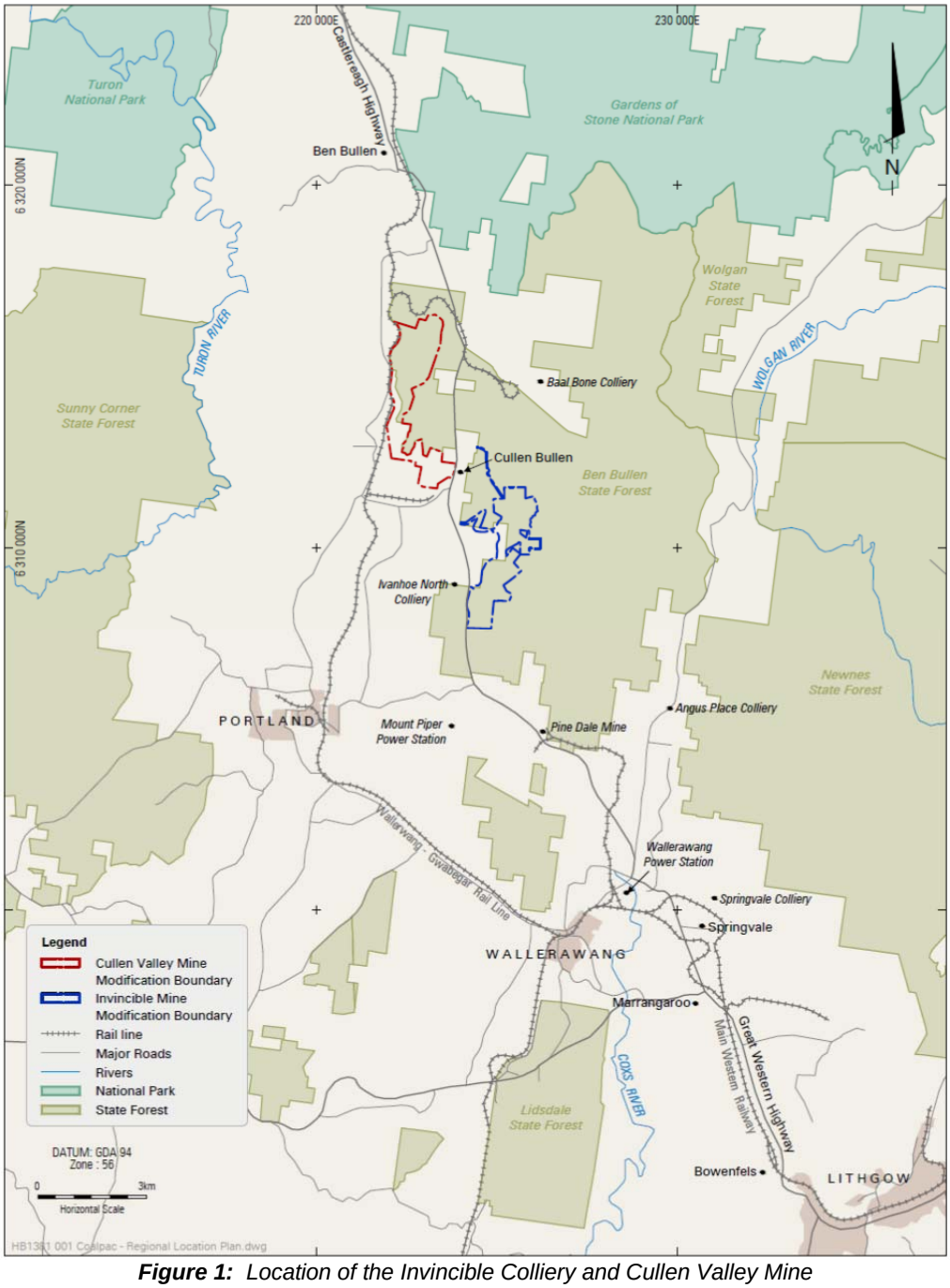

Figure 1: *Location of the Invincible Colliery and Cullen Valley Mine*

1.1 Existing Operations

The Cullen Valley Mine was originally approved in 1997, but currently operates under a 2004 Ministerial consent (DA 200-5-2003). The consent allows Coalpac to:

- extract coal by open cut, highwall and underground mining methods;
- produce up to 1 million tonnes per annum (Mtpa) of coal; and
- transport this coal via public roads to Mount Piper Power Station and other domestic markets.

The consent for the Cullen Valley Mine lapses in 2025. However, even though there are still extensive resources approved for extraction under the consent, including an approved open cut pit on the Hillcroft property to the west and an extensive underground mine to the east (see Figure 2), the mine was placed on care and maintenance in 2013 as economically recoverable coal resources had been exhausted.

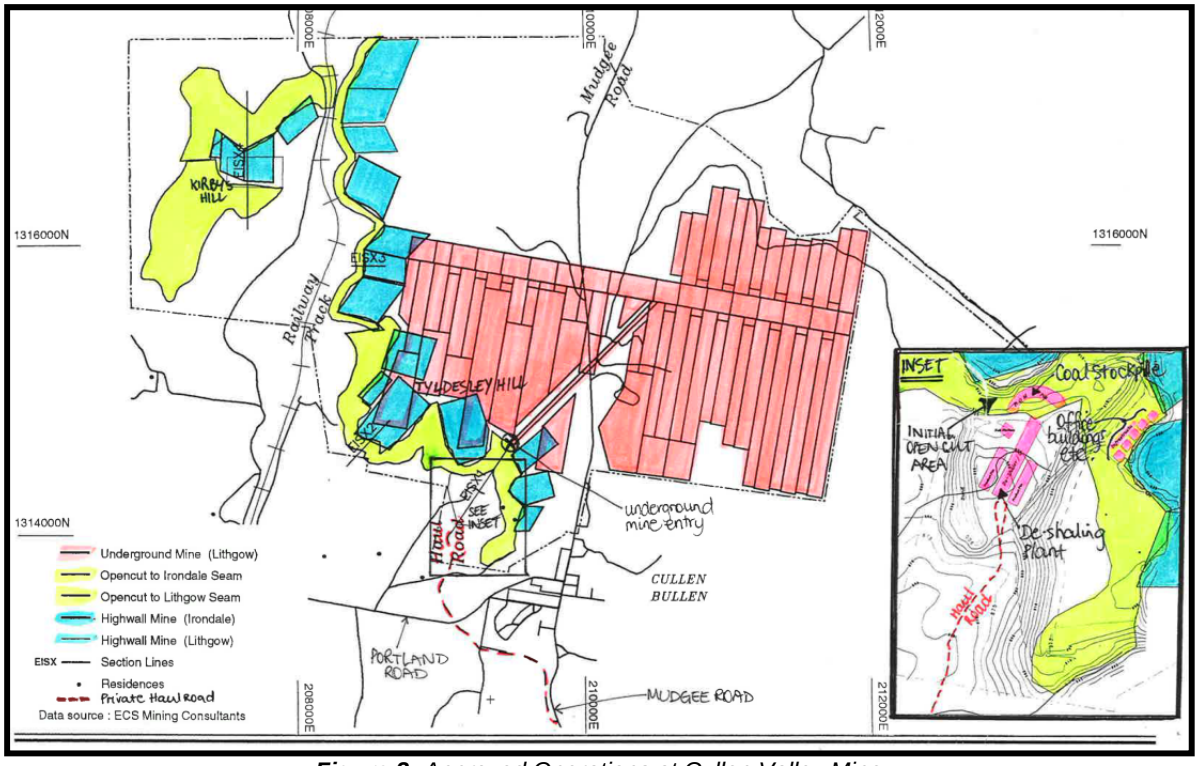

Figure 2: *Approved Operations at Cullen Valley Mine*

The Invincible Colliery has had a long history of both underground, and more recently, open cut mining. The Colliery currently operates under a 2008 Ministerial approval (PA 07_0127), which allows Coalpac to:

- extract up to 1.2 Mtpa of coal using open cut and high wall mining methods; and
- transport this coal via public roads to the nearby power stations and other customers.

Although the project approval lapses in December 2016, accessible coal reserves at the mine were recently exhausted and the mine has also been placed on care and maintenance.

While many parts of the mine sites have been rehabilitated, there are still significant areas where rehabilitation is yet to occur. This includes 6 final voids – 3 at the Invincible Colliery and 3 at the Cullen Valley Mine (see Figures 3 and 4). There is currently insufficient overburden material on the site to properly backfill these voids and to create a suitable final landform that integrates with the surrounding landscape.

Figure 3: *Invincible Colliery*

1.2 Strategic Context

The mines are located primarily within the Ben Bullen State Forest, which has well-established native woodland and sandstone cliff lines and pagoda formations. Historically, the forest has been used for forestry and both open cut and underground coal mining at the Cullen Valley, Invincible, and Baal Bone mines. The Gardens of Stone National Park is located approximately 2 km north of the site (see Figure 1), and forms part of the Greater Blue Mountains World Heritage Area.

For many years, various community groups (including the Colong Foundation) have argued that the Ben Bullen State Forest should be protected for conservation, and form part of a larger proposal to establish the Gardens of Stone Stage II National Park. The *Advisory Committee for the Greater Blue Mountains World Heritage Area* (which provides advice to the State and Commonwealth Environment Ministers on matters relating to the protection, conservation, presentation and management of the Greater Blue Mountains World Heritage Area) has also formally recommended to both the NSW and Commonwealth Environment Ministers that the Gardens of Stone Stage II National Park proposal be accepted, and the area protected as a matter of priority.

The Office of Environment and Heritage (OEH) has advised the Department that the Ben Bullen State Forest has significant conservation value, and is a suitable candidate for future reservation under the *National Parks and Wildlife Act 1974*. However, the area also has substantial coal resources, and at this stage there is no formal proposal by the NSW Government to gazette the area as a National Park.

The nearest residential area to the mines is the village of Cullen Bullen. It is located between the Invincible and Cullen Valley mines, and has a population of around 200. There are also a number of rural and rural-residential properties to the north and west of the both mines.

Coalpac has purchased a number of properties around the mines to provide a buffer from the amenity impacts of mining, and is proposing to revegetate and manage some of these properties for conservation purposes (see Figure 5).

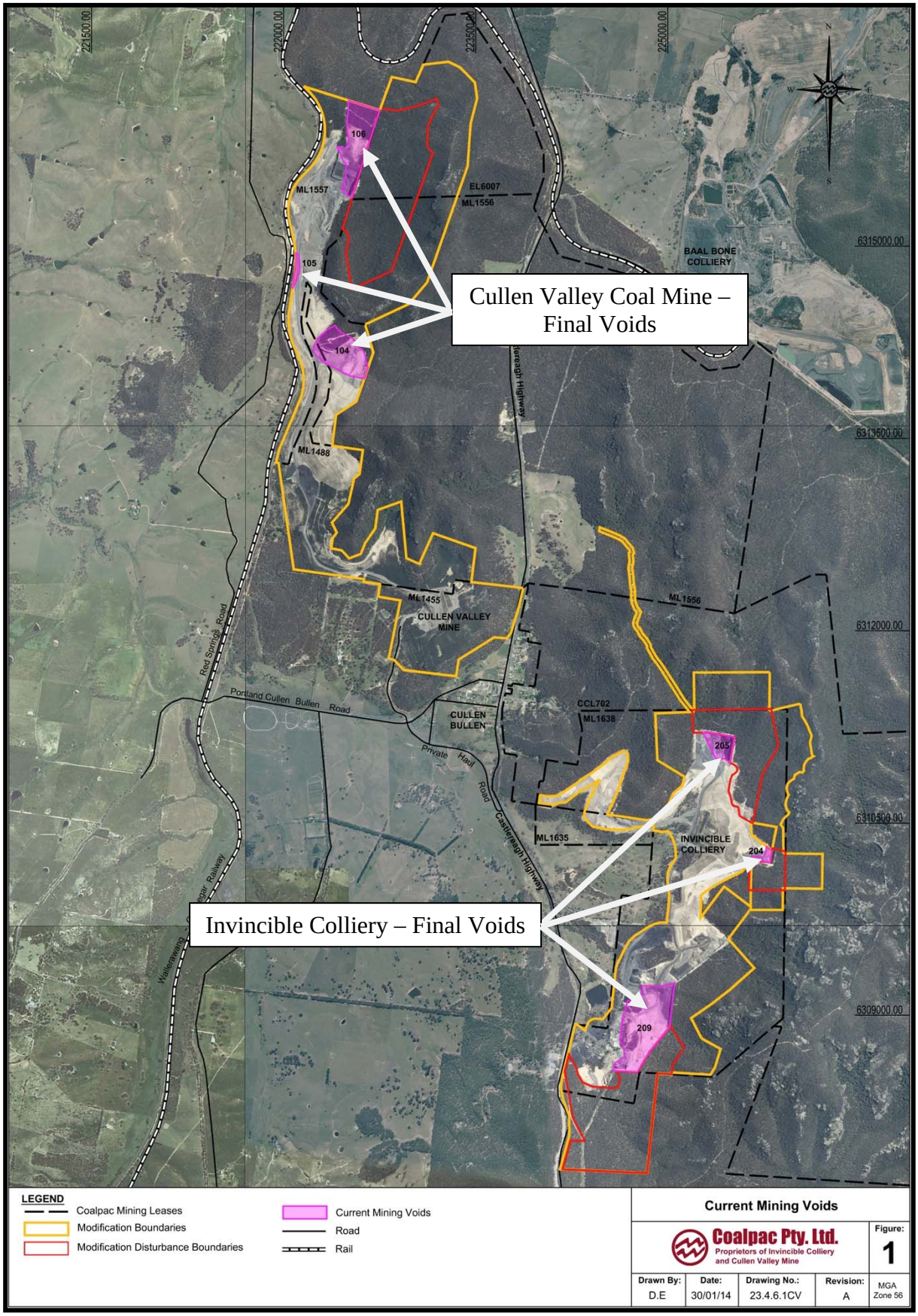

Figure 4: *Invincible Colliery and Cullen Valley Mine – Final Voids*

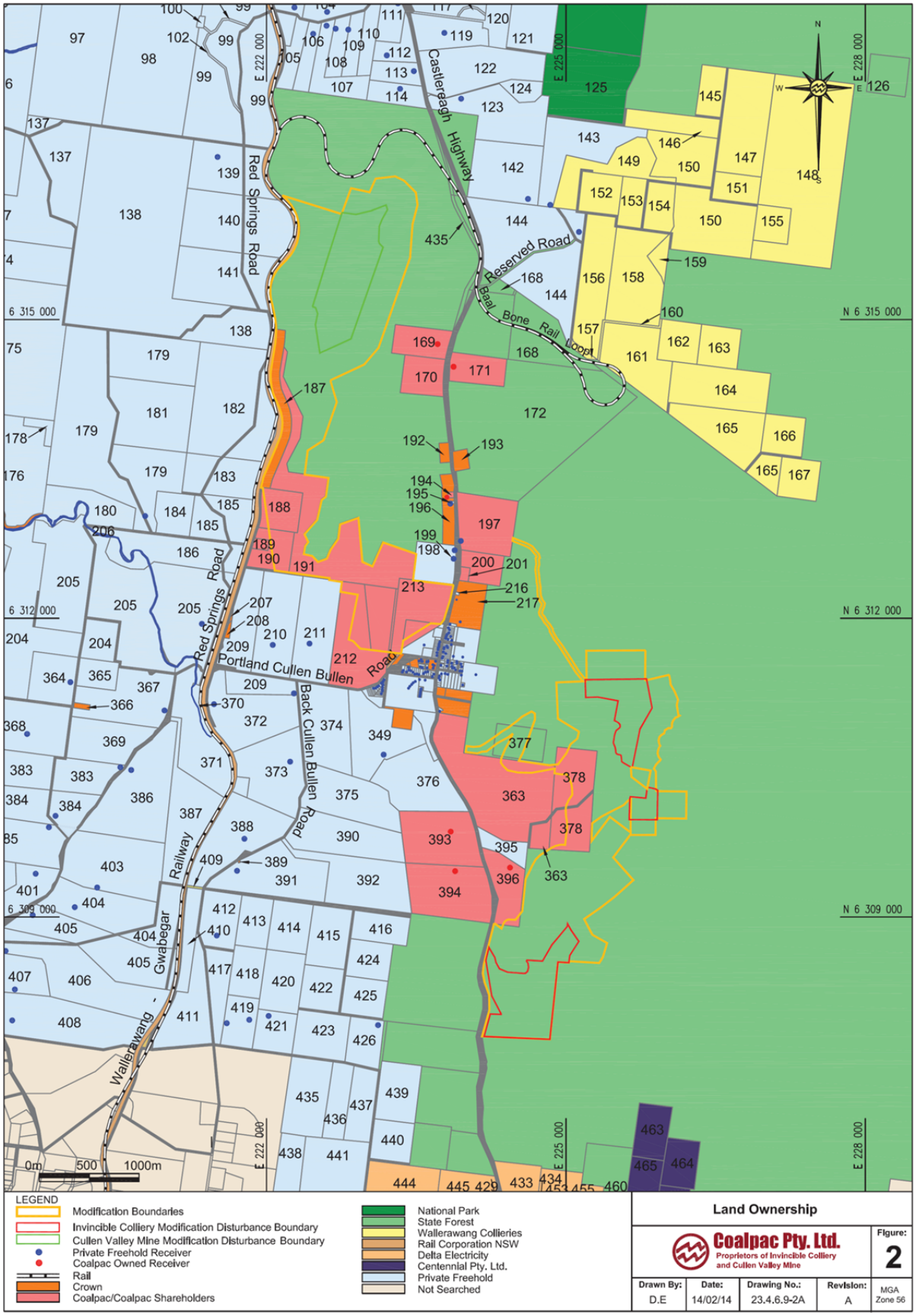

Figure 5: *Land Ownership*

Other major land uses in the area include agriculture and electricity generation. The majority of agricultural land in the area is of relatively low capability, and is predominately used for low intensity grazing. No areas of Biophysical Strategic Agricultural Land (BSAL) have been identified either on, or in the immediate vicinity of, the mines. Coalpac has obtained a "Site Verification Certificate" from the Secretary of the Department confirming this is the case.

The nearby Mount Piper and Wallerawang coal fired power stations owned by Energy Australia, are located approximately 4 km and 10 km (respectively) south of the project site. These power stations represent around 14% of NSW's installed electricity generation capacity, and rely solely on coal supplied from coal mines in the immediate vicinity. There is limited opportunity to economically supply coal to the power stations from other coalfields due to competition from coal exports and the high cost of constructing the necessary infrastructure that would be required to transport coal to the area.

This has created an important strategic inter-dependence between coal mining and electricity generation in the area over many decades. In 2011, approximately 7% of the population in the Lithgow LGA was employed in the mining industry (compared to the State average of between 1 and 2%).

There are currently 10 existing and proposed coal mines in the region, most of which are underground mines. Many of these mines are not operating at the present time, and Energy Australia currently has to source almost all its coal (i.e. up to 6 Mtpa) from the Angus Place and Springvale underground mines, both of which are owned and operated by Centennial Coal.

Prior to the Invincible Colliery and the Cullen Valley Mine being placed on care and maintenance, these mines supplied approximately 2 Mtpa to the power stations (i.e. around 30% of the total annual coal supply requirements).

1.3 Coalpac Consolidation Project

On 29 October 2010, Coalpac submitted a project application for a major expansion of the Invincible Colliery and Cullen Valley Mine, known as the "Coalpac Consolidation Project". The project involved the expansion of mining areas into the Bullen Bullen State Forest, including a disturbance area of almost 800 hectares (ha).

The project was amended on a number of occasions during the assessment process to reduce the potential impacts of the project on pagoda rock formations and the associated slopes, particularly in the area west of the existing Invincible Colliery. The final iteration of the project, as shown in Figure 6, would have recovered approximately 96 Mt of coal and would have extended mining operations for 21 years.

The project was reviewed by the NSW Planning Assessment Commission (PAC), which recommended that the project should not be approved due to its unacceptable impacts on regional biodiversity values, the internationally significant rock pagodas that occur near the site, and the amenity of the residents in Cullen Bullen (i.e. noise, dust and blasting impacts).

After assessing the merits of the project, and considering the findings of the PAC, the Department concluded that the site was unsuitable for such a large and elongated open cut coal mine, as it would destroy the significant conservation values of the area, and recommended that the project be refused.

Nevertheless, the Department acknowledged that there could be some merit in allowing a smaller extension that would avoid the more sensitive parts of the site, as this would enable some of the remaining coal reserves to be extracted and the existing mining voids to be filled and appropriately rehabilitated.

On 16 October 2013, Coalpac formally withdrew its application for the Coalpac Consolidation Project prior to it being determined by the PAC.

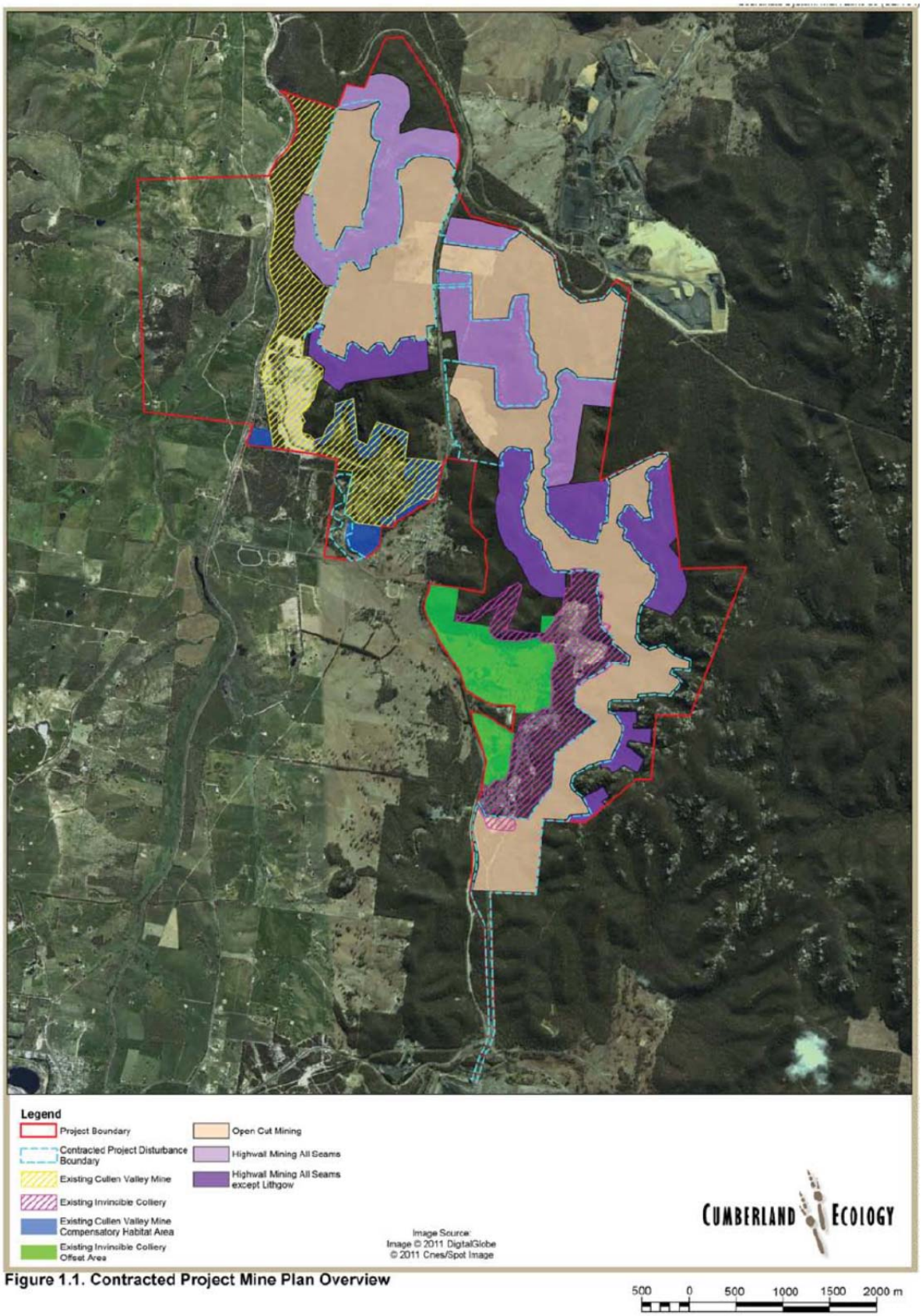

Figure 6: *Coalpac Consolidation Project*

2. PROPOSED MODIFICATIONS

Coalpac is now seeking to modify the consents for the Cullen Valley Mine and Invincible Colliery to allow an extension of mining operations (see Figures 7 and 8).

The modification to the *Invincible Colliery* involves:

- extending the life of the project by 4 years until December 2020;
- extending the area approved for open cut and highwall mining by 88 ha and 86 ha respectively;
- constructing a water pipeline to enable transfer of water to and from the Cullen Valley Mine; and
- progressively rehabilitating the site.

The modification to the *Cullen Valley Mine* involves:

- extending the area approved for open cut and highwall mining by 62 ha and 79 ha respectively;
- transferring water to and from the Invincible Colliery; and
- progressively rehabilitating the site.

These expansions would allow Coalpac to access a coal resource of approximately 9 million tonnes, and provide employment for approximately 80 people for up to 6 years (i.e. until 2020). The modifications would also allow Coalpac to rehabilitate the existing mining voids at both mines, creating a free draining final landform that blends in with the surrounding landscape.

The proposed modifications would result in additional disturbance of 150 ha of native vegetation within the Ben Bullen State Forest. To compensate for the loss of this vegetation, Coalpac is proposing to implement a comprehensive biodiversity offset strategy comprising both onsite and offsite offsets, which would protect and conserve more than 1,400 ha of land (see Figure 9).

The modifications do not involve any other significant changes to the mines as currently approved, and there would be no change to:

- the approved production limit which would remain at a total of 2.2 million tonnes of ROM coal a year (1.2 Mt from the Invincible Colliery and 1 Mt from Cullen Valley);
- coal extraction methods and coal processing;
- the approved operating and transportation hours;
- the number of people employed at the mines; and
- the use of trucks to transport product coal via the Castlereagh Highway to the power stations and other domestic customers.

All the land subject to the modification applications is owned by Coalpac, subject to an agreement with Coalpac, or located on land within the Ben Bullen State Forest. Coalpac has a draft agreement with the Forestry Corporation NSW regarding the proposed modification area which will be finalised and executed if the modifications area approved. It is noted that NSW Trade & Investment (which incorporates Forests Corporation NSW) has been consulted by the Department and has not objected to the modifications.

The modifications are described in full in the Environmental Assessment (EA) for the modifications, which is attached as Appendix C.

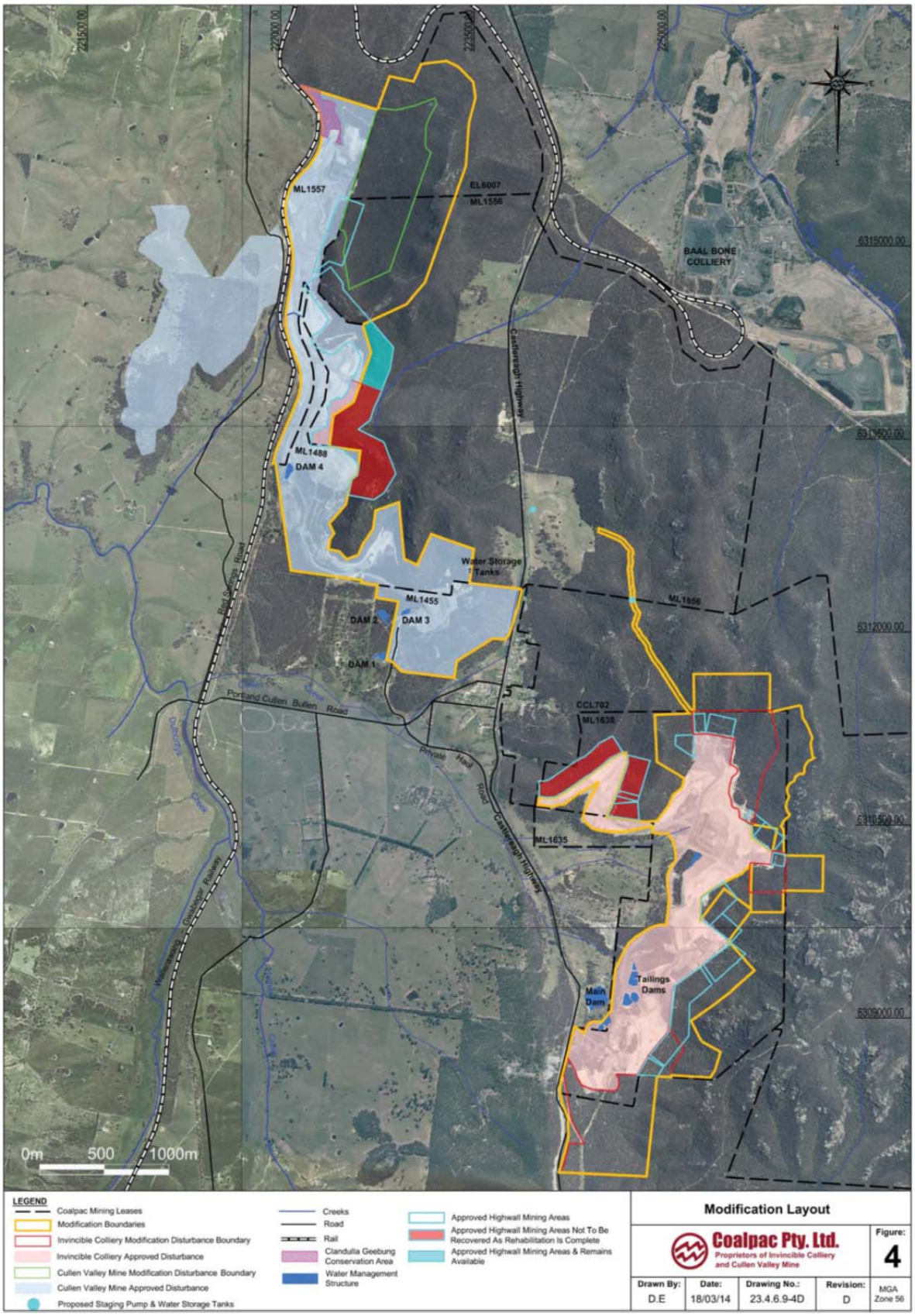

Figure 7: *Proposed Modifications*

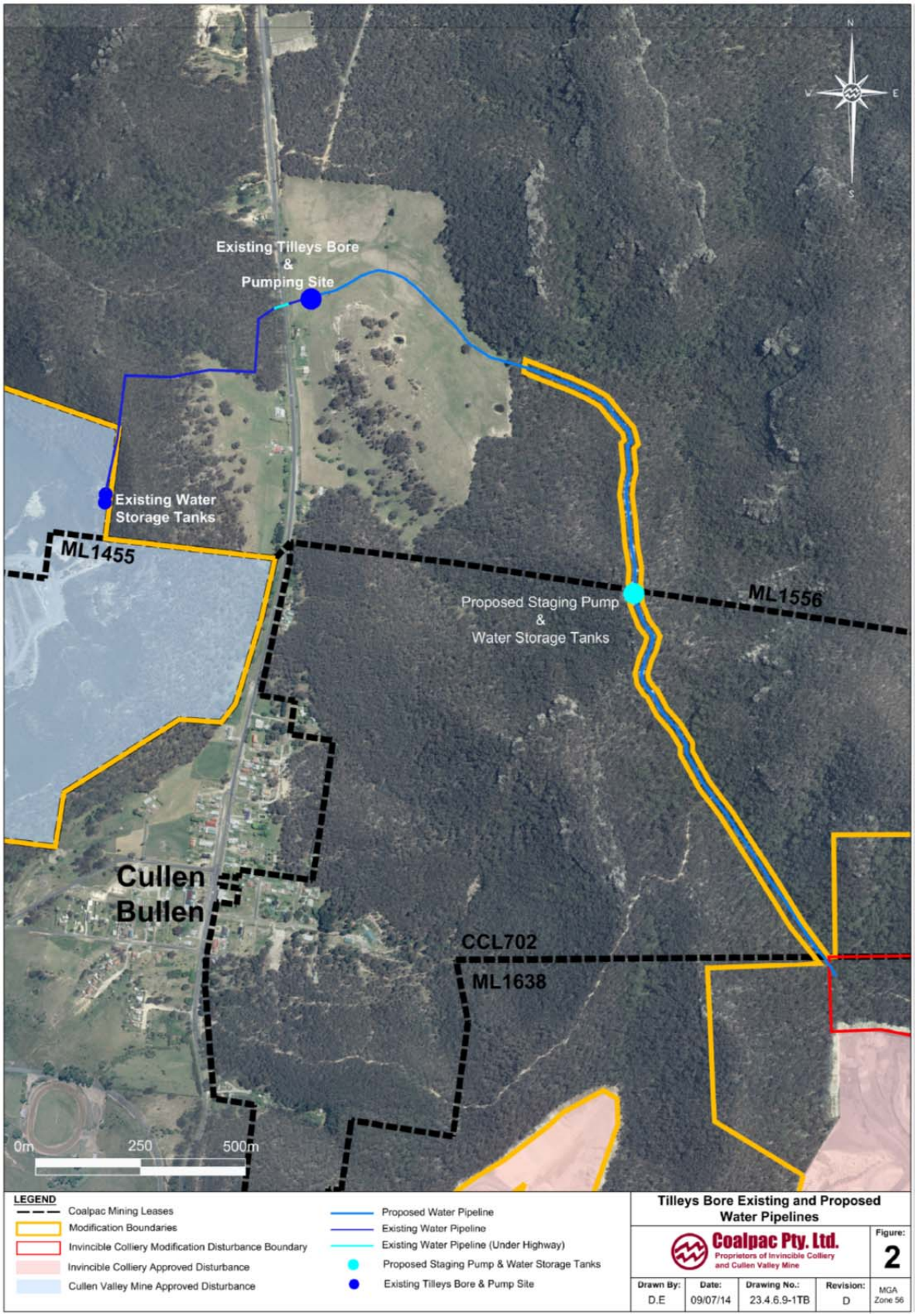

***Figure 8**: Existing and Proposed Water Pipeline Alignment*

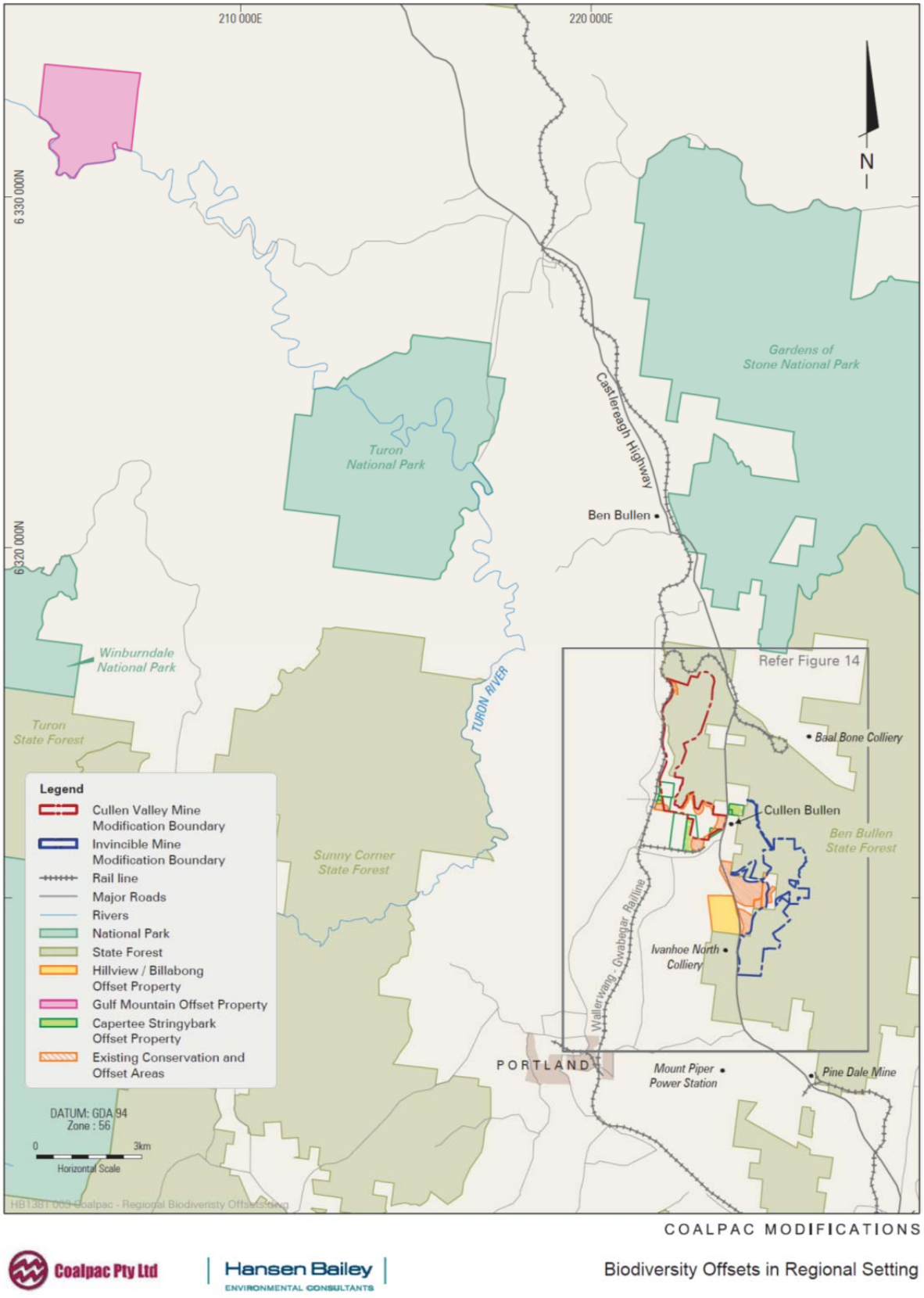

***Figure 9**: Proposed Onsite and Offsite Biodiversity Offsets*

3. JUSTIFICATION FOR THE MODIFICATIONS

Coalpac has mounted several arguments to justify the modifications.

3.1 Coal Supply

The primary need for the modifications is to ensure the short-term supply of competitively priced coal to the nearby Energy Australia power stations while longer-term strategies for coal supply can be explored.

As mentioned above, the power stations require up to 6 Mt of coal a year to generate electricity (Mount Piper ~ 4 million tonnes and Wallerawang ~ 2 million tonnes each year). Together these power stations generate up to 2400 MW, which represents approximately 14% of installed electricity generation capacity in NSW. Mount Piper in particular is one of the most efficient base load coal fired power stations in NSW, and is likely to keep operating for at least another 20 years in accordance with the agreement between the NSW Government and Energy Australia, which lapses in 2043. The Wallerawang power station is currently not operating, but Energy Australia has indicated it may recommence operations in the future.

Coalpac currently has a contract to supply up to 2.5 million tonnes of coal to the Mount Piper power station until 2029, which represents around 60% of Mount Piper's coal supply needs over this period. While the proposed modifications would only provide a small fraction of the coal required under this contract, it would enable Energy Australia to diversify its coal supply to the power stations.

As described above, Energy Australia is currently reliant on coal supplied from the Angus Place and Springvale mines, both of which are owned by Centennial Coal. The withdrawal of the larger Coalpac Consolidation Project, and recent cessation of mining at both Invincible and Cullen Valley, have created a virtual monopoly for Centennial in supplying coal to the power stations.

Further, Centennial is currently upgrading the Lidsdale Coal Loader could decide to export a greater proportion its coal from the mines in the vicinity of the power stations. This means Energy Australia may have to compete against the export price of coal (which is generally significantly higher than coal used for domestic power generation) to secure future supply contracts with Centennial. Consequently, unless short-term alternatives are available or there is greater competition for coal supply to the power stations, Energy Australia may have to pay a significantly higher price for its fuel supply than has historically been the case.

Certainly, in 2013 Energy Australia advised the Department that it would cost approximately 30% more to source coal from Centennial rather than Coalpac. It also provided independent modelling that indicated this could increase retail electricity prices in NSW by between 4 and 12%.

Whether this would actually occur is a complex matter. Nevertheless, the Department accepts that the proposed modifications would reintroduce some diversity into the coal supply chain for Energy Australia, albeit only for a few years, and could help to reduce the risk of retail electricity price rises in the short term.

3.2 Economic Benefits

Coalpac claims the proposed modifications would result in a number of economic benefits for the region and NSW as a whole. These benefits include:

- creation of 80 direct jobs and up to 165 indirect jobs in the region for up to 6 years;
- $155 million in savings for Energy Australia in the form of lower priced coal and flow-on benefits to consumers; and
- $29 million in royalties for the NSW Government and $11 million in company taxes to the Commonwealth Government to fund the provision of government infrastructure and services to the broader community.

The EA includes a cost-benefit analysis prepared by Gillespie Economics. This analysis includes sensitivity testing (+/- 10%) to account for changes to some of the fundamental inputs that may occur over time (such as the price of coal).

Even using worst-case assumptions, the analysis calculates that the modifications would generate a total net production benefit of more than $200 million for Australia.

Coalpac has also offered to enter into a Voluntary Planning Agreement (VPA) with Lithgow Council to contribute towards projects that would benefit the local community. The offer involves making an initial payment to Council of $30,000, followed by 7 cents per tonne of coal sold by the Coalpac over the life of the project (equivalent to around $150,000 a year or a total of more than $600,000).

3.3 Mine Design

Coalpac claims it has incorporated a number of measures into the proposed mine design to minimise the environmental impacts of the proposal. These measures include:

- confining open cut mining to areas immediately adjacent to the existing voids to facilitate efficient backfilling;
- maximising the area of highwall mining to minimise the area of surface disturbance;
- incorporating a significant buffer between the open cut mining and the significant pagoda formations near the site;
- avoiding areas where threatened flora species occur (e.g. *Clandella geebung* in the northern part of the Cullen Valley site);
- creating a free-draining final landform that is representative of pre-mining conditions, and is compatible with the surrounding landscape of the Ben Bullen State Forest;
- progressively rehabilitating the site with suitable native species to create 664 ha of woodland; and
- implementing a comprehensive biodiversity offset strategy, which involves the protection and enhancement of 1,400 ha of land to compensate for the residual flora and fauna impacts of the modifications.

Coalpac also claims that the coal at Cullen Valley is of relatively poor quality, and needs to be blended with the coal extracted from the Invincible Colliery to meet Energy Australia's specifications. Consequently, the Cullen Valley proposal is to a large extent dependent on the Invincible proposal.

4. STATUTORY CONTEXT

4.1 Section 75W

Prior to the repeal of Part 3A in 2011, Clause 8J(8) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) allowed a development consent for State Significant Development that was granted under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) before 1 August 2005 to be modified under Section 75W of the EP&A Act.

Following the repeal of Part 3A, these arrangements continue under the transitional provisions in Schedule 6A of the EP&A Act.

As the Cullen Valley Mine was classified as State Significant Development pursuant to Section 76A of the EP&A Act (as it was then), and the development consent for the mine was granted before 16 December 2004, the transitional arrangements in Schedule 6A of the EP&A Act apply and the development consent may be modified under the former Section 75W of the EP&A Act.

The Invincible Colliery was approved under Part 3A of the EP&A Act, and is also subject to the transitional arrangements in Schedule 6A of the EP&A Act. Consequently, the proposed modification of the project approval can also be determined under the former Section 75W of the Act.

The Department is satisfied that both applications can be characterised as modifications to the existing consents/approvals, and may be determined under the former Section 75W as they involve relatively minor extensions to the approved operations, and would not result in changes to the:

- approved production limits of the two mines;
- approved operating and transportation hours; and
- mining, processing, or transportation methods at both mines.

4.2 Approval Authority

Under Section 75W of the EP&A Act, the Minister for Planning is the approval authority for the modification applications. However, under the Minister's delegation of 14 September 2011, the PAC must determine the applications. This is because there were more than 25 public submissions objecting to each of the modifications.

4.3 Integrated and Other Approvals

Under Section 75U of the EP&A Act, a number of approvals have been integrated into the Part 3A approval process and are not required to be separately obtained. These include:

- heritage related approvals required under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977*; and
- some water related approvals under the *Water Management Act 2000*.

Under Section 75V of the Act, a number of further approvals are required to be obtained, but must be approved in a manner that is consistent with any Part 3A approval. This includes variations to the existing environment protection licence under the *Protection of the Environment Operations Act 1997*.

However, it is important to note that even though the Cullen Valley development consent (DA 200-5-2003) may be modified under the provisions of the former Part 3A, under the transitional arrangements under Schedule 6A of the EP&A Act (see above), it would remain a Part 4 development consent. Further, while the exemptions (under Sections 75U & V) apply to the Invincible modification, they do not apply to the Cullen Valley modification. Consequently, in addition to securing planning approval for the Cullen Valley modification under the EP&A Act, Coalpac will require separate approvals for those matters that are normally integrated into the Part 3A approvals process.

The Department has considered the matters relevant to these integrated and other approvals further in Section 6 below.

4.4 Environmental Planning Instruments

The Department has considered the project against the relevant provisions of several Environmental Planning Instruments (see Appendix B), as well as Coalpac's consideration of these instruments in its EA. Based on this consideration, the Department is satisfied that these instruments either do not apply to the proposed modifications or substantially govern the carrying out of the proposals.

On 4 November 2013, the NSW Government amended the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) to clarify the decision-making process for proposals for the mining of mineral resources, including coal.

The amendment introduced a clear statutory requirement that the consent authority must consider the significance of the resource, both to the State and the region where it is located, as part of its decision-making process. While the amendment made clear that the significance of the resource is an important factor in the decision-making process, it is not the only factor, and environmental, social and economic impacts continue to be significant considerations. While the amendments to the Mining SEPP do not strictly apply to modifications, the Department has included consideration of the significance of the coal resource in its assessment (see Section 3 above).

4.5 Site Verification Certificate

Under Clause 50A 2(b) of the EP&A Regulation, an application for a mining development on land that is covered by the Strategic Agricultural Land Map is required to be accompanied by a gateway certificate or a site verification certificate issued by the Secretary of the Department certifying that the subject land does not contain BSAL. In this case, both applications were accompanied by a site verification certificate that was issued in March 2014, in accordance with Clause 17C of the Mining SEPP.

5. CONSULTATION

After accepting the modification applications and accompanying Environmental Assessment, the Department exhibited the documents from 3 April 2014 until 2 May 2014:

- on the Department's website;
- at the Department's Information Centre;
- at Lithgow City Council,
- at Cullen Bullen Progress Association Hall; and
- at the Nature Conservation Council.

The exhibition was advertised in the Lithgow Mercury and the Sydney Morning Herald, and relevant State government authorities were notified of the exhibition.

In response to the public exhibition, the Department received a total of 748 submissions, including:

- 9 from public authorities;
- 21 from special interest groups; and
- 718 submissions from the public from 614 individual submitters.

In June 2014, Coalpac submitted a detailed response to the issues raised in submissions (see Appendix E), which was made publicly available on the Department's website.

The Response to Submissions (RTS) was also forwarded to public authorities to determine whether these authorities had any residual concerns about the proposal.

The Department has worked closely with the NSW Office of Environment & Heritage on the assessment of biodiversity and Aboriginal cultural heritage matters, and Departmental officers have visited the site on a number of occasions as well as the significant pagoda formations that occur in the area.

A full copy of the submissions is provided in Appendix D.

5.1 Public Authorities

In summary, none of the government authorities objected to the proposed modifications. While some of these authorities raised concerns about some aspects of the proposal, these concerns have mostly been addressed by Coalpac, either through further consultation or the provision of additional information/commitments in the RTS. Notwithstanding, some residual concerns remain.

Lithgow City Council (Council) – supported the proposal, but raised a number of concerns about ensuring proper management of dust, noise, sub-surface heating, weeds, and the potential for dirt/debris on the Castlereagh Highway associated with coal trucks entering/leaving the site. Council also requested to be consulted further during the detailed design of the northern bund at the Cullen Valley mine. The Department has recommended a range of conditions to address these residual concerns (see below).

Office of Environment and Heritage (OEH) - raised a number of concerns about the potential impacts of the modifications upon the biodiversity and geological values of the Ben Bullen State Forest. Although most of these concerns were addressed in Coalpac's RTS, OEH still has concerns about some of the setback distances from the sandstone escarpments and pagodas adjacent to the site. The Department has considered this issue further in Section 6.1 below.

Environment Protection Authority (EPA) – was satisfied that the EA adequately assessed the potential impacts of the modifications with respect to air, noise and surface water quality. The EPA considers that the proposed modifications can be suitably regulated under the existing environment protection licences (EPA) for both mines without any variations.

NSW Office of Water (NOW) - initially raised concerns regarding the level of assessment of groundwater-related impacts. These concerns have now been addressed, and NOW has indicated that Coalpac should be required to update the existing water management plan for each mine prior to implementing the proposed modifications, and secure appropriate water licensing requirements

under the *Water Act 1912* and the *Water Management Act 2000*. The Department has incorporated these recommendations into the revised conditions for each mine.

NSW Health – Nepean Blue Mountains Health District (NSW Health) - recommended that all reasonable and feasible measures should be implemented to minimise particulate emissions, and that tenants of mine-owned residences where applicable criteria are predicted to be exceeded should be informed about the health risks of elevated concentrations of dust. NSW Health also recommended that a Noise Management Plan should be prepared to minimise impacts on the local community. The Department has incorporated these measures in the recommended conditions.

Roads and Maritime Services (RMS) – recommended that Coalpac be required to prepare and implement a driver's code of conduct, and consult with it about the proposed pipeline under the Castlereagh Highway. RMS also raised concerns about some aspects of the intersection performance of the Invincible access road and the Castlereagh Highway. Coalpac has since consulted with RMS, and agreed to make some modifications to the line markings at the intersection that are no longer required as they were associated with the former Ivanhoe North Coal Project which was located on the opposite side of the highway.

Division of Resources and Energy (DRE) – strongly supports the proposed modifications on economic grounds.

Office of Agricultural Sustainability & Food Security (NSW Agriculture) – asked for any visual impacts on surrounding agricultural properties to be kept to a minimum. The Department has recommended several conditions to ensure this occurs.

Endeavour Energy – owns and operates two 11kV power lines through the southern extension area of the Invincible Colliery that would need to be relocated if the proposal proceeds. Endeavour Energy has advised the Department that it has no objections to the proposal, and that any required works can be readily managed.

5.2 Community and Special Interest Groups

Of the 739 submissions from special interest groups and individuals, 545 objected to the proposed modifications and 194 supported the proposals.

Submissions in Support
Around 25% of the submissions supported the proposal, including 5 special interest groups (Energy Australia, Cullen Bullen Tidy Towns, Portland Newsagency, Portland District Motorsports Club, and Big Rim Pty Ltd).

Almost 50% of the submissions supporting the proposal were from the Lithgow LGA, with many of the submissions from individuals and businesses claiming to have been adversely affected in some way by the job losses following the closure of the Invincible and Cullen Valley mines. A large proportion of the remaining submissions in support were from individuals residing in the nearby Bathurst LGA.

The key reasons given to support the proposed modification related to the local and regional socio-economic benefits associated with the ongoing operations of the mines, including direct and indirect employment, and the provision of a cheap and reliable coal supply for the power stations and the associated flow-on benefits for consumers.

Objections
Of the 545 objections to the proposal, 513 were from individuals and 16 were from special interest groups.

Special interest groups that made submissions were:
- The Australia Institute;
- Bathurst Community Climate Action Network;
- Blue Mountains Conservation Society;
- Colong Foundation for Wilderness;
- Cullen Bullen Lifestyle Group;
- The Colo Committee;

- Environment Liaison Officer;
- Greens NSW;
- Hawkesbury Environment Network;
- Hornsby Conservation Society;
- Lithgow Environment Group;
- Nature Conservation Council;
- NSW Heritage Network;
- Rivers SOS;
- Parramatta Climate Action Network; and
- Stop Coal Seam Gas Blue Mountains.

Approximately 50 of the objections were from the Lithgow LGA, including approximately 16 from the nearby township of Cullen Bullen. The remainder were predominantly from the Blue Mountains LGA and the greater Sydney region.

The issues raised by special interest groups largely mirrored the public submissions, and can be summarised as follows:

- ***Biodiversity and Geological Values*** – the majority of objections raised concerns about the proposal to mine within the Ben Bullen State Forest, including potential impacts to the scenic and geological values associated with the pagoda landforms and tablelands grassy woodland complex. Concerns were raised that the proposal fails to provide a 300 m buffer from open cut mining and the base of the pagoda formations as recommended by the PAC in its review of the Coalpac Consolidation Project. A number of other concerns were raised regarding impacts to threatened flora and fauna, EECs, and the adequacy of the biodiversity offset strategy;
- ***Socio-economics*** – many of the objections claimed that the socio-economic benefits have been overstated, and that the proposal is not necessary to ensure affordable electricity generation for NSW consumers;
- ***Amenity and Health*** – the majority of objections also raised concerns about the impact of dust and noise emissions on the town of Cullen Bullen, including potential health risks to the community;
- ***Water Resources*** – objections were raised about the proposed increase in water being used by the mining industry in the region, and the potential impacts on local aquifers and groundwater bores;
- ***Rehabilitation*** – many of the objections raised concerns about the lack of progress of rehabilitation on the site, and that the voids and highwalls have deliberately not been fully rehabilitated as an excuse to allow further mining on the site; and
- ***Aboriginal Heritage*** - concerns were raised about the quality of the Aboriginal cultural heritage assessment, and that the significance of a rock art site near the Cullen Valley mine has not been adequately assessed.

The Department has considered the issues raised in these submissions during its assessment of the merits of the proposal and in Section 6 below.

6. ASSESSMENT

During its assessment of the merits of the proposed modifications, the Department has considered:

- the EA, submissions, and the RTS;
- the existing conditions for the Invincible Colliery and Cullen Valley Mine;
- the provisions of relevant EPIs, policies and guidelines; and
- relevant provisions of the EP&A Act, including the objects of the Act.

Following this assessment, the Department considers the key issues associated with the proposed modifications to be the potential impacts on the regional landscape and geo-heritage; biodiversity values; water resources; and the amenity of local residents.

6.1 Landscape and Geo-Heritage

The significance of the landscape and geo-heritage values associated with the rock pagodas and escarpments of the Ben Bullen State Forest and nearby National Parks and World Heritage Areas was canvassed in detail in the Department's assessment of the Coalpac Consolidation Project.

In summary, this assessment considered that the rock pagodas adjacent to the site form part of an internationally significant landscape that should be conserved and protected from the impacts of mining.

In light of this, the Department concluded that the extent of the open cut mining associated with the Coalpac Consolidation Project was fundamentally incompatible with preserving the significant conservation and landscape values of the area as a whole, and hence recommended that the proposal should not proceed.

However, it is important to note that the Coalpac Consolidation Project comprised a non-conventional open cut mine along the valleys and slopes between the rock escarpments with a perimeter of more than 40 km.

It involved the removal of almost 800 ha of high quality remnant native woodland representing around 11% of the entire Ben Bullen State Forest. By contrast, the current modifications would remove 150 ha of vegetation, all of which is immediately adjacent to existing areas of open cut mining.

Further, under the Coalpac Consolidation Project open cut mining was proposed within 50 m of the pagodas and escarpments. By contrast, Coalpac is now proposing (with some exceptions) to leave a buffer of around 300 metres between open cut mining at the Invincible Colliery and the significant pagodas to the east of the site (see Figure 10), which is in line with the buffer recommended previously by the PAC. However, at the Cullen Valley Mine open cut mining is proposed within 100 m of the escarpment.

OEH has raised concerns about the proximity of both open cut and highwall mining to mapped 'geodiversity' features in the northern portion of the Invincible extension area and at Cullen Valley (see Figures 11 and 12).

According to Coalpac, these buffer areas have been based on the relative significance of the various rock features adjacent to the mines, and the 300 m buffer at Invincible is designed to provide greater protection to the largest and most spectacular pagodas to the east of the mine (which it refers to as 'Significant Pagoda Landform'). Further, the Department notes that Coalpac has used the term 'escarpments' in its assessment to capture the larger cliff-lines and pagoda formations in the area, as opposed to 'geodiverse' features, which would include some smaller and more isolated rock features.

The Department accepts that the conservation significance of the rock formations does vary, and that the OEH mapping does not distinguish between these variations. The Department also notes that the rock features throughout this area form part of the 'Pagoda Country' landscape complex mapped by Washington & Wray (2011) which covers approximately 60,000 ha.

In this context, the Department believes it is reasonable to adopt a risk-based approach to the assessment of impact where the buffer distance should be adjusted to match the size and significance of the rock features.

The adequacy of the setbacks proposed by Coalpac is considered further below.

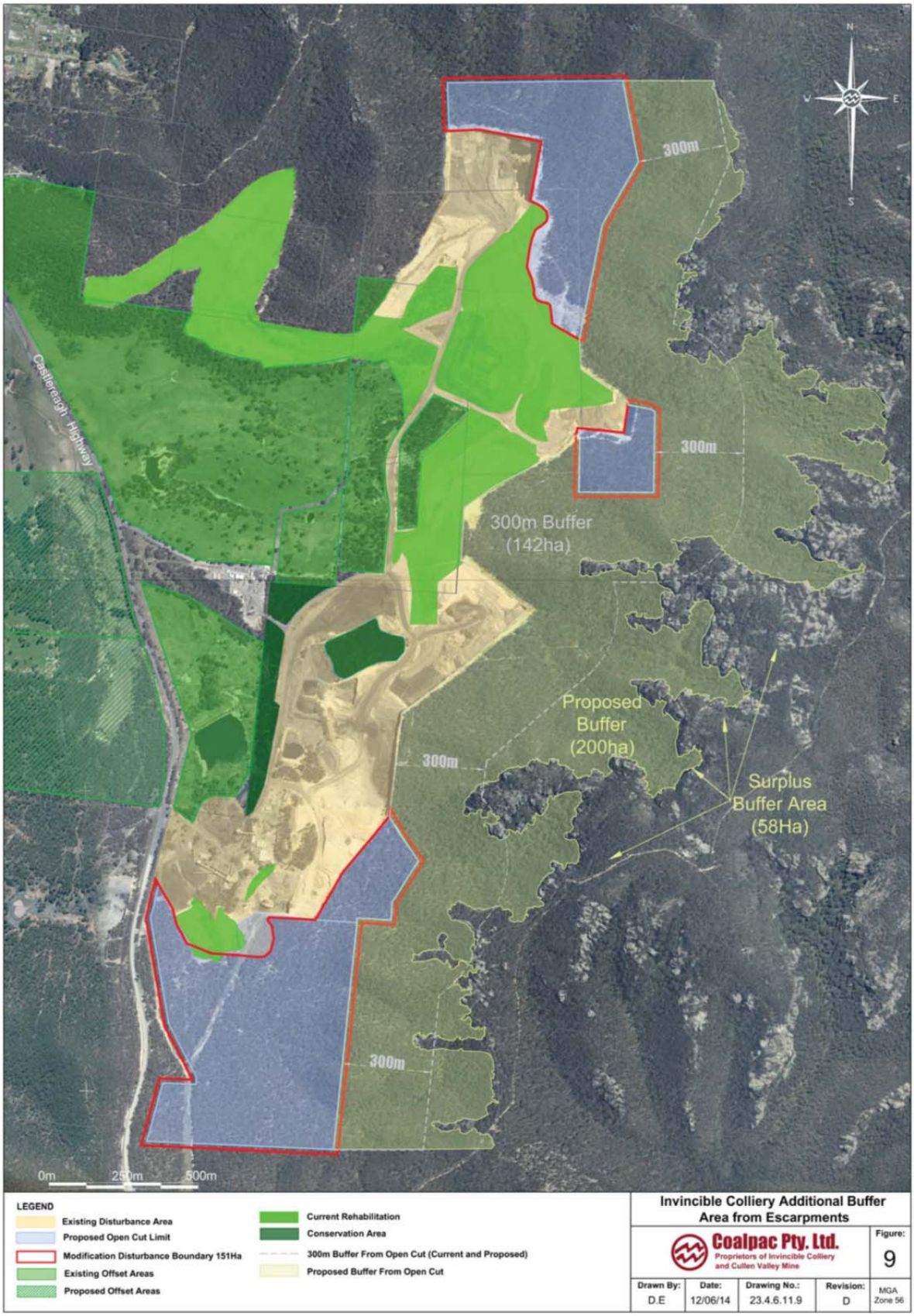

***Figure 10**: Setback from Significant Pagoda Formations*

***Figure 11**: Setback from Mapped Geodiverse Features - Invincible*

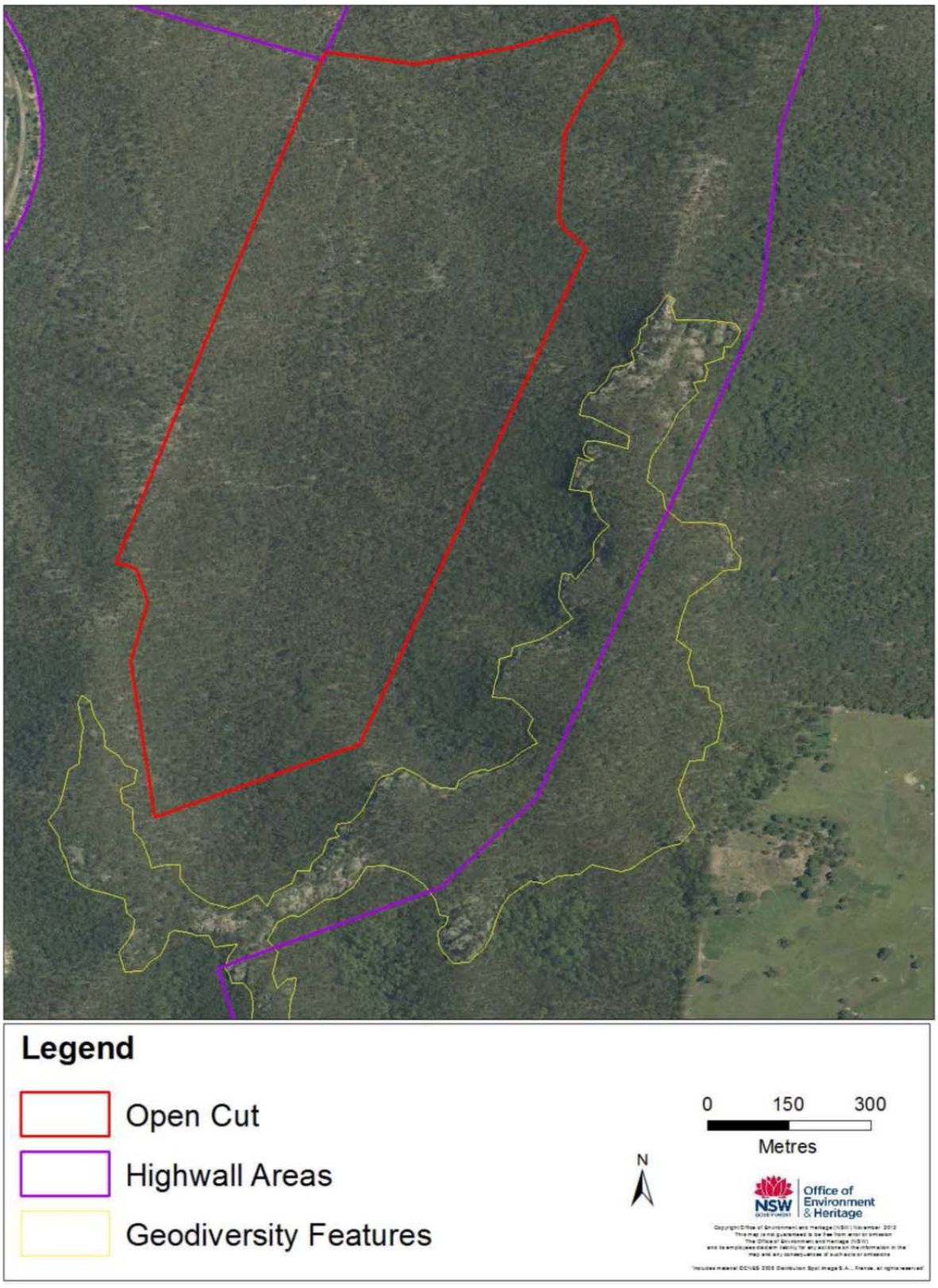

***Figure 12**: Setback from Mapped Geodiverse Features – Cullen Valley*

Risks to Pagodas

The risks to the pagodas and associated landscape can be considered in 3 broad categories:

a) *Structural Integrity* - potential risks to the structure of the pagodas and escarpments as a result of:
   - blasting;
   - instability associated with open cut mining on the slopes beneath the pagodas; and
   - subsidence associated with highwall mining in the vicinity of the pagodas;

b) *Landscape Values* - potential impacts on the visual landscape values associated with the pagoda landform; and

c) *Biodiversity* - potential risks to the flora and fauna that rely on the habitat created by the pagoda landform and associated slopes.

The risks to the structural integrity and landscape values are considered below, and matters associated with biodiversity are considered further in Section 6.2.

a) Structural Integrity

In considering whether the proposal poses a risk to the structural integrity of the pagodas and associated slopes, it is important to distinguish the risks associated with open cut mining (blasting and slope instability) from the risks posed by highwall mining (subsidence).

Coalpac claims that blasting has occurred on the site within 57 m of the escarpment with vibration up to 200 mm/s with no discernible impacts. For the modifications, Coalpac is proposing a limit of 100 mm/s for ground vibration, with a staged process that would initially adopt 50 mm/s when the open cut mining is within 200 m of the escarpment.

At the Invincible Colliery, the open cut limit would not approach within 200 m of the escarpment, but Coalpac is proposing to adopt the 50 mm/s vibration limit nonetheless. The open cut mining at Cullen Valley is proposed within 200 m, and the adaptive management approach to blasting would be adopted.

Coalpac is also proposing to implement a range of measures recommended by Terrock Consulting Engineers, including undertaking a baseline geotechnical inspection of the escarpment prior to blasting within 200 m.

Based on past experience, the technical advice from Terrock Consulting, and the fact that there is considerable scope to control the impacts of blasting by design (through, for instance, minimising the size of charges used in the blast), the Department considers Coalpac's proposed adaptive management regime to be reasonable.

However, given the significance of some of the rock formations in question, the Department believes Coalpac should be required to maintain a buffer of at least 100 metres between any open cut mining and the geodiverse features mapped by OEH (i.e. the yellow line shown on Figures 11 and 12). This will reduce the risks associated with blasting close to the rock formations, and require some coal to be sterilised at the Cullen Valley mine.

Further, the Department does not think that it is appropriate to rely on specific vibration limits to control the impacts of the proposal on these rock formations, as the structural stability of these formations can vary quite significantly from one formation to the next. Consequently, the Department believes that Coalpac should be required to ensure that the blasting on site has no more than a negligible impact on the structural stability of any of these rock formations. This would make Coalpac responsible for ensuring an acceptable outcome is achieved, rather than relying on any specific vibration limits to try and control the impacts on any blasting on site.

The Department has recommended conditions to ensure this occurs.

While some people may argue that Coalpac should be required to have zero impact on the adjoining rock formations, the Department does not consider the imposition of such a performance measure to be reasonable in this instance given the fact there may be changes to the structural stability of some of these rock formations due to natural processes, and it will be hard to distinguish whether any changes in the future have occurred as a result of natural process or blasting on the site.

A number of slope stability studies were prepared for the Coalpac Consolidation Project (SCT Operations 2012 and GeoTek Solutions 2013).

The GeoTek study examined a near worst-case scenario with the highwall only 60 m from the base of the highest rock escarpment. The study found that even under these worst-case conditions, the Factor of Safety (FoS) would be well within acceptable levels.

Given that the Department is recommending open cut mining be restricted to within 100 m of any escarpment or pagoda formation, it is satisfied that the modifications would not pose any significant risk to the stability of the slopes beneath these features.

As can be seen in Figure 13, Coalpac is proposing highwall mining up to 305 m around the majority of the proposed open cut extension area at both Invincible and Cullen Valley. While no highwall mining is proposed beneath the 'Significant Pagoda Landform' to the east of Invincible, it is proposed beneath the escarpment to the north of Invincible and to the east of Cullen Valley.

The Department notes that this type of mining can be designed so that it does not result in any measurable subsidence, and hence no discernible impacts on the stability of the pagodas themselves (see Figure 14).

This can be achieved by ensuring that the frequency and width of the barrier coal pillars left in place between the extraction drives are sufficient to remain long term stable. In fact, successful extraction of the coal in highwall mining relies on the stability of the overlying strata. If this collapses, the coal becomes far more difficult to extract. Highwall mining has successfully been undertaken at a number of mines around NSW without any discernible surface subsidence effects, including at Invincible and Cullen Valley.

The Department is therefore satisfied that the risk of any damage to these features as a result of highwall mining would be negligible.

Nevertheless, the Department has recommended that Coalpac be prohibited from mining within 20 metres of an Aboriginal rock art cave on the Culley Valley site (see below), and required to meet a performance measure of 'negligible damage' to all pagoda formations, cliff-lines and escarpments (which is the most stringent objective applied by the Department for mines in NSW, as there needs to be allowance for natural instability in these features).

The recommended conditions also require Coalpac to prepare and implement a detailed Extraction Plan to the satisfaction of DRE that would provide the technical details of how this would be achieved.

Overall, the Department is satisfied that the mining operations can be managed in a manner that would not pose a significant risk to the structural stability of the pagoda formations and other rock features on or near the site.

b) Landscape Values

As discussed in detail in the assessment of the Coalpac Consolidation Project, the Department considers that the aesthetic and scenic values of the pagoda landform complex are inherent to their status as natural features of 'special significance'. The aprons and slopes of the pagodas also contribute to the overall geo-heritage and scenic values of the pagodas themselves, and hence the Department believes that considering the landform as a whole is the only sensible approach to the assessment of the potential impacts of the project on pagodas.

As mentioned above, the proposed modifications would disturb a significantly smaller area than was proposed under the Coalpac Consolidation Project (150 ha compared with 800 ha), and would be located immediately adjacent to existing mining operations rather than extending several kilometres to the north of these operations.

While they would bring mining closer the larger pagoda landscape that occurs in the Ben Bullen State Forest and nearby National Parks (see Figure 15), the Department accepts that they would only affect small proportion of this larger landscape. Furthermore, the Department notes that the landscape and visual values of the landscape in the immediate vicinity of the Invincible and Cullen Valley mines, where the proposed modifications would occur, have already been affected by

existing mining operations, and that the proposed modifications would not significantly change these existing impacts.

However, this should not be seen as paving the way for a series of incremental increases to the open cut footprint of either of these mines. In its assessment of the merits of the Coalpac Consolidation Project, the Department made it clear that it considers large-scale open cut mining to be incompatible with the significant conservation values of the broader area. Nevertheless, it conceded that there may be some merit in allow a small extension of open cut mining operations at both mines in order to bring about an orderly cessation to mining and improve the rehabilitation of both sites.

In this regard, the Department notes that Coalpac proposes to progressively rehabilitate the site to woodland using suitable native species, and to create a final landform that integrates with the surrounding landscape.

While the Department does not consider that mine site rehabilitation would 'replace' the values that would be lost if mining is allowed to proceed, it is satisfied that in the long term a landscape would be created that would not preclude the future reservation of a significant proportion of the Ben Bullen State Forest as has been proposed by various groups for many years as part of the Gardens of Stone Stage II National Park.

The details of the proposed rehabilitation and final landform are discussed further in Section 6.6 below.

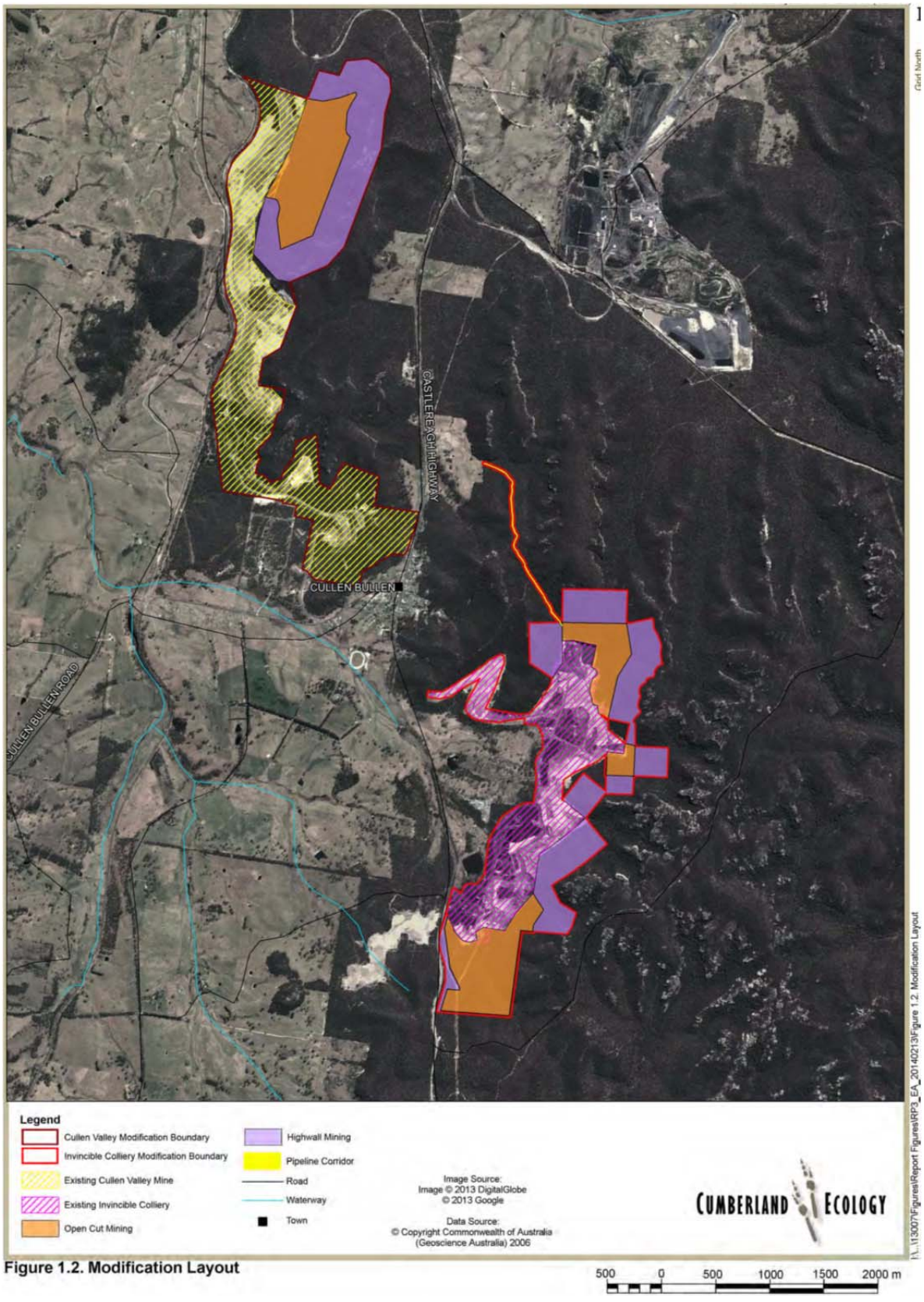

Figure 13: *Modification Layout – Including Areas of Highwall Mining*

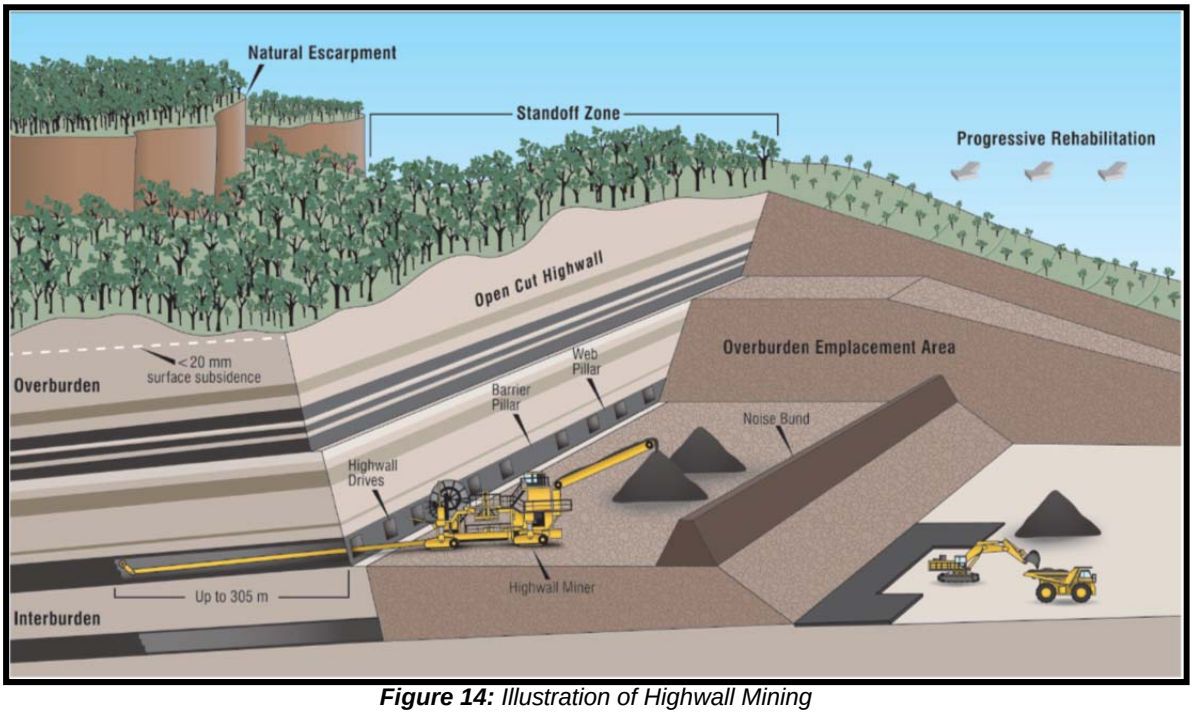

Figure 14: *Illustration of Highwall Mining*

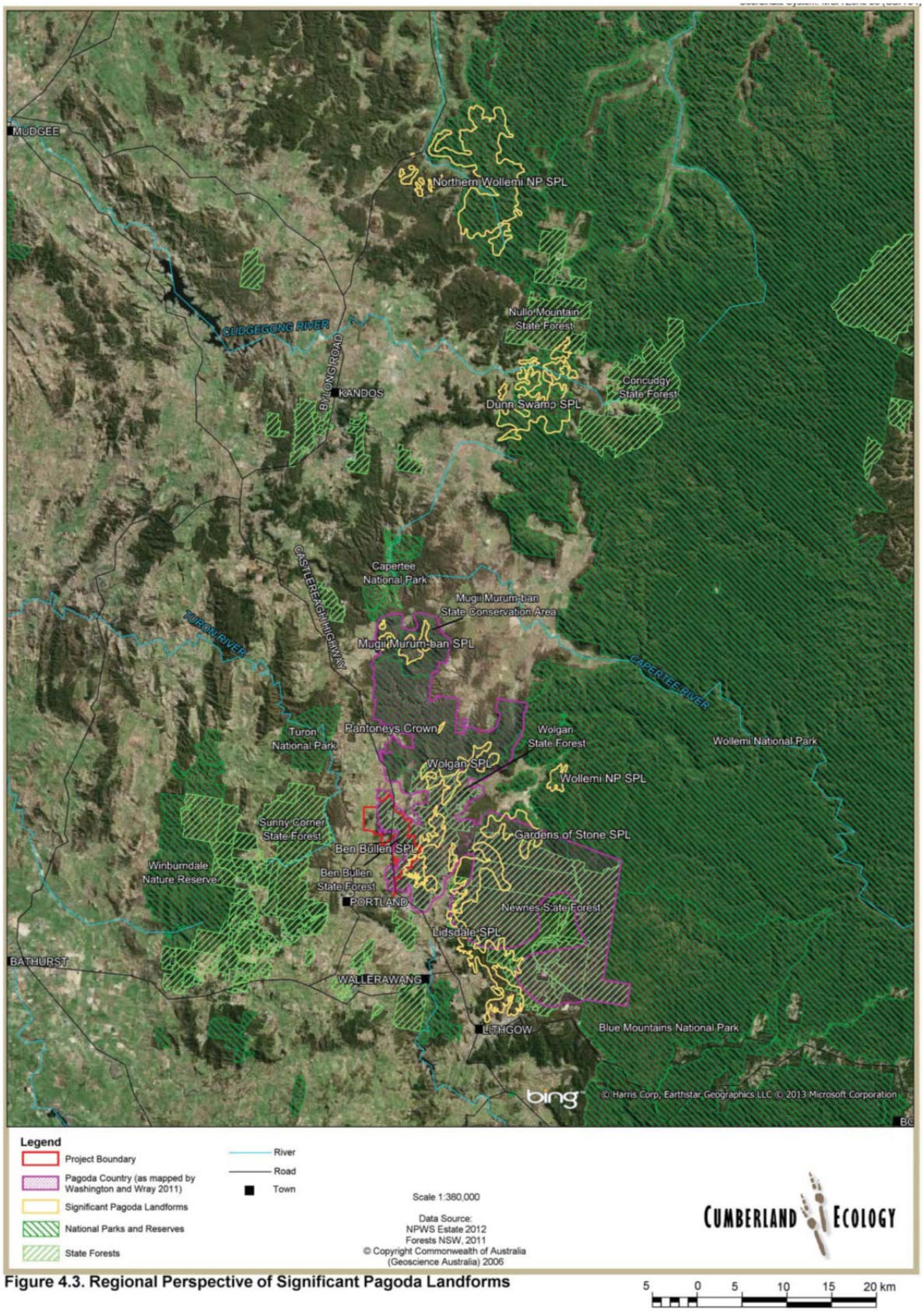

Figure 15: *Significant Pagoda Landscape (SPL) within the 'Pagoda Country' mapped by Washington & Wray (2011)*

6.2 Biodiversity

The EA contains a specialist biodiversity assessment undertaken by Cumberland Ecology that was updated in the RTS to respond directly to concerns raised by OEH. The RTS included additional flora surveys as part of a biobanking assessment undertaken by Eco Logical Australia Pty (ELA).

Flora Impacts

The proposal would disturb approximately 150 ha of native woodland within the Ben Bullen State Forest consisting of 8 vegetation types (see Table 1 and Figure 16). The disturbance footprint includes a 15 m area beyond the proposed open cut limit to account for potential indirect impacts known as 'edge effects', such as weed invasion, erosion, light, noise and dust.

Table 1: *Native Vegetation Clearing for the Modifications*

Vegetation Community	***Area (ha)***		
	Cullen Valley MOD	***Invincible MOD***	***Total***
Tableland Gully Ribbon Gum Blackwood Apple Box Forest		7.9	7.9
Tableland Scribbly Gum – Narrow-leaved Stringybark Shrubby Open Forest	34.8	0.4	35.2
Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest	21.7	37.7	59.4
Tableland Gully Mountain Gum – Broad-leaved Peppermint Grassy Forest	-	8.0	8.0
Tableland Gully Mountain Gum – Broad-leaved Peppermint Grassy Forest DNG	-	2.4	2.4
Cox's Permian Red Stringybark – Brittle Gum Woodland	-	0.1	0.1
Exposed Blue Mountains Sydney Peppermint – Silvertop Ash Shrubby Woodland	5.2	32.2	37.4
Capertee Rough-barked Apple – Red Gum – Yellow Box Woodland: non grassy	0.1	-	0.1
Total	**61.8**	**88.7**	**150.5**

None of the vegetation communities are defined as EECs under the NSW *Threatened Species Conservation Act 1995* or the Commonwealth *Environment Protection Biodiversity Conservation Act 1999*. However, the vegetation in the forest is generally in good condition and there is a full range of habitat features such as tree hollows.

Three of the vegetation communities that occur on 'Permian sediments' are considered to have a higher conservation significance than the other communities on the site due to the level of clearing and the low occurrence of these communities in the reserve system. These communities are the:

- Tableland Gully Ribbon Gum Blackwood Apple Box Forest (7.9 ha);
- Tableland Gully Mountain Gum – Broad-leaved Peppermint Grassy Forest (8 ha); and
- Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest (59 ha).

Altogether, the modifications would clear around 75 ha of these communities, and OEH raised concerns about the extent of the impacts on these communities. However, the Department notes that the offsets contain more than 180 ha of these communities, some of which occur on Permian sediments (see discussion about offsets below). The Department also notes that these Permian sediments can be found across a broad area on the western slopes of the Blue Mountains (approximately 44,000 ha), and the modifications would disturb about 0.1% of the vegetation that occurs on these sediments.

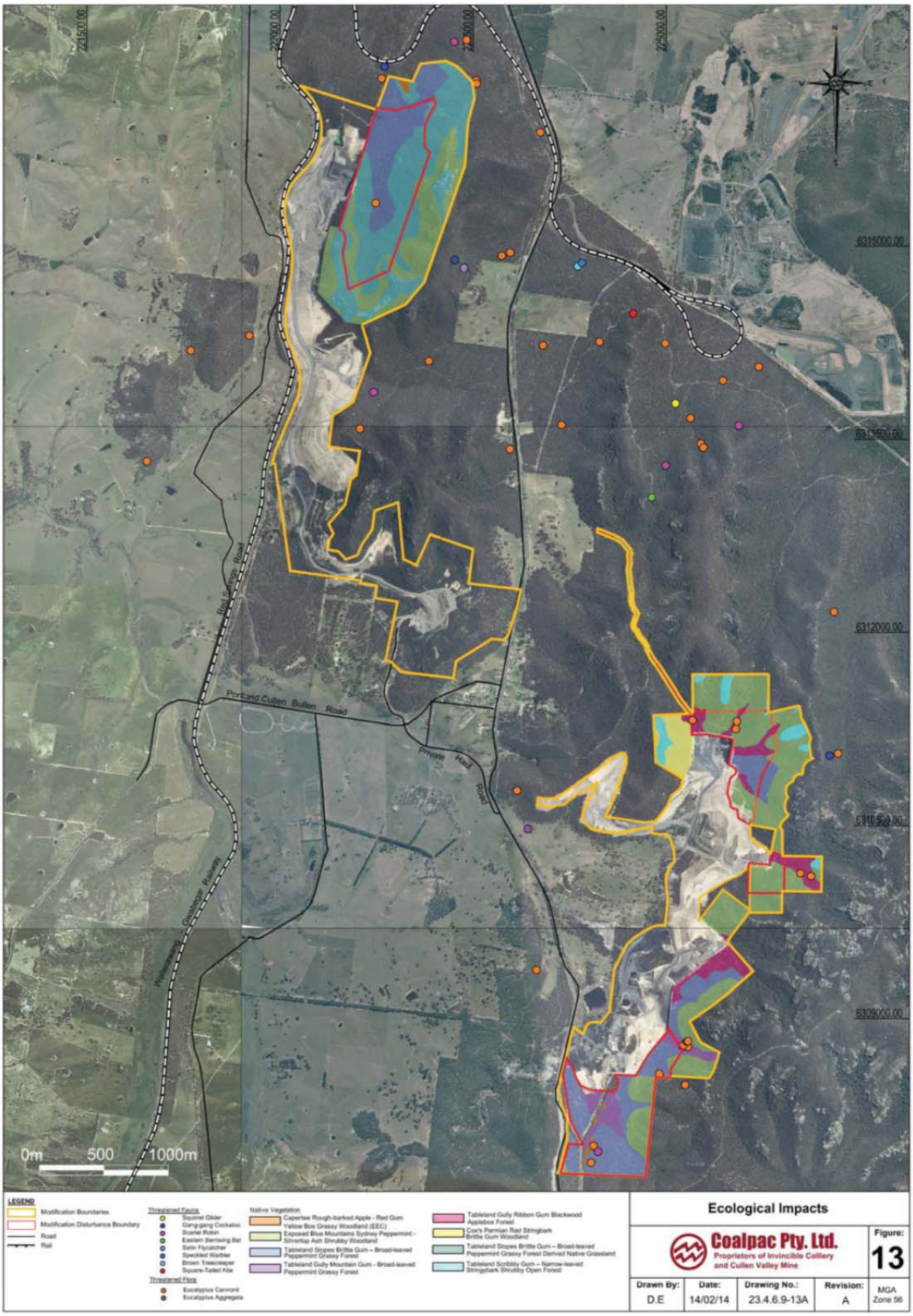

Figure 16: *Vegetation Communities and recorded Threatened Species*

The assessment identified 1 threatened flora species, Capertee Stringybark (*Eucalyptus cannonii*), within the modification disturbance boundary. Another 6 that occur in the Lithgow LGA were not identified, but were considered to have the potential to occur on the site.

The assessment estimated that up to 2,300 individual Capertee Stringybark trees would be removed as a result of the modifications. However, the Department notes this species is abundant throughout the Ben Bullen State Forest and the nearby National Parks, and can be readily established on rehabilitated land. For example, the assessment estimates that there are around 4,500 individual Capertee Stringybark trees within the development boundary and almost 17,000 within the study area for the assessment. The Department also notes that in December 2013, the species was delisted as a vulnerable species under the EPBC Act.

Given these considerations, the Department is satisfied that the modification would not have a significant impact on Capertee Stringybark and the residual impact would be adequately compensated for through the implementation of the biodiversity offset strategy (as discussed further below).

Fauna Impacts

Although no threatened fauna species were recorded within the modification areas, 14 threatened fauna species have previously been recorded in the broader study area, and further 22 species have the potential to occur. This includes a broad range of species including 2 threatened reptile species (Broad-headed Snake and Rosenberg's Goanna), 20 endangered or vulnerable bird species, 10 vulnerable mammal species, and 1 endangered mammal species (Spotted-tail Quoll).

The assessment includes a detailed 'test of significance' for each of these species, and concluded that the modification would not result in a significant impact on any of these species. This conclusion was primarily based on the limited extent of clearing, the presence of suitable alternative habitat nearby, the mobility of the species, and the protection of suitable habitat in the proposed offset areas.

However, OEH raised concerns about the impacts on the Broad-headed Snake, particularly the adequacy of the buffer between the rock escarpments and the open cut mining that are used as summer foraging habitat for the snake. This issue was considered in detail by the PAC during its review of the Coalpac Consolidation Project, and was one of the key reasons it recommended a 300 m setback from the rock pagodas and the proposed open cut mining.

The Department understands that the snake generally frequents the rocky escarpments that would not be disturbed by the modifications, but relies on foraging habitat on the slopes below the rock escarpments and pagodas during the summer months up to a maximum of 800 m from the base of these escarpments. The Invincible extension would result in the removal of some potential habitat of the snake, but the assessment indicates that the areas adjacent to the Cullen Valley Mine do not comprise suitable habitat for the snake.

In general, Coalpac has designed the open cut extension to remain more than 300 m from the rock escarpments and pagodas, but the Department acknowledges there are several areas where the proposal would be much closer to the escarpment, particularly in the northern part of the Invincible modification area. In total, the Department estimates that approximately 60 ha of land within 300 m of cliff lines and escarpments would be removed by the proposal. However, the Department notes that the distribution of the Broad-headed snake is very broad, covering 2.5 million hectares with recordings across wide areas to the south, west and north of the Sydney basin. Importantly, there are also large areas of suitable alternative habitat that are contiguous with the site in the Ben Bullen State Forest and the nearby National Parks. Given these considerations, the Department is satisfied that the modifications would not result in a significant impact on the Broad-headed snake.

Biodiversity Offsets

To compensate for the residual impacts Coalpac is proposing to implement a comprehensive biodiversity offsets strategy comprising both onsite and offsite offsets (see Figure 9 above and Figure 17 below):

- *Onsite Offsets* – 113 ha of land associated with the Hillview / Billabong properties located across the Castlereagh Highway and seven lots located in the vicinity of the southern section of Cullen Valley mine (known as the 'Additional Offset Areas'); and
- *Offsite Offsets* – 1,288 ha of land known as 'Gulf Mountain' located approximately 20 km northwest along the Turon River.

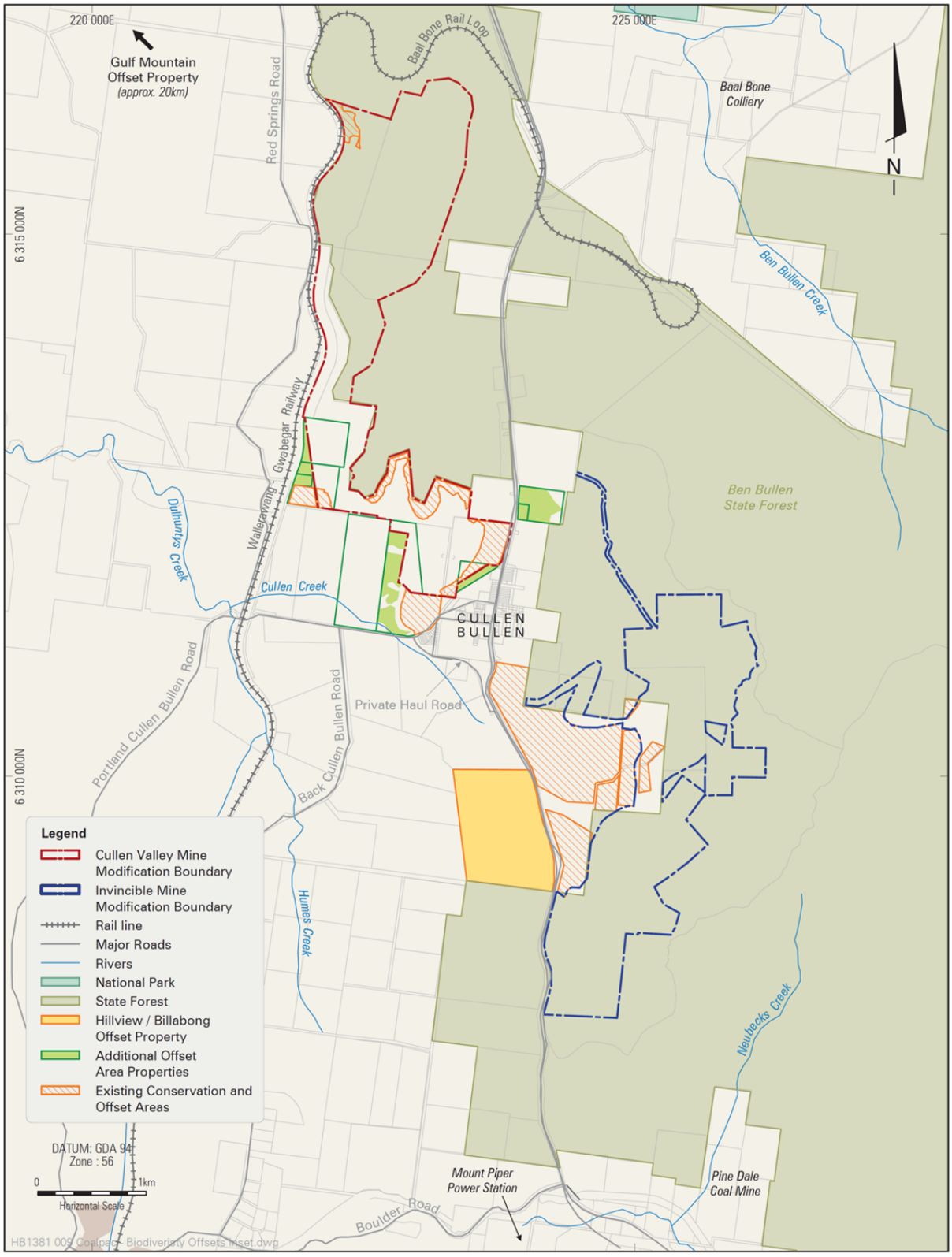

Figure 17: *Onsite Biodiversity Offsets*

In all, the proposed offsets would deliver over 1,400 ha of native vegetation comprising a combination of woodland and forested grassland to compensate for the clearing of 150 ha of the Ben Bullen State Forest.

Several of the impacted threatened fauna species have been recorded in the offset areas, and the areas also provide suitable habitat for a range of other threatened fauna species that have the potential to be impacted by the modifications.

Importantly, with the exception of the Exposed Blue Mountains Sydney Peppermint - Silvertop Ash Shrubby Woodland, the offsets also contain significant areas of the vegetation communities that would be impacted by the proposal. In regard to the Silvertop Ash woodland community, the Department understands that this community is common and widespread within the Greater Blue Mountains region, and that OEH is satisfied that the areas of other woodland communities of conservation significance in the offset areas can be used to compensate for the deficit of this community in the offsets.

Finally, the proposed biodiversity offsets would be augmented by the rehabilitation of the entire site (i.e. both the Invincible and Cullen Valley) using suitable woodland species. This includes the modification areas, and has the potential to deliver an additional 664 ha of woodland in the local area in the medium to long term.

To demonstrate the adequacy of the offset strategy, Coalpac also commissioned ELA to undertake an assessment using the BioBanking Assessment Methodology (BBAM) for the modification areas.

In summary, the assessment found that the modification impact areas would generate a biobanking 'liability' of 7,534 ecosystem credits, assuming that the mine site would be rehabilitated back to woodland. The total offset package would deliver 12,416 ecosystem credits which more than compensates for the loss of the vegetation on the site.

However, OEH advised that the biobanking assessment was not strictly compliant with the BBAM methodology, and because a significant proportion of the Gulf Mountain property is already subject to a restrictive conservation covenant, the credits for the offset strategy may need to be discounted by 20 to 30%.

Nonetheless, the Department notes that even if OEH applies a 40% discount, the offset strategy would still generate enough credits to meet Coalpac's biobanking liability.

In terms of long term protection of the site, Coalpac is proposing to adopt a suitable mechanism in consultation with the Department and OEH. The Department is satisfied that there are a number of suitable mechanisms that exist (e.g. Voluntary Conservation Agreement, BioBanking Agreement), and has recommended that this be resolved by the end of 2015.

Conclusion

While the Department acknowledges the conservation significance of the broader Ben Bullen State Forest and surrounds, it is satisfied that the proposed modifications would not result in any significant impacts on threatened species, EECs, or the broader ecological values of the area.

The Department is also satisfied that the proposed biodiversity offset strategy would adequately compensate for any residual impacts associated with the proposed mining. Furthermore, the Department believes that the proposed offset strategy, combined with the rehabilitation of the site, would deliver substantial regional biodiversity benefits in the medium to long term.

To ensure these benefits are realised, and the impacts on biodiversity minimised, the Department has recommended conditions requiring Coalpac to:

- implement the proposed biodiversity offset strategy;
- secure the long term protection of the offset areas;
- lodge a conservation bond to safeguard the implementation of the offset strategy; and
- prepare and implement a comprehensive Biodiversity Management Plan in consultation with OEH that incorporates:
  - detailed performance and completion criteria for the biodiversity offset strategy;
  - measures for managing remnant vegetation and fauna habitat; and
  - best practice pre-clearance protocols.

6.3 Air Quality

An air quality impact assessment was undertaken by Pacific Environment Limited (PEL) in accordance with the *Approved Methods for Modelling and Assessment of Air Pollutants in NSW South Wales* (EPA 2005).

Existing Air Quality
The assessment used air quality data from the company's two high volume air samplers (HVAS) from 2008-2013 and 10 dust deposition gauges to determine the background levels of PM_{10} (suspended particles in the air less than 10 microns) and deposited dust from the site.

The data collected included contributions from both existing mining operations producing at 1.5 Mtpa as well as from other nearby mines such as Ivanhoe North and Baal Bone Colliery. Over this period the annual average background level of PM_{10} was 10.5 micrograms per cubic metre ($\mu g/m^3$), which is well below the annual criterion of 30 $\mu g/m^3$. Only 3 exceedances of the daily criterion (50 $\mu g/m^3$) were recorded over the 6 years. The EA states that an analysis of the data indicates that the most likely cause was events such as bush fires or dust storms. The analysis of the dust deposition gauges has shown that the annual average deposition rate was 1 g/m^2/month, which is well below the criterion of 4 g/m^2/month.

To determine the background level of $PM_{2.5}$ and total suspended solids (TSP) (i.e. all suspended particles in the air) the assessment used conversion ratios derived from the Upper Hunter Air Quality Monitoring Network (2011-2012) for $PM_{2.5}$, and long term co-located PM_{10} and TSP monitors from the Hunter Valley. The Department is satisfied that this is a reasonable and conservative approach when there is no site-specific data available.

The Department considers that this monitoring data demonstrates that the Cullen Bullen area has good air quality conditions despite being near three mining operations. It also demonstrates that Coalpac has had a good track record of complying with the air quality limits that apply to its mines.

Air Quality Impacts
The assessment modelled the predicted contributions from the proposed modifications together with background levels for $PM_{2.5}$, PM_{10}, TSP and dust deposition, to determine the impact of the modifications on nearby sensitive receivers. The Department considers this is a conservative approach as the background data incorporates a 5 year period when the existing mines were operational.

Even with this conservative approach, the assessment predicted there would be *no exceedances* of annual average PM_{10}, TSP or dust deposition at any privately-owned or mine-owned residences (see Figure 18).

The Monte Carlo Statistical approach was used to model cumulative short term dust emissions (i.e. 24-hour PM_{10}) at 17 representative locations. These locations were selected based on their proximity to the operations, prevailing wind direction, and the magnitude of the potential contribution from the mines.

The results of this assessment indicate that the modifications would make a negligible contribution to cumulative particulate concentrations, and would not result in any additional exceedances of the 24-hour PM_{10} criteria of 50 $\mu g/m^3$ at any privately-owned residences. However, the statistical analysis indicates that the mines may result in some exceedances of the criteria at 3 mine-owned residences to the west of the Invincible Colliery (Receivers 393, 394, and 396). It also predicts that the 24-hour PM_{10} criteria would be exceeded over more than 25% of one parcel of vacant land (Property 395) in the same area. However, the Department has been advised by Coalpac that this land is owned by Coalpac shareholders, and hence can also be considered mine-owned.

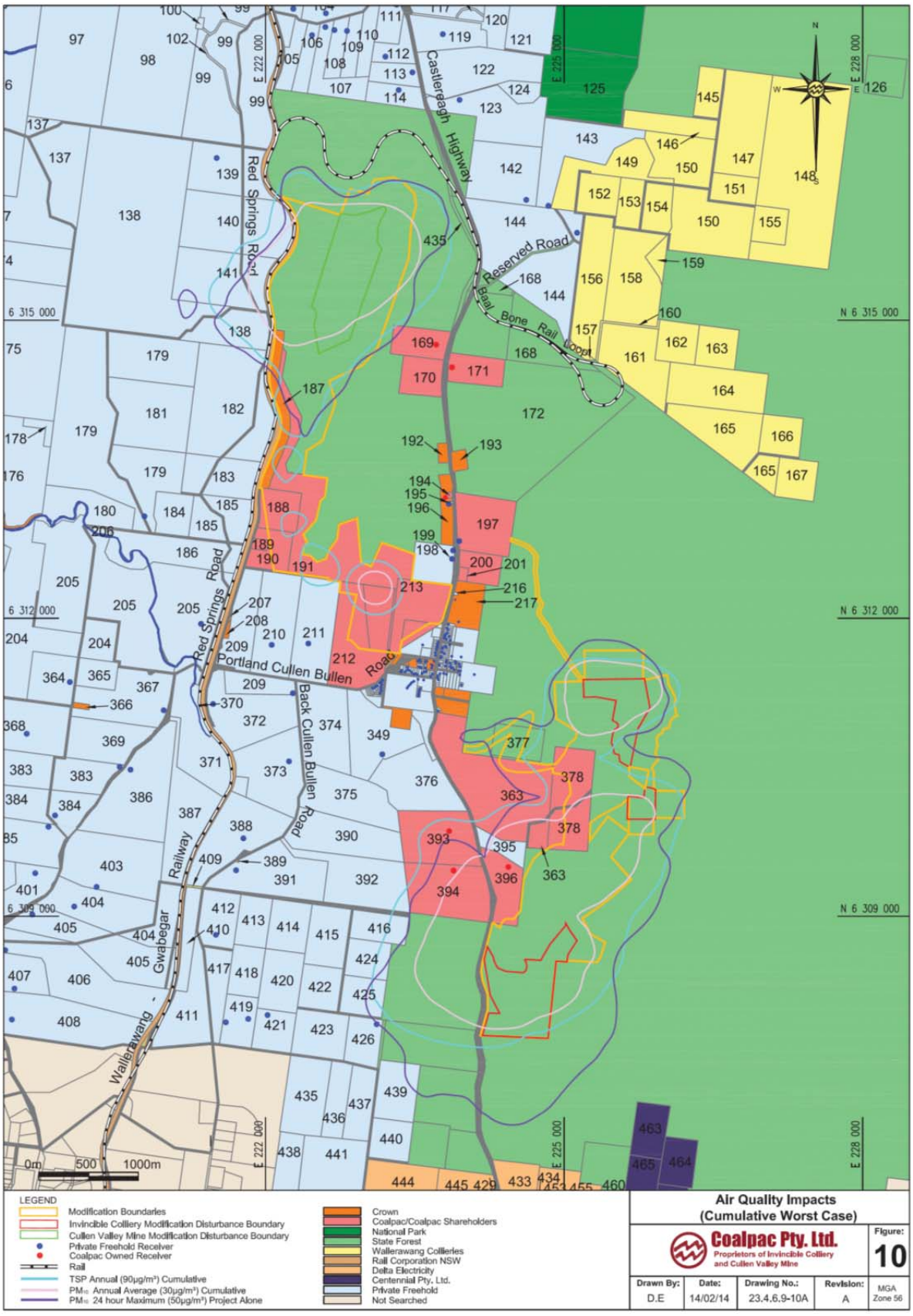

Figure 18: *Air Quality Impacts*

Conclusion
Both the Department and the EPA are generally satisfied that the assessment of air quality impacts provides a robust basis against which to assess the potential impacts of the modified mining operations, and that the proposals would not result in any exceedances of the applicable air quality criteria at any privately-owned residences in the areas surrounding the mine, including the nearby village of Cullen Bullen.

This is supported by monitoring data that indicates that Coalpac has been able to comply with applicable air quality criteria over recent years, the fact there would be no night-time operations at either site, and the fact that the proposed extensions would be located further from the majority of receivers than has historically been the case.

The Department notes that the approvals that currently apply to both mines include a range of conditions relating to the management and monitoring of air quality impacts. However, the Department believes that these conditions can be strengthened, and has taken the opportunity to update the instruments to fully reflect contemporary standards and obligations for mines in NSW.

6.4 Noise

The EIS included a specialised noise impact assessment prepared by Bridges Acoustics in accordance with the *NSW Industrial Noise Policy* (INP). The EPA has advised the Department that it is satisfied with this assessment, and that it would not need to alter the applicable EPLs to allow the modifications to proceed.

Hours of Operation
The approved hours of operation for the Invincible Colliery are 7 am to 10 pm Monday to Saturday for extraction, processing and transportation. At Cullen Valley extraction and processing may occur 24 hours a day seven days a week, with transportation permitted from Monday to Saturday from 7 am to 5.30 pm.

Nevertheless, Coal has indicated that the proposed modifications would generally be restricted to the day, with some activities (processing) during the evening and none at night.

The noise assessment has only considered the noise impacts associated with these proposed operating hours, rather than the hours of operation currently approved.

The Department has also recommended that the conditions of both mines be modified to reflect the operating hours proposed in the EA.

Existing Noise Limits
The Invincible approval and the consent for Cullen Valley both incorporate noise criteria for day, evening and night as shown in Tables 2 and 3.

Coalpac has used these limits as the basis for the noise assessment.

The Department accepts this approach as the proposed mining involves:
- a modification to the existing operations;
- there would be no increase in the approved production rate; and
- the proposed mining is located immediately adjacent to the existing operations.

***Table 2**: Invincible – Existing Noise Limits*

Residence / Location	Day LAeq,15 minute	Evening LAeq,15 minute	Night LAeq,15 minute
All privately owned land	40	35	35

***Table 3**: Cullen Valley – Existing Noise Limits*

Day	Evening	Night	Night	Land Descriptor
LAeq,15minute			LA1,1minute	
43	38	35	45	• Ryan • Tesoriero • Fitzgerald • Tilley • Red Springs (during mining to the west of the railway line) • Hillcroft (during mining to the west of the railway line) • Dobson • Williams • Northey
40	40	38	45	Forest Lodge
37	35	35	45	Red Springs (during mining to the east of the railway)
35	35	35	45	Hillcroft (during mining east of the railway) and all other land (including vacant land)

Noise Impacts

The noise assessment considered Year 2 operations under both adverse and neutral weather conditions and included adjustment for low frequency noise. Temperature inversions were not modelled as no activity is proposed to occur at night.

The noise assessment predicts that the operations at the Invincible Colliery would comply with the noise limits in the approval at all nearby privately-owned receivers for the scenarios modelled (see Figure 19). The Department notes that the maximum predicted noise levels generated by the operations at Invincible are around 38 dB(A) in the day at properties to the west of the Castlereagh Highway. Noise levels during the evening are far lower (i.e. less than 25 dB(A)) as operations on the site at this time only comprise coal processing and transportation. Importantly, the Department notes that noise generated by the Invincible Colliery would remain well below the INP recommended acceptable day-time noise level for a rural area which is 50 dB(A).

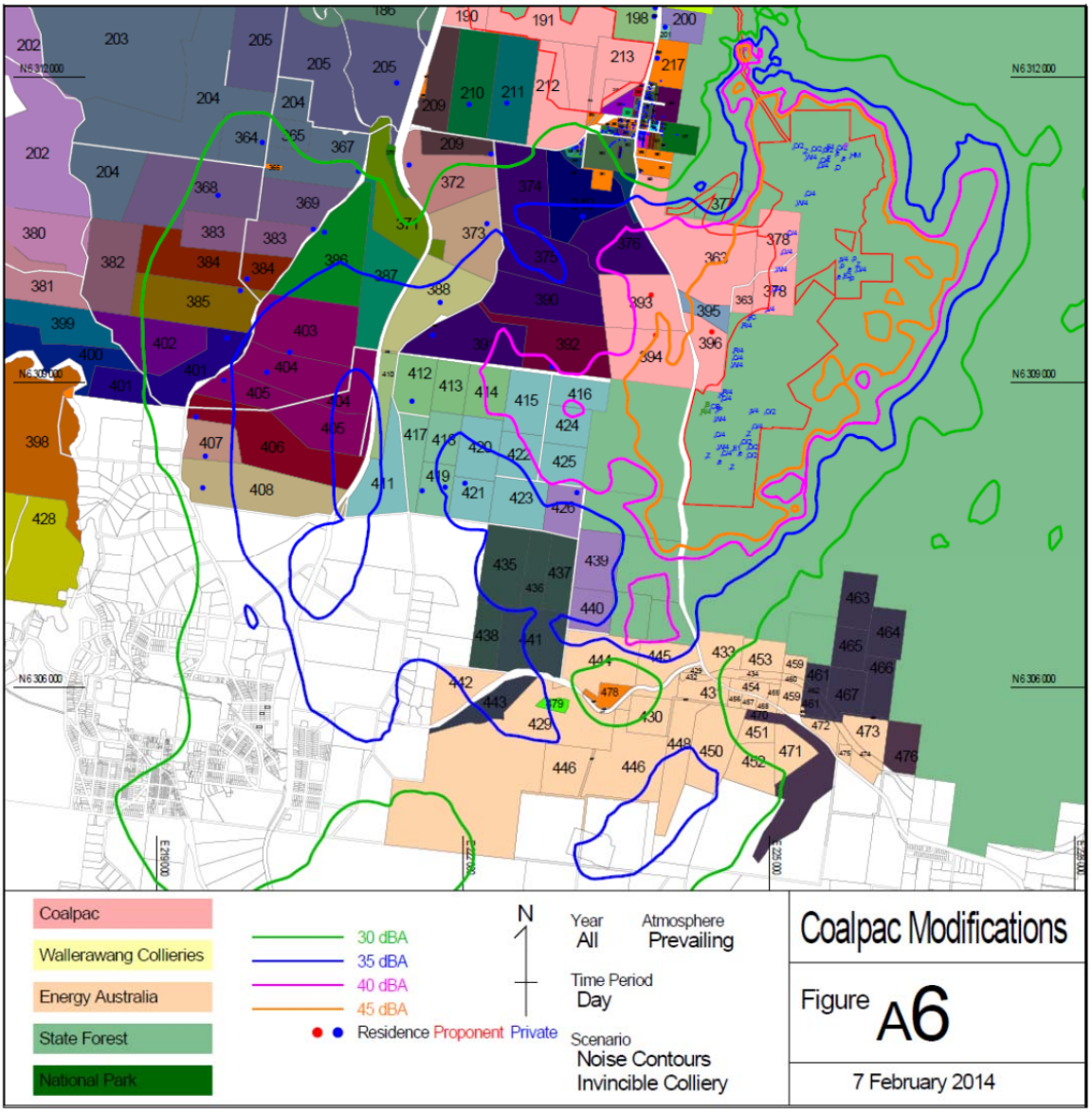

Figure 19: *Noise Impacts - Invincible*

For Cullen Valley, the noise assessment predicts minor exceedances (i.e. less than 2 dB(A)) of the noise limits in the consent at 3 privately-owned residences (142, 143, and 205) during the day and evening periods under worst case meteorological conditions (see Figure 20).

However, the Department notes that the maximum noise levels at these properties is 36.5 dB(A) during the day and 36 dB(A) in the evening – both of which are well below the recommended acceptable rural amenity criteria in the INP of 50 dB(A) and 45 dB(A) respectively.

It is also important to note that receivers 142 and 143 are located on the eastern side of the Castlereagh Highway, and are likely to be influenced by road noise that is greater than noise generated by the mine. This conclusion is supported by background noise monitoring at Receiver 171 that indicates noise adjacent to the highway is regularly over 40 dB(A). In regard to receiver 205, the noise assessment indicates that the exceedances of up to 1.5 dB(A) are only predicted to occur intermittently when a water cart visits the water fill point at the southern end of the Cullen Valley mining area under worst case meteorological conditions.

Finally, it is important to note that the mine would not operate at night, and hence any amenity impacts on nearby receivers are not likely to be significant.

Notwithstanding the above, the Department is not proposing to alter the existing noise limits, and Coalpac would therefore be required to demonstrate that it is complying with these limits, or modify its operations to ensure it does so. Given the relatively minor exceedances predicted, the Department is confident that with best practice noise mitigation, it would be able to comply with the existing noise limits.

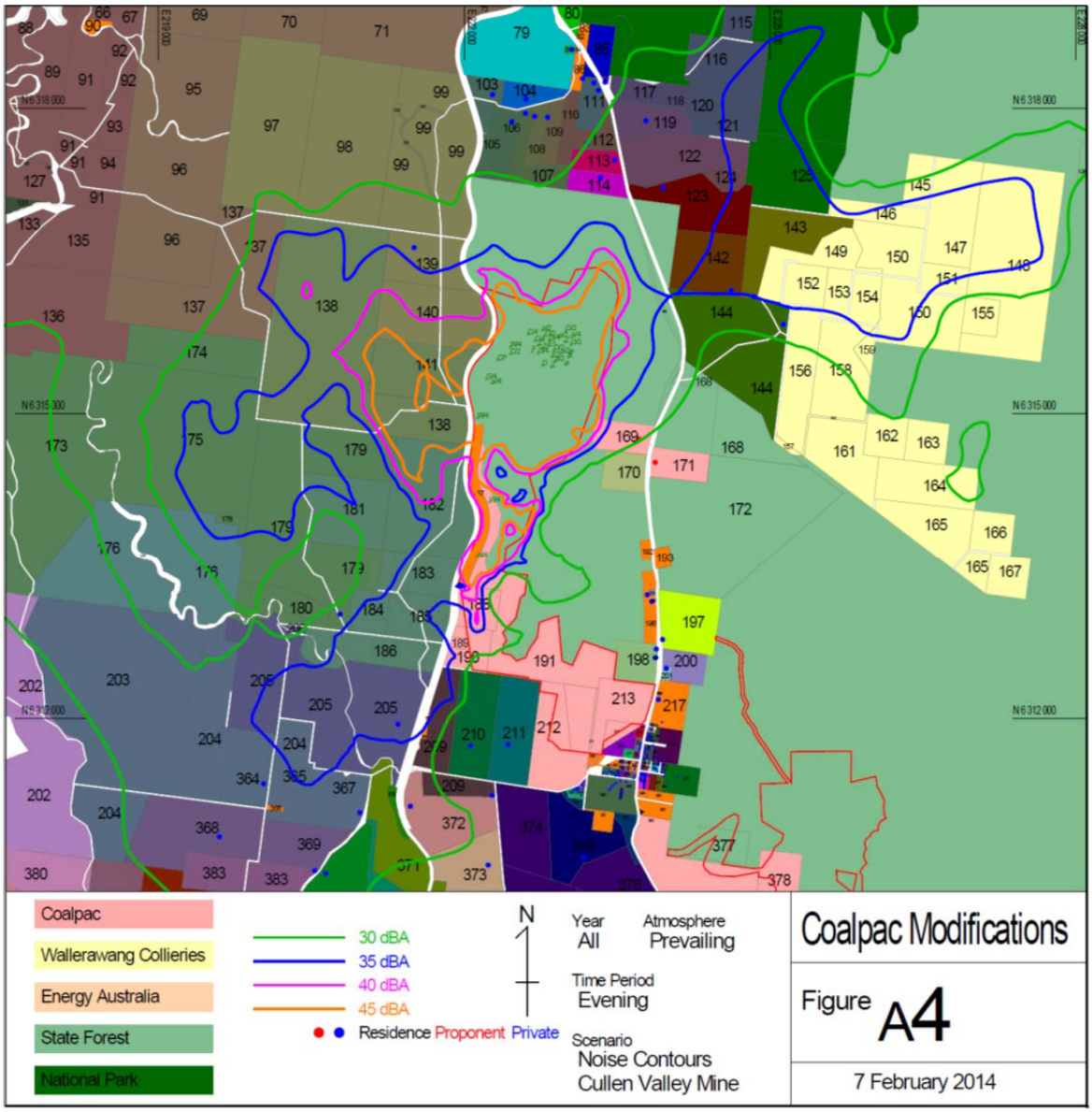

Figure 20: *Noise Impacts – Cullen Valley*

Low Frequency Noise

The noise assessment considered low frequency noise in accordance with the INP, which entails the application of a 5 dB(A) modifying factor if the dBC levels exceed dBA noise levels by more than 15 dB at a receiver. The assessment predicts that there are a number of receivers where the strict application of the INP requires the application of the 5 dB(A) modifying factor. For Cullen Valley this does not result in any additional exceedances of the noise limits. For Invincible, there are 3 receivers where the difference is marginally greater than 15.1 to 15.3 dB (Receivers 392, 403 and 404). However, if the modifying factor is applied to these receivers it suggests that they would receive greater impacts than receivers much closer to the Invincible Colliery.

Clearly, this is not a sensible outcome, and is an anomaly that has been recognised by the EPA in the assessment of mining projects more generally. Consequently, in this case, the Department does not believe it would be reasonable to apply the modifying factor to the noise predictions at these properties.

Construction Noise
The noise assessment considered noise generated by the construction of the water pipeline. Generally, the construction of the pipeline would be within the Ben Bullen State Forest and well removed from residential receivers. However, near the Castlereagh Highway a number of receivers would be impacted by construction noise for short periods. In particular, receivers 197 and 198 are predicted to experience noise levels up to 55 dB(A). However, the noise would be confined to day-time construction hours only, and Coalpac is proposing to prepare a construction noise management plan to ensure all reasonable and feasible measures are implemented. Furthermore, the Department notes that the subject properties are located adjacent to the Castlereagh Highway. With the implementation of these measures, the Department is satisfied that the construction noise would not result in any significant impacts on residential receivers.

Road Traffic Noise
There would be no change to the approved production and transportation rates at the mines, and the noise assessment indicated that the traffic generated by the mines would comply with the applicable road traffic noise criteria under the *NSW Road Noise Policy*.

Blasting
The noise assessment predicts that there would be no exceedances of the applicable blast overpressure and vibration criteria at any receiver. The Department has recommended that 1 blast occur per day with a maximum of 5 per week, with no blasting on weekends or public holidays, in accordance with the ANZEC blasting guidelines. It has also recommended that the blasting hours remain the same at each mine – 9am to 5pm at Invincible and 9am to 3pm at Cullen Valley.

Conclusion
The Department considers that the proposed modifications essentially represent a continuation of the existing mines with extraction to occur predominantly in areas further removed from the majority of receivers, particularly Cullen Bullen.

While some minor exceedances of the existing noise limits are predicted at three receivers, the Department believes that the minor nature and extent of these exceedances means that Coalpac would be able to manage its operations to comply with its existing limits without significant additional mitigation.

To ensure this occurs, the Department has recommended a range of contemporary conditions for noise at each of the mines, including requirements to:
- comply with the existing noise limits;
- prepare and implement a comprehensive noise management plan; and
- undertake attended monitoring of noise every 2 months to demonstrate compliance.

6.5 Water Resources

Introduction
The EA contains a specialist surface water assessment undertaken by WRM Water and Environment Pty Ltd and a specialist groundwater assessment undertaken by Australian Groundwater and Environmental Consultants Pty Ltd. Both documents where revised in the RTS to address concerns raised by NOW. NOW has advised the Department that it is satisfied with the additional information provided in the RTS, and has recommended a number of conditions be incorporated in the notice of modifications.

Existing Situation
Both mines are located in the catchment of Turon River, which in turn is a tributary to the Macquarie River. Invincible Colliery is located in the Cullen Creek catchment, while Cullen Bullen Mine is located in the Jews, Red Springs and Cullen Creek catchments.

The hydrological regime of these catchments has been subject to a long history of disturbance from forestry, underground mining, open cut mining, extensive agricultural enterprises and construction of infrastructure. There are extensive historical underground workings in the vicinity which have had (and continue to have) a major influence on the groundwater regime in the area (see Figure 21).

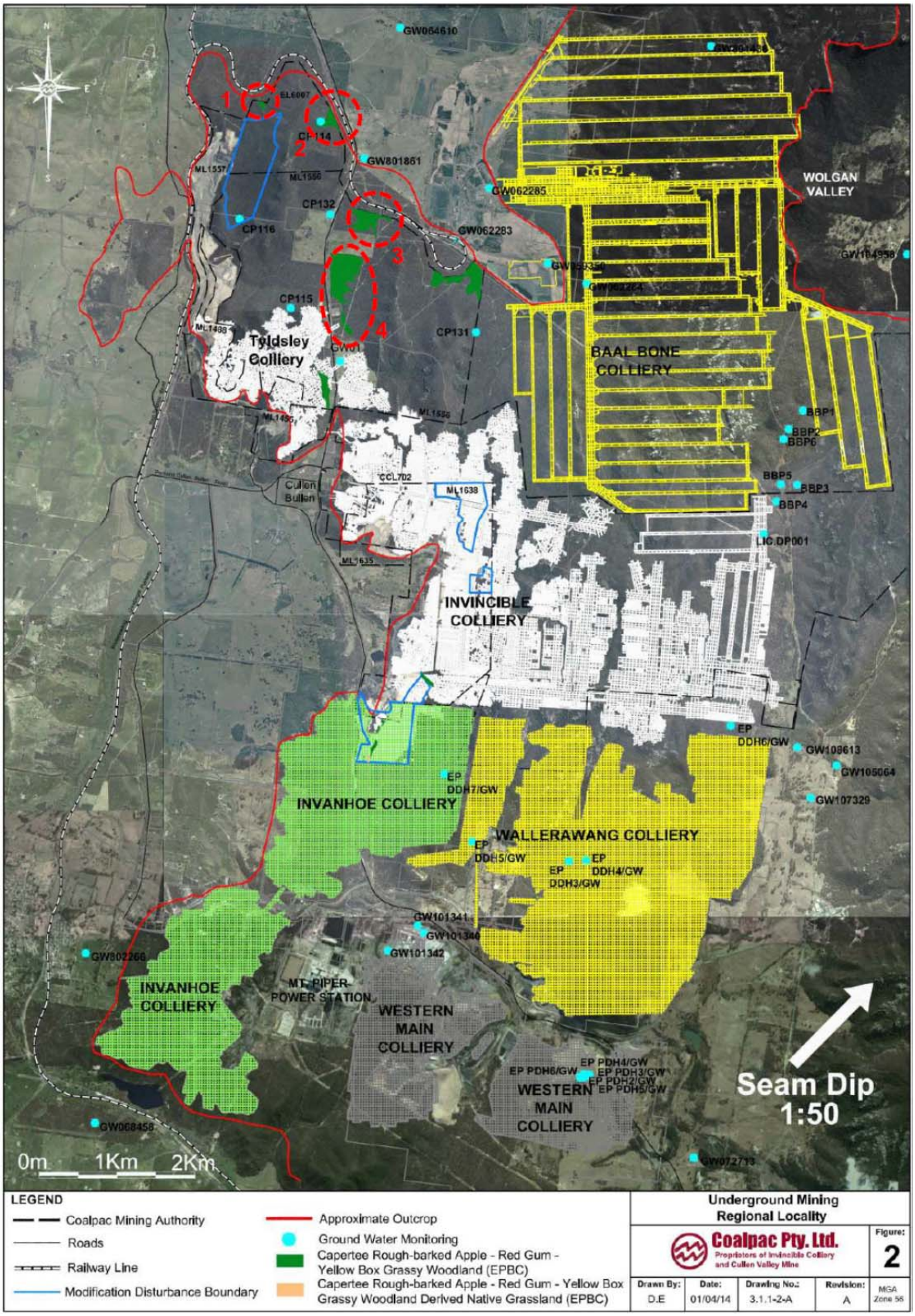

Figure 21: *Existing Underground Workings in the Region*

Both mines have existing surface water management systems, which capture dirty mine water in a series of dams and sumps, or within the active pit, to prevent uncontrolled discharge. Both mines also have the ability to store mine water within extensive historical underground workings if surface storages are nearing capacity. Any release of mine water from mine water storages must meet the criteria in the EPLs for both mines. Cullen Valley has two licensed discharge points (Dam 1 and Dam 4) and Invincible has one licensed discharge point at the 'Main Dam', which is adjacent to its surface facilities.

The groundwater regime surrounding the Invincible Colliery and Cullen Valley Mine comprise the following units:

- overburden sediments of the Triassic Narrabeen Group – characterised by perched aquifers and semi confined aquifers separated by relatively impermeable claystone with good water quality and low levels of salinity;
- coal seams within the Permian Illawarra Coal Measures – with water quality fresh to slightly brackish; and
- the Marrangaroo Formation – which is the primary aquifer relied upon by groundwater users in the region; however, it lies below the lowest coal seam, and would not be impacted by the proposal.

Site Water Balance

The EA calculated that the combined water demand for both operations would be 725 ML/year, the majority of which would be used for dust suppression. This figure is conservative as it assumes the maximum haul road watering rate of 2 L/m^2/hour required under the EPLs for both mines, and the processing plant operating at full capacity.

To meet this water demand, Coalpac would be able to source water as follows:

- 95 ML/year from harvestable rights;
- 226 ML/year from licensed extraction of groundwater from two different groundwater sources (S*ydney Basin Murray Darling Basin Groundwater Source* and *Sydney Basin Coxs River Groundwater Source*); and
- 960 ML/year from the surface water management systems (for an average rainfall year).

Consequently, the Department is satisfied that Coalpac would have sufficient water to supply its operational requirements.

If surplus water is captured on site, Coalpac proposes to store this within the existing underground workings and/or within its water management dams for release in accordance with the relevant EPL water discharge criteria. This has worked satisfactorily in the past, and there is no reason to believe it would not work well in the future.

Finally, the proposed modifications include the installation of a water pipeline between the Invincible and Cullen Valley mines to allow the transfer of water between the mines. The Department is satisfied that this pipeline would provide improve Coalpac's ability to manage any shortfalls or surpluses of water across the mining complex.

Surface Water Impacts

For Invincible Colliery the existing operations and proposed new pits are located within the Cullen Creek catchment. The proposed modification would temporarily reduce the total catchment of Cullen Creek by 88 ha. However, the proposed extension would occur in an area that already reports to the existing water management system for Invincible. Hence, the modification would not result in any further reduction in the catchment area.

The Department notes that the clean water diversions that are required by the existing Water Management Plan at the Invincible Colliery do not operate in accordance with best practice. This results in some water from undisturbed areas reporting to Invincible's dirty water management system (rather than being diverted around the disturbance footprint of the mine). To remedy this situation, the Department has recommended that Coalpac be required to install the applicable clean water diversions within 6 months of mining re-commencing on the site, in consultation with NOW.

For the Cullen Valley mine, the pit expansion is located wholly within the Jews Creek Catchment and would reduce the catchment area by approximately 85 ha, which represents approximately 1.4% of the Jews Creek catchment area upstream of Turon River. Given the relatively minor loss of

the total catchment area, and that the loss would be for no more than 6 years (i.e. prior to rehabilitation), the Department considers this temporary reduction would have a very minor impact upon the environment and downstream water users.

Groundwater Impacts

The proposed modifications would interact with the coal seams within the Permian Illawarra Coal Measures. This aquifer is highly disturbed due to past extensive underground mining activities that have occurred in all directions around the two proposed modifications (see Figure 21 above).

For the Invincible Colliery, there would be no groundwater in-flows to the pit as the coal measures are located 'up-dip' and have already been dewatered by historical mining activities. Consequently, the proposed extension is not anticipated to result in any impacts on groundwater users or groundwater dependent ecosystems.

However, there is a substantial volume of water in the Old Invincible Colliery underground workings and the connected Baal Bone underground workings to the north. Currently, Glencore is pumping out up to 1.3 GL of water a year from Baal Bone. If Glencore ceases to pump and/or there is an extended period of high rainfall, it is possible that there would be seepage from the Old Invincible Colliery underground workings into the northern part of the proposed open cut extension at Invincible. If this occurs, Coalpac is proposing to pump the excess water into the Main Colliery Dam, and/or to Cullen Valley for use in dust suppression and managing sub-surface heating and/or discharged in accordance with the EPL for the site. Coalpac would also be required to obtain applicable groundwater licences for the additional water make in the pit, which it may need to acquire from other mining companies. However, if these contingencies are inadequate, Coalpac would need to curtail its mining in the deeper coal seams of the northern extension area.

However, given that the mining in this area is planned to occur over only 2 years and Glencore has advised that it has no plans to cease pumping at Baal Bone, the Department believes the risk of this being a significant issue is very low. Nonetheless, the Department has recommended that Coalpac be required to:

- develop a protocol with the owners of the Ball Bone Colliery to manage this issue;
- describe the proposed contingency measures in detail in a revised Water Management Plan for the mine; and
- obtain applicable water licences or modify its mining operations accordingly.

For Cullen Valley, the assessment estimates that groundwater in-flows to the open cut pit and highwall mining drives would be a maximum of 3.3 ML/year. When evaporation is taken into account, this is a very minor volume of water and would not result in any significant depressurisation beyond 500 m of the mine. The assessment indicates that there are no registered groundwater bores or groundwater dependent ecosystems within the zone of depressurisation. The proposed extension at Cullen Valley is located more than 1 km from any historical underground workings, and therefore the issue that may occur at Invincible would not be an issue at the Cullen Valley mine.

Conclusion

Both the Department and NOW are satisfied that the proposed modifications would have a minimal impact on the quality and quantity of water resources in the areas surrounding the mines. The Department is also satisfied that the modifications would not reduce the availability of surface or groundwater for water users in the area.

To ensure this is the case, the Department has recommended that Coalpac be required to:

- revise the Water Management Plans for the mines;
- maintain a detailed site water balance for both mines;
- establish and comply with surface water and groundwater impact assessment criteria;
- implement measures to prevent and/or minimise impacts on surface water and groundwater resources;
- implement surface water and groundwater monitoring programs;
- establish trigger action response plans should impacts be greater than predicted; and
- provide compensatory water supply to affected users if required.

The Department has also recommended that Coalpac be required to establish appropriate clean water diversions around all mining areas within 6 months of re-commencing mining on the site,

obtain all relevant water access licences, and ensure mining operations are modified to match water availability.

6.6 Rehabilitation and Final Landform

Coalpac states rehabilitation at both mines would continue to be undertaken generally in accordance with the *'Strategic Framework for Mine Closure'* (ANZMEC MCA 2000) and the *'Mine Rehabilitation'* and *'Mine Closure and Completion'* handbooks developed by the former Commonwealth Department of Industry, Tourism and Resources.

Progressive Rehabilitation
To date, Coalpac has rehabilitated 194 ha of the approved mining area across both sites, and the vegetation on these areas ranges in age from 1 to 12 years. The total area that would require rehabilitation following the modification would increase by around 150 ha (i.e. from approximately 512 ha to 664 ha).

Coalpac is proposing to rehabilitate the entire site back to woodland. The Department fully supports this outcome as it broadly reflects the current land use (i.e. State Forest), and in the long term would mitigate the impacts on the conservation values that would be lost as a result of mining. It would also augment the onsite biodiversity offsets to create local habitat corridors.

The Department acknowledges that the rehabilitated landscape would not replace the values that would be lost as a result of mining. However, the draft *NSW Biodiversity Offset Policy* developed by OEH recognises the value that mine site rehabilitation can play in achieving a positive biodiversity outcome in the long term, and seeks to provide appropriate incentives for mining companies to rehabilitate mines sites for conservation.

However, in weighing up the likely conservation value of any rehabilitation, it is important to consider the feasibility of the proposed rehabilitation.

In this regard, Coalpac has shown that it is capable of achieving a stable landform with forested vegetation on previously mined areas (see Figure 22 below). These revegetation efforts have been regularly audited by third party experts against the rehabilitation criteria in the existing Rehabilitation Management Plans, and found to be complying with these criteria.

To ensure this continues to be the case, the Department has recommended that Coalpac be required to:

- carry out progressive rehabilitation as soon as practicable following disturbance;
- restore ecosystem function by establishing 664 ha of self-sustaining woodland across both sites targeting the establishment of key vegetation communities that occur on Permian sediments; and
- prepare and implement a Rehabilitation Management Plan that includes:
  - performance and completion criteria;
  - triggers for remedial action; and
  - a program for monitoring and reporting on the effectiveness of the rehabilitation of the site and progress against the performance and completion criteria.

The Department also notes that Coalpac would be required to lodge a substantial rehabilitation bond with DRE to provide surety that the site is appropriately rehabilitated in the event of insolvency or similar.

Figure 22: *Progressive Rehabilitation – Cullen Valley*

Final Landform

Coalpac has stated that the modifications have specifically been designed to create a free draining final landform (without final voids) that can support native woodland communities to ensure integration with the surrounding Ben Bullen State Forest. This can be achieved by immediately filling and shaping the void behind the mining face with overburden, thereby eliminating the need for an overburden emplacement area and for a final void/s.

The Department is generally satisfied with the progress of rehabilitation on the site, and notes that eliminating the need for an overburden emplacement area and final void/s on the site is a positive outcome, and something that on larger open cut coal mines is usually not feasible.

The Department has investigated the feasibility of the proposed final landform, and requested additional information from Coalpac to demonstrate that it would have sufficient material available under the proposed modification plans for filling the existing and proposed voids, and for managing and capping historical sub-surface heating at Cullen Valley.

A summary of the materials balance provided by Coalpac is shown in Table 4. This analysis indicates that there would be sufficient material to achieve the final landform and manage sub-surface heating. This conclusion is supported by DRE, which has advised the Department it has no concerns with the feasibility of Coalpac's rehabilitation and final landform plans.

Table 4*: Final Landform Material Balance*

Ref	Description	Unit	INV (Million)	CVM (Million)	Total (Million)	Comments
a	Excess Overburden	m^3	6.40	4.30	10.70	Assumes swell 20%
b	Mined Open Cut Coal	t	5.00	3.00	8.00	As per EA Modification
c	Coal Void	m^3	3.33	2.00	5.33	Assumes 0.66 m^3/tonne
d	Pre-existing underground void	m^3	0.45	0.00	0.45	Underground workings from previously mined areas at Invincible Colliery
e	**Overburden Remaining**	**m^3**	**2.62**	**2.30**	**4.92**	**a – (c + d)**
f	Existing void	m^3	1.60	0.40	2.00	As per EA Appendix H
	Excess overburden	**m^3**	**1.02**	**1.90**	**2.92**	**e - f**

Coalpac has generated a conceptual final landform (including cross-sections) for both mines (see Figures 23 to 26).

The cross-sections indicate that the maximum slopes would be adjacent to the highwalls created by mining in areas of elevated topography, while other areas would comprise more gentle slopes. The Department is generally satisfied with the proposed final landform as it is would mimic the surrounding undulating landscape.

The Department notes that to achieve long term stability of the final landform, Coalpac would need to create areas with up to 18 degree slopes, particularly at the southern end of the proposed southern pit and the eastern edge of the northern pit at the Invincible Colliery. However, these areas with steeper slopes would be relatively confined, and would rapidly integrate into area with shallower slopes of 10 degrees or less.

While the Department would prefer slopes to be no more than 10 degrees, it accepts that this is not always possible, and would unavoidable in this instance without sterilising coal resources. Further, it notes that several mines in NSW have successfully created new landforms with 18 degree slopes that are long term safe and stable, and that Coalpac has a good track record at the Invincible Colliery of being able to successfully rehabilitate areas with slopes of greater than 18 degrees.

Consequently, the Department considers the proposed rehabilitation of both mines to be acceptable, and has recommended conditions to ensure this rehabilitation complies with strict performance measures, and that the steeper slopes on site are made long term safe and stable.

Conclusion

The Department is satisfied that the proposed final landform and land use (i.e. woodland) is consistent with the surrounding landscape, and in the longer term would offset (at least to some extent) the impacts that mining would have on the conservation values of the site.

The Department is also satisfied that the modifications would enable an orderly cessation of mining within the location of the existing open cut mining areas and a higher quality rehabilitation outcome for both sites.

To ensure this is the case, the Department has recommended a range of measures in the conditions, including a requirement for Coalpac to comply with specific rehabilitation objectives and prepare and implement a detailed Rehabilitation Management Plan that details how these objectives would be achieved. With the implementation of the measures, the Department is satisfied that the site can be rehabilitated to achieve a free-draining stable final landform that is consistent with best practice.

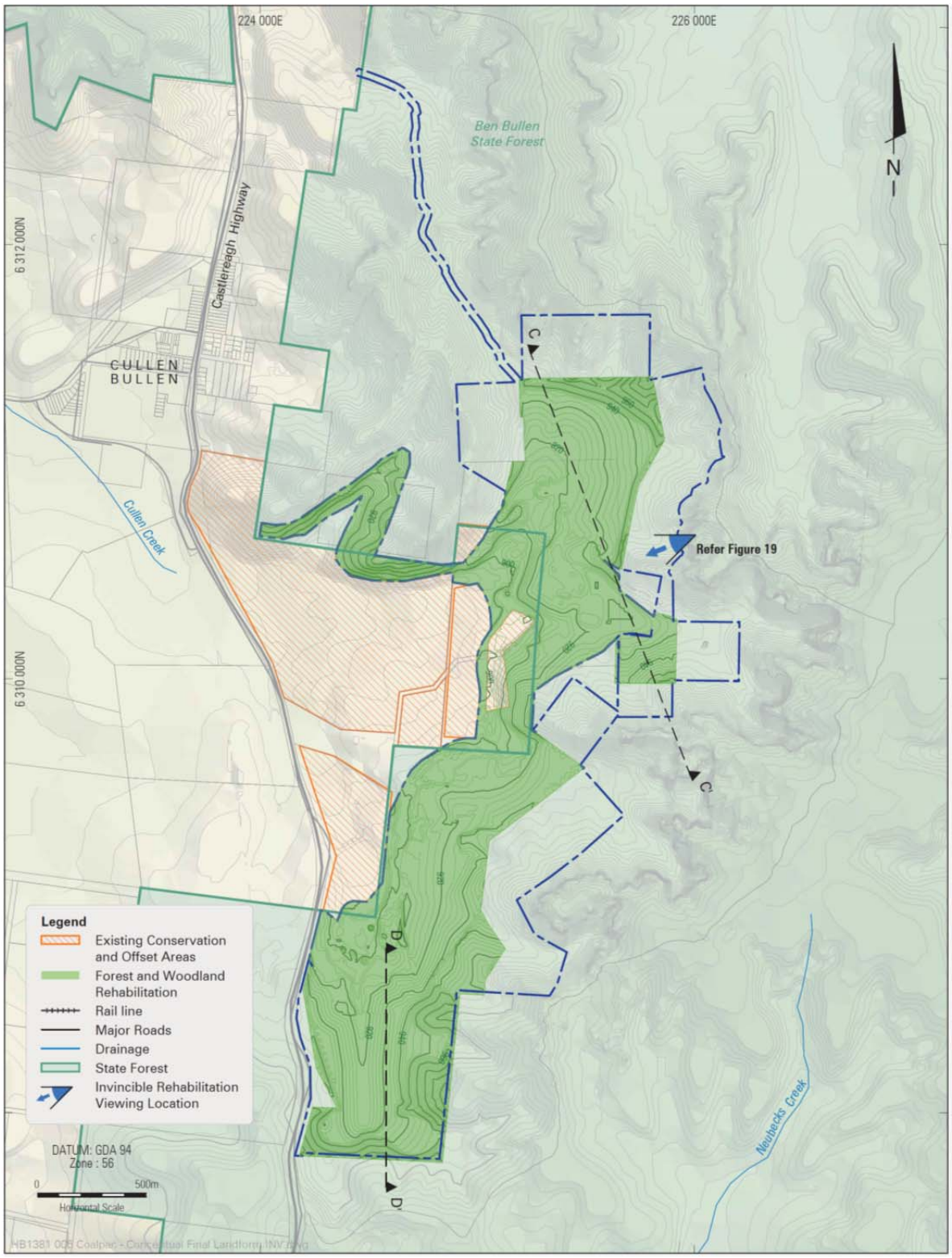

Figure 23: *Conceptual Final Landform - Invincible*

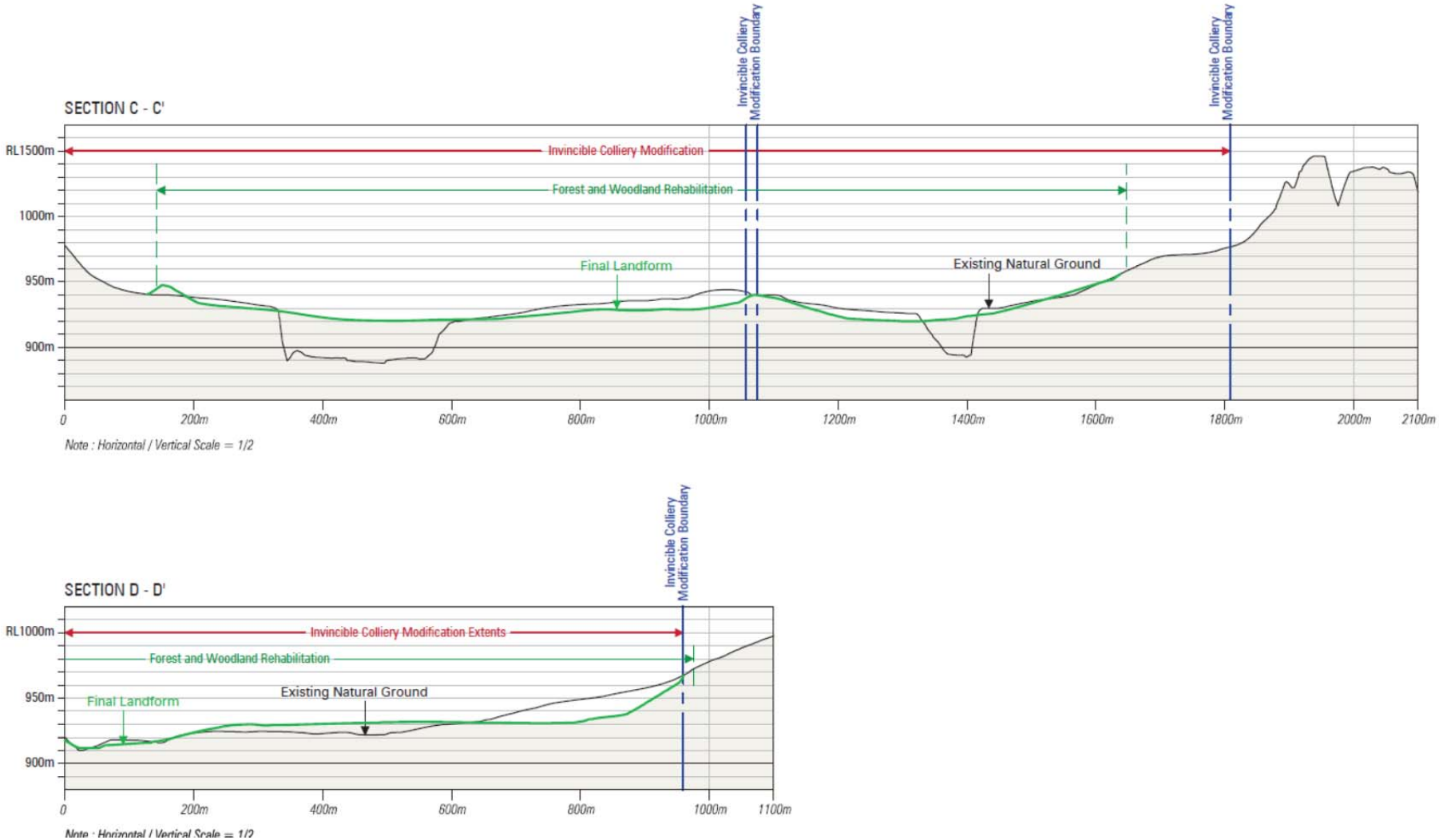

Figure 24: *Conceptual Final Landform – Cross-Sections – Invincible*

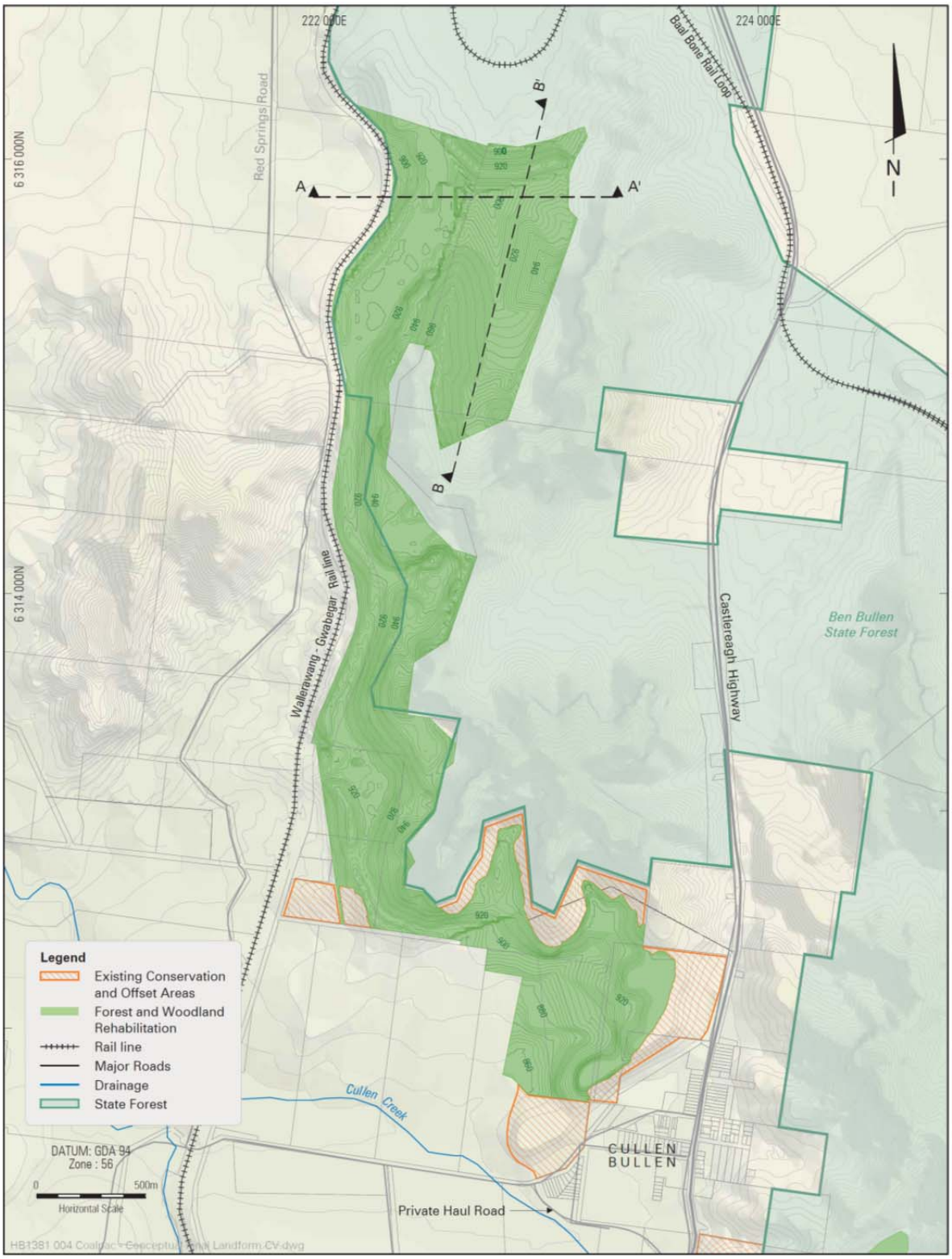

Figure 25: *Conceptual Final Landform – Cullen Valley*

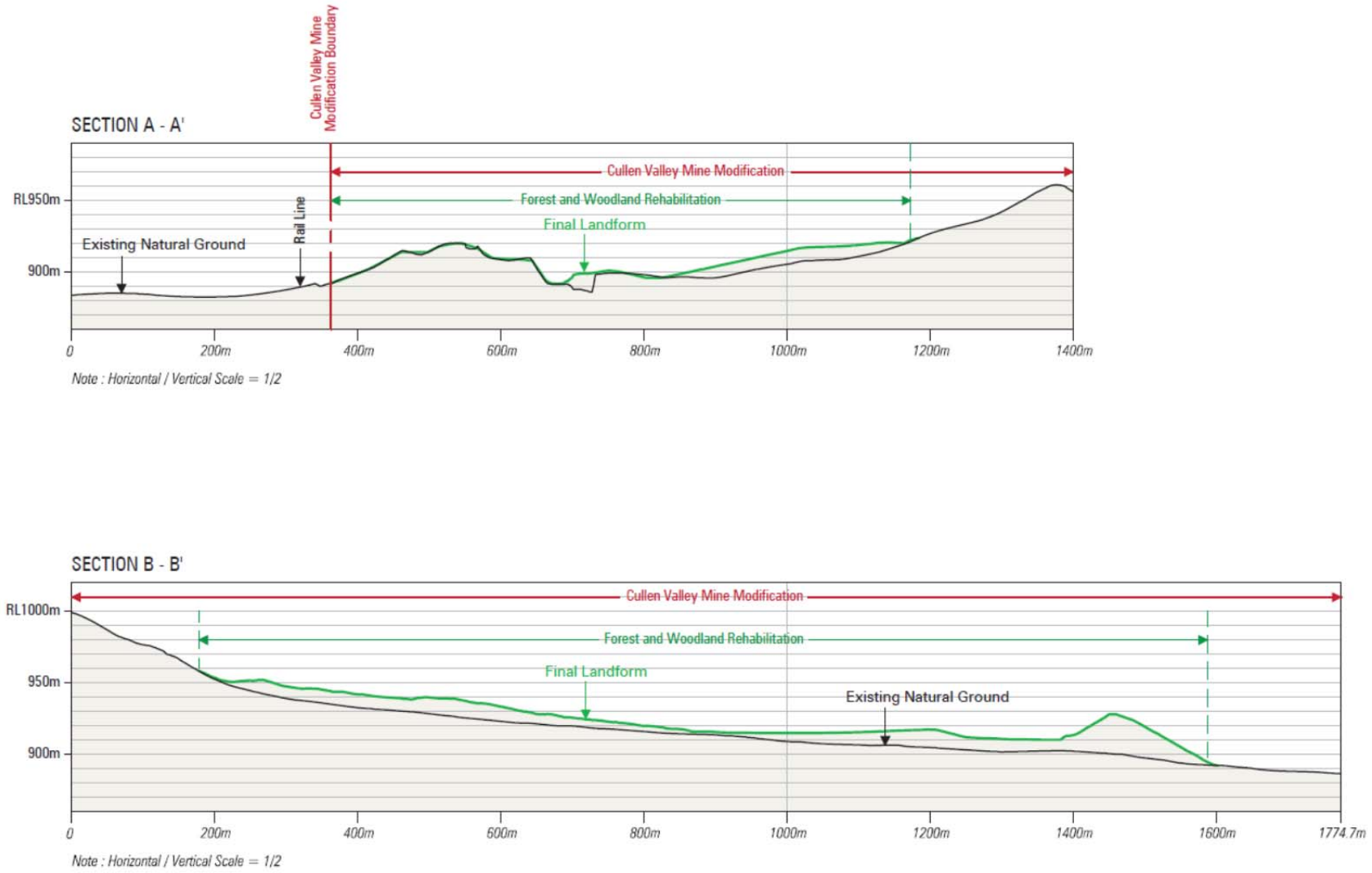

Figure 26: *Conceptual Final Landform – Cross-Sections – Cullen Valley*

6.7 Visual Amenity

Hansen Bailey has undertaken a visual assessment for the modifications, which has taken into account the visual effect and the visual sensitivity of the receiver. Given the complex topography in the area the two mines were considered separately and the Department has repeated this separation in its consideration below. The Department considers this acceptable given receivers would not have views of both mines simultaneously.

Invincible Colliery
The assessment determined that for the Invincible Colliery extension the available views would be from 3 key areas:

a) the Castlereagh Highway;
b) distance views from rural residences to the west; and
c) recreational users of the Ben Bullen State Forest.

The assessment indicates that views from sensitive rural receivers to the west would only be incrementally impacted by the expansion of the pits at Invincible. The eastern pit (and some raised sections of the southern pit) would be the most visible, while the northern pit would be mostly shielded. However, the assessment considers that the small size and location of the eastern pit would make it difficult to distinguish from the existing operations from these receivers.

From the Castlereagh Highway, the southern pit would increase the visual impact on motorists, particularly for southbound vehicles. Views for northbound vehicles would be effectively minimised by the vegetation buffer that would be retained between the southern pit and the highway. The Department also notes that the impacts of the additional areas of mining would be less visually intrusive than historical mining on the site, which was very noticeable from the Castlereagh Highway (see example in Figure 27).

The potential visual impacts on the landscape values of the Ben Bullen State Forest and the pagodas have been considered in Section 6.1 above. In terms of impacts on potential receivers in these areas, the Department acknowledges that the additional mining at Invincible would increase the visual impacts for walkers in the Ben Bullen State Forest, particularly from the top of the rock escarpments to the east of the mine. However, the Department notes that these areas are not National Parks, and there are relatively view visitors to the forest and even fewer tourists. The Department also notes that apart from ensuring that the progressive rehabilitation is successfully implemented, there are limited options for Coalpac to further reduce these impacts.

Overall, the Department believes that the Invincible modification would not significantly increase the impacts of the existing operations, and that the visual impacts on receivers would be relatively low The Department also believes that there are limited opportunities for Coalpac to further reduce the visual impacts of the mine, and that any visual impacts would be temporary as the proposed mining would only occur over 4 years, and the site would be progressively rehabilitated. Once the site is rehabilitated, the visual impacts of the mine would be minimal.

Figure 27: *Comparison of 'Before' and 'After' Rehabilitation - Invincible*

Cullen Valley

The visual impacts of the Cullen Valley modification would be most significant at a number of rural-residential properties to the north of the mine and to some larger rural land holdings to the west. In order to minimise the potential impacts to the north, a large bund (30 m high, 920 m long and 75 m wide) would be constructed at the northern extent of the modification disturbance boundary (see Figures 28 and 29).

The bund would effectively block available views of the highwall at Cullen Valley to the north, and once constructed, would also reduce the noise impacts on receivers in this area. Coalpac is proposing to vegetate the bund as soon as possible with temporary grass cover to reduce the visual impact, followed by final rehabilitation with trees. However, given the size and height of the bund, it is likely it would create visual impacts of its own, particularly prior to the trees being fully established.

The assessment indicates that the modification would result in a high visual impact on up to 9 residences to the north for a period of 1 to 2 years. After this the assessment indicates that the visual impacts would be significantly reduced as vegetation is established on the outer face of the bund.

The Department agrees that progressive rehabilitation can be effective in reducing visual impacts (see Figure 30). However, the Department believes that the proposed modification would still result in significant impacts on the residents to the north of the mine. To address this impact, the Department has recommended that Coalpac be required, at the request of the landowner, to implement additional visual mitigation measures at or near these residences. These measures should be targeted at reducing the visibility of the mine from the residence (rather than from the surrounding land) and comprise tree screening or similar landscaping treatments.

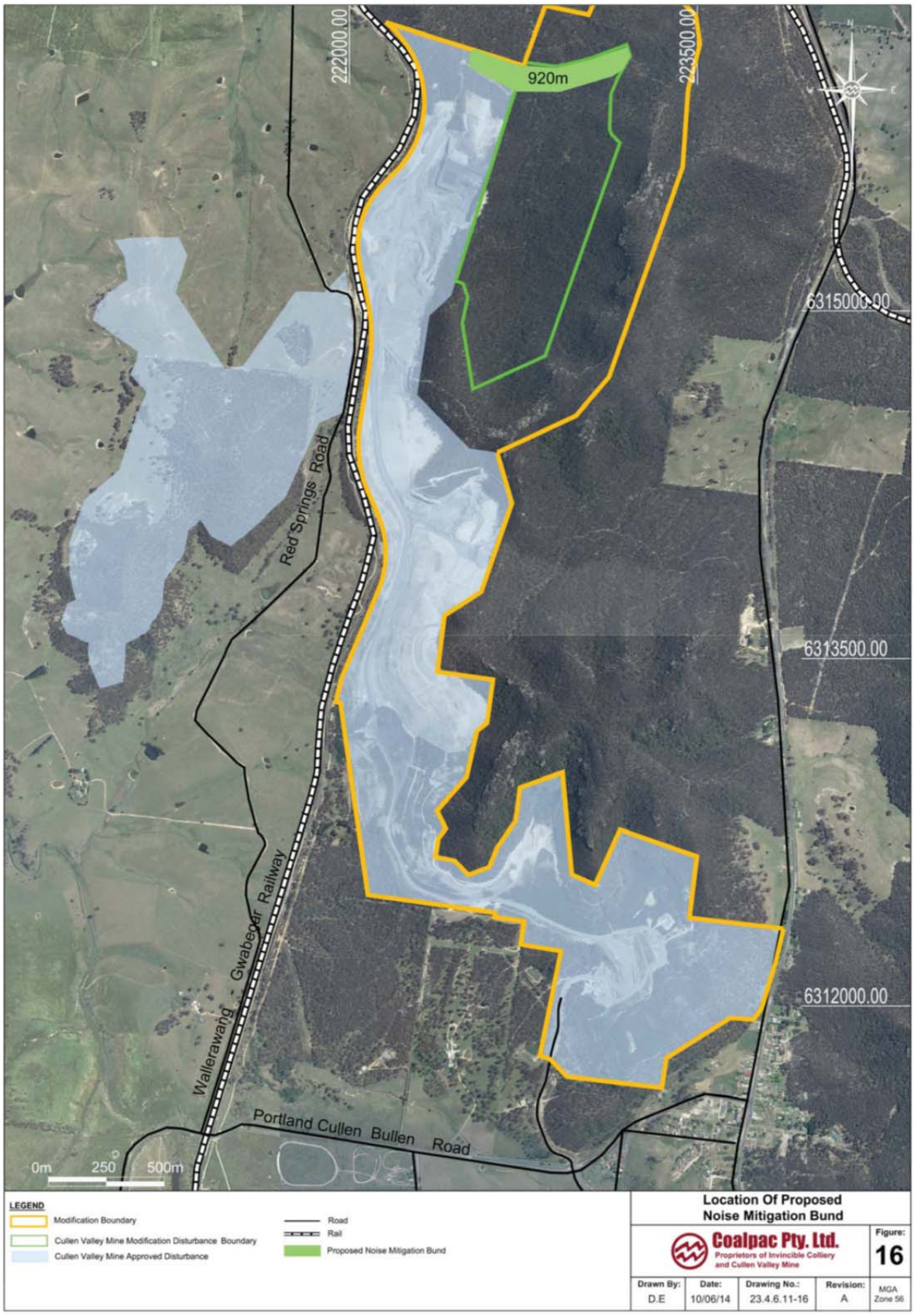

Figure 28: *Location of Proposed Noise/Visual Mitigation Bund – Cullen Valley*

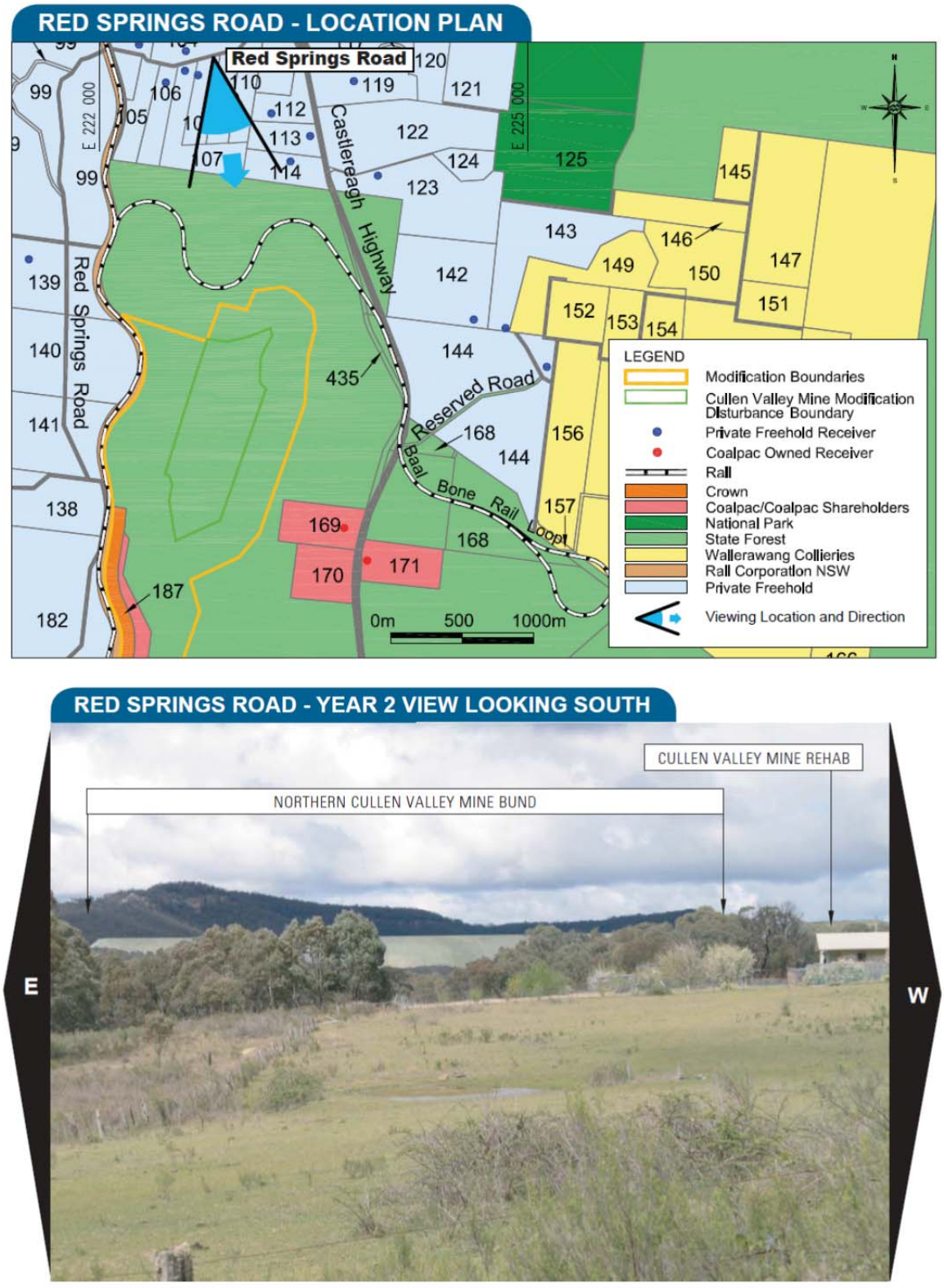

Figure 29: *Photomontage of Proposed Bund from the North – Cullen Valley*

Figure 30: *Comparison of 'Before' and 'After' Rehabilitation – Cullen Valley*

Some rural land holdings to the west of the Wallerwang – Gwabegar Rail line have existing views of the mining operations and would also have distant views of the proposal modification. The Department does not believe that the visual impacts on these properties would be significantly different than is currently the case, and with the progressive rehabilitation of the site, the visual impacts of the Cullen Valley mine as whole would be reduced.

Lithgow Council also raised concerns about the design and location of the bund, and requested to be consulted prior to the design being finalised.

To address the concerns about the bund from Council and local residents, the Department has recommended that Coalpac be required to:

- prepare a detailed design for the proposed bund in consultation with Council and nearby landowners;
- implement all reasonable and feasible measures to minimise the visual impacts of the bund;
- ensure the bund incorporates micro-relief and mimics other landforms in the surrounding area;
- ensure the bund is vegetated as soon as practicable once it is constructed; and
- maintain the vegetation on the bund once it is established.

With the implementation of these measures, the Department believes that the residual visual impacts of the bund would be effectively minimised, although there would be some residual visual impacts on a number of residents.

6.8 Sub-Surface Heating

At the Cullen Valley Mine subsurface heating is present within a section of the old historical Tyldesley Colliery underground workings and adjacent open cut backfill areas. The Department understands to date that all heating zones are located in areas mined prior to Coalpac purchasing the mine in 2007. Coalpac states that available evidence suggests that a fire was either deliberately started in the old workings or set alight by a bushfire, and is consequently not a result of spontaneous combustion.

To confirm this, Coalpac commissioned RGS Environment Pty Ltd in 2011 and 2013 to investigate the propensity of the coal and carbonaceous material to spontaneously combust. This study found that the risk of coal in the area to spontaneously combust is low due to its low pyritic content. The Department accepts this analysis, which reflects the Department's understanding of the coal seams in the western coalfield.

Under the current Care and Maintenance Mining Operations Plan, which has been approved by DRE, Coalpac is required to manage the sub-surface heating at Cullen Valley with the objective of eventually extinguishing it. Coalpac has engaged Olsen Environmental Consulting Pty Limited (OEC) to assess the progress and implementation of the Approved Plan of Works on an annual basis.

The Department understands that there are two zones of heating, firstly within the old underground workings and secondly within adjacent carbonaceous fill material used to backfill the open cut void at Cullen Valley.

The recent analysis by OEC indicates that the sub-surface heating is relatively dormant, and that it is important to ensure that the groundwater levels in the underground workings are maintained to prevent any residual sub-surface heating spreading. To this end, the proposed pipeline from Invincible would also ensure that there is sufficient water available at Cullen Valley to manage sub-surface heating.

With regard to the heating in the open cut backfilled areas, the Mining Operations Plan (MOP) contains a capping strategy for this heating zone. OEC reports that this task is approximately 50% complete and the recommended 4 m depth of cover of inert material (which is over three times the recommended minimum) has been met and exceeded in most locations. Once operations recommence, there would be sufficient backfill material available for Coalpac to complete the strategy.

The Department has reviewed the MOP and believes the recommended actions regarding containment and extinguishment, as well as, the detailed monitoring and reporting procedures are robust and sufficient to ensure that heating at the site is appropriately addressed.

Given the above, the Department believes there is a low risk of spontaneous combustion associated with the proposed modifications, and is satisfied that the standard management practices required in the MOP required by DRE would address any residual risks.

6.9 Aboriginal Heritage

The EA summarised the findings of the AECOM 2011 Aboriginal Cultural Heritage Impact Assessment (ACHIA), which considered the heritage values of all the areas to be disturbed by the modifications.

The EA states that 6 Aboriginal heritage sites would be directly impacted by the modifications, including 3 isolated finds and 3 artefact scatters. These finds are located within the proposed southern pit of the Invincible Colliery.

The ACHIA determined these sites were of low scientific significance, and Coalpac proposes to manage these sites by salvaging and storing the items in consultation with the Aboriginal community. Both the Department and OEH support these proposed management measures.

One potential Aboriginal rock art shelter approximately 100 m northeast of Cullen Valley could be indirectly impacted from blasting. Coalpac has indicated that it would design its blasting regime to have a minimal impact upon this site. The Department accepts that this is feasible, and has recommended conditions to protect this shelter from any adverse impacts from blasting on site (see above).

Since the AECOM report, two additional Aboriginal rock art caves have been discovered:
- the first in September 2012 within the mining lease of the Invincible Colliery; and
- the second in May 2014 within the proposed highwall mining area at Cullen Valley.

The 2012 art cave was inspected by Coalpac and the traditional owners, who asked for its location to be kept secret. This cave lies well outside the modification disturbance area, and is unlikely to be affected by any blasting associated with the proposed modifications.

The 2014 art cave is located approximately 140 m east of the proposed Cullen Valley open cut expansion, and is within the proposed highwall mining area, which extends up to 305 m from the open cut highwall. While there was some debate about the authenticity of the art within the cave

during the assessment process, the Department has considered further advice from OEH on the matter, and accepts that the cave has conservation values that should be protected from the impacts of mining.

Coalpac proposes to design its highwall mining to achieve negligible subsidence effects (i.e. less than 2 mm of vertical subsidence) on the cave, and says this level of subsidence is unlikely to result in any damage to the cave or its artwork.

Nevertheless given that the site is likely to have a high Aboriginal cultural heritage value and the concerns expressed by the Aboriginal community, the Department considers that this site should be given the highest level of protection. Consequently, the Department has recommended that no highwall mining be undertaken within 20 m of the cave.

In summary, the Department has concluded that the proposed modifications are unlikely to have a significant impact on the Aboriginal heritage values of the area, provided suitable measures are implemented to control the blasting and subsidence impacts of the project on three rock art shelters/caves in the vicinity of the sites.

To ensure this occurs, the Department has recommended conditions requiring Coalpac to:

- update the Aboriginal Heritage Management Plan for both sites, and carry out further consultation with the relevant Aboriginal stakeholders;
- develop protocols to salvage and store the heritage items within the approved disturbance area;
- ensure the Aboriginal rock art caves in the vicinity of the proposed modifications are suitably protected from any adverse blasting impacts; and
- no highwall mining occurs within 20 metres of the rock cave discovered in 2014.

Subject to the above conditions, the Department is satisfied the impact upon Aboriginal Cultural Heritage would be minimal and could be appropriately managed.

6.10 Other Impacts

The Department is satisfied that all the other potential impacts of the proposed modifications would be acceptable or could be suitably controlled by the implementation of appropriate conditions. These issues and the Department's assessment are summarised in Table 5 below.

Table 5: *Summary of the Department's Assessment of Other Impacts*

Transport	***Recommended Conditions***
• There would be no change to the approved rate of coal production, transportation or approval period for the Cullen Valley Mine. Consequently there would be no foreseeable impact on the road network from the proposed modification at the Cullen Valley mine. • With regard to Invincible Colliery, the approved rate of coal production and transportation arrangements would remain unchanged. However the approval period would be extended by four years. • Coalpac engaged DC Traffic Engineering Pty Ltd to review the performance of three intersections along the main transport route from the Colliery to Mount Piper power station over the extended time period to account for background traffic growth. • DC reported that there is ample spare capacity in the network to account for background growth over the extended life of the Invincible Colliery. • RMS raised concerns regarding potentially unsafe maneuvers being undertaken by non-project traffic at the intersection of the Castlereagh Highway and Invincible Colliery entrance. • RMS requested that Coalpac assess the intersection in conjunction with RMS to determine appropriate treatment to address these concerns. • Coalpac consulted with RMS in April 2014, and it was agreed that the road markings at the intersection should revert back to those in place prior to them being	• To ensure that coal trucks on public roads are appropriately managed the Department has recommended conditions requiring the Transport Management Plans for both mines be updated in consultation with Council and RMS. • These plans would include a heavy vehicle drivers' code of conduct, measures to enforce the code, and procedures for handling and responding to community complaints. • The Department has also recommended that the line markings at the Invincible site access intersection on the Castlereagh Highway be altered to the satisfaction of RMS. • Subject to these conditions and Coalpac's commitments, the Department is satisfied that the modification would have a minimal and acceptable impact on the road network. •

changed for the Centennial Coal Ivanhoe North Project (now closed) located opposite the front entrance to the Colliery. • Coalpac has committed to assisting with the assessment of the intersection in conjunction with RMS.	
Greenhouse Gas Emissions	***Recommended Conditions***
• A greenhouse gas (GHG) assessment for the proposed modifications considered both direct and indirect GHG emissions associated with the modifications. • The GHG emissions were calculated using the equations and emissions factors specified in the *National Greenhouse Accounts Factors 2013*. • The GHGs assessed included: Scope 1 emissions (fuel consumption during mining operations and explosives consumption); Scope 2 emissions (indirect emissions with onsite electricity use); and Scope 3 emissions (indirect emissions including production and transport of fuels and electricity lost in transmission). • The estimated Scope 1 emissions intensity is approximately 0.015 t CO_2-e/t saleable coal, with the largest contribution being combustion of fuel on site. This intensity is similar to other open cut mines in NSW. • Total GHG emissions over the life of the project would be 17.24 Mt CO2-e (0.13 Mt Scope 1, 0.01 Mt Scope 2 and 17.1 Mt Scope 3). • Coalpac would continue to implement the existing Greenhouse Gas and Energy Efficiency Management Plans and would continue monitoring and improving energy use and efficiency.	• The Department acknowledges the threats posed by global warming and climate change. Nevertheless, the Department considers that the direct contribution of the project to national and global GHG emissions is very small. • The Department also considers that refusing the project would be unlikely to have any measurable impact on global GHG emissions as the gap in the market would be filled by coal sourced from other suppliers in the region. • In the context of national and global emissions the impacts of the development are not significant. Nonetheless, the Department has recommended a condition that requires Coalpac to demonstrate that it is minimising the GHG emissions generated by both mines.

7. RECOMMENDED CONDITIONS

The Department has recommended conditions of approval for the proposed modifications (see Appendix A). These conditions are required to:

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

The Department notes that it has taken the opportunity to update and strengthen the majority of the conditions to reflect current best practice for the regulation of mines in NSW, particularly for the Cullen Valley Mine development consent, which was issued almost 10 years ago. The conditions also incorporate the recommendations of relevant government authorities.

Overall, the Department believes these conditions provide a sound basis for managing, monitoring and offsetting the potential impacts of the modified operations at Invincible and Cullen Valley.

8. CONCLUSION

The Department has assessed the merits of the modification applications, EA, submissions on the proposal and Coalpac's response to submissions in accordance with relevant policies, plans, guidelines, and the requirements of the EP&A Act. The Department has also referred to the relevant aspects of its assessment of the Coalpac Consolidation Project, and the recommendations of the PAC in regard to that project.

This assessment has found that the proposed modifications would result in economic and social benefits, including generating up to 80 jobs and $29 million in royalties to the NSW Government.

More importantly, the proposed modifications would reintroduce some diversity into the coal supply chain for the nearby power stations, and could help to reduce the risk of increased electricity prices for NSW consumers. It would also maximise the use of existing mining, processing and transport infrastructure on the site, and improve the final rehabilitation of both sites by enabling the existing mine voids to be filled and returned to woodland.

In regard to residual impacts, the Department considers that the amenity impacts of the proposal would be similar to the approved operations on both sites, and in some respects they would be reduced. In particular, the Department notes that during the proposed modifications there would be no night time mining operations at either of the mines. The Department also notes that the areas of extraction would generally be further away from the majority of residents in the area, particularly the residents in Cullen Bullen.

While the assessment indicates that the operations as modified would be able to comply with applicable noise and dust criteria at surrounding properties, the proposed bund on the northern edge of the Culley Valley mine would be highly visible from some of the adjoining properties. To mitigate the potential visual impacts of the bund, the recommended conditions require the bund to be designed in consultation with Lithgow Council and nearby landowners, and to be revegetated as quickly as possible following construction. They also allow these landowners to ask Coalpac to implement additional visual mitigation measures, such as landscaping treatments, to minimise the visibility of the mine from their residences. With the implementation of these measures, the Department believes the visual impacts of the proposed modifications would be acceptable.

Ultimately, the key issue associated with the modifications relates to allowing further open cut mining in an area of significant conservation value, and close to internationally significant pagoda formations.

In this regard, the Department acknowledges that the modifications would result in the clearing of an additional 150 ha of this landscape. To some extent, this would be mitigated in the medium to long term by the rehabilitation and revegetation of the site to woodland. Further, any residual impacts would be compensated for through the implementation of a biodiversity offset strategy that would facilitate the long term protection and management of an additional 1,400 ha of land with similar biodiversity values.

The Department is satisfied that the proposed setback from the most significant pagoda formations to the east of the Invincible Colliery would ensure there is no risk to the structural stability of these formations. However, in other areas (i.e. to the north of Invincible and at Cullen Valley), the Department believes that the setback from rock features is not sufficient to afford an adequate level of protection, and has therefore recommended that a 100 m buffer be imposed for open cut mining. In regard to highwall mining, the Department is confident that this can be effectively managed to ensure there would be no damage to any rock features or identified sites of Aboriginal cultural heritage significance in the area.

Importantly, if the modifications do not proceed, it is possible that the existing voids on the site would never be filled and they would become a permanent feature of the landscape. In the Department's view, it would be better to accept the limited short term impacts of further mining in order to achieve a better final landform, than it would complete the rehabilitation now.

Given these considerations, the Department is satisfied that the proposal would not significantly increase the impacts of the approved mines, and that the residual impacts can be adequately mitigated and managed through the imposition of strict conditions.

Overall, the Department is satisfied that the proposal strikes an appropriate balance between environmental protection and realising the economic and rehabilitation benefits that would flow to the region and the State if the project is allowed to proceed.

Consequently, the Department considers the project to be in the public interest, and recommends that it be approved subject to strict conditions.

5.8.14

Chris Wilson
Executive Director
Development Assessment Systems & Approvals

APPENDIX A – NOTICES OF MODIFICATION

APPENDIX B – ENVIRONMENTAL PLANNING INSTRUMENTS

Reference should also be made to Section 4.2 of the EA where Coalpac has also considered the EPIs.

SEPP No. 33 – Hazardous and Offensive Development

The proposals do not meet the definition of potentially hazardous industry. While it could be characterised as a potentially offensive industry without employing any mitigation measures, the Department is satisfied that suitable mitigation measures have been incorporated into the design of the modifications to ensure it will meet the relevant standards, and be compatible with the existing or likely future use of the land surrounding the mines. The Department is therefore satisfied that the proposed modifications are not potentially hazardous or offensive, and that the proposal is consistent with the aims, objectives and requirements of SEPP 33.

SEPP No. 44 – Koala Habitat Protection

The ecological assessment accompanying the EA identifies that the modifications boundaries do not contain any areas of 'core koala habitat', as defined by SEPP 44. However, the flora surveys identified the presence of preferred feed tree species listed in Schedule 2 of SEPP 44. Consequently, the assessment concluded that the modifications would clear approximately 148 ha of 'potential koala habitat'.

Nonetheless, the ecological assessment concluded that the modifications were unlikely to significantly impact koala habitat. This conclusion was based on the fact that no koalas have been historically recorded within the large study area, no evidence of koala habitation was found during several targeted surveys, and the fact that the no area of habitat for this species would be fragmented or isolated as the modification boundaries are located directly adjacent to existing mining development.

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SEPP 44 aims to conserve and manage koala habitat to reverse the current trend of koala population decline. In this respect, the Department is satisfied that the applications would not significantly impact the koala populations and would eventually lead to improved long term habitat outcomes through the establishment and enhancement of local offsets that would link with existing areas of vegetation.

Overall, the Department is satisfied that the applications are generally consistent with the aims, objectives and requirements of SEPP 44.

SEPP No. 55 – Remediation of Land

Most of the site is State forest, which is unlikely to be contaminated. The rest of the site comprises the existing Invincible Colliery and Cullen Valley mines. While there is a small risk that some parts of each mine could be contaminated - such as the areas surrounding the existing fuel storages - the Department has no evidence to suggest that any of this land is contaminated. Nevertheless, if any of this land contaminated, the Department is satisfied that it could easily be remediated to ensure it is suitable for its existing or future use.

Overall, the Department is satisfied that there is limited risk of the subject land being contaminated and that the modifications are generally consistent with the aims, objectives, and provisions of SEPP 55.

SEPP (Infrastructure) 2007

The Infrastructure SEPP requires the consent authority to notify relevant public authorities about developments that may affect public infrastructure or public land. To this end, the Department notified Lithgow City Council, RMS, DPI, and Endeavour Energy about the proposed applications.

Lithgow City Council, RMS, DPI, and Endeavour Energy did not object to the applications, subject to a number of recommended conditions of approval.

All matters raised by public authorities have been extensively considered by the Department in its assessment of the applications (see Section 6 above). Where appropriate, the Department has also incorporated the recommendations made by public authorities into the recommended notice of modifications (see Appendix A). Consequently, the Department is satisfied that the requirements of the Infrastructure SEPP have been satisfied.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

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

- the significant of the resource;
- certain non-discretionary development standards in relation to noise, air quality, blasting and aquifer interference;
- the compatibility of the proposal with other land uses;
- natural resource management and environmental management;
- resource recovery;
- transport; and
- rehabilitation.

While these matters do not technically apply to section 75W modification applications, the Department has considered all of these matters in its assessment of the merits of the applications.

Based on this assessment, the Department is satisfied that:

- the resource is significant, as confirmed by DRE;
- the applications would generally comply with the non-discretionary standards in the SEPP;
- the applications would be compatible with other land uses in the areas;
- the applications would not have any significant impacts on other major natural resources in the region, including:
  - surface and ground water resources; and
  - the biodiversity values of the site;
- the residual biodiversity impacts of the applications would be offset;
- the greenhouse gas emissions of the applications would be minimised to the greatest extent practicable;
- the resource recovery of the applications is acceptable, even though some coal would be sterilised to minimise impacts upon Aboriginal Heritage;
- the impact to the local road network is negligible as the large majority of the coal produced by the mines would be trucked on the State road network to the nearby Mount Piper Power Station; and
- the site would be suitably rehabilitated over time to blend in with the surrounding landscape, and enhance the biodiversity values of the region.

Finally, the Department is satisfied that the applications would not have a significant impact on the nearby village of Cullen Bullen or other nearby residences.

Consequently, the Department is satisfied that the applications can be carried out in a manner that is generally consistent with the aims, objectives and provisions of the Mining SEPP.

APPENDIX C – ENVIRONMENTAL ASSESSMENT

Refer to Department's website:

Invincible Website
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6446

Cullen Valley
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6451

APPENDIX D – SUBMISSIONS

Refer to Department's website:

Invincible Website
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6446

Cullen Valley
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6451

APPENDIX E – RESPONSE TO SUBMISSIONS

Refer to Department's website:

Invincible Website
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6446

Cullen Valley
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6451