

ASSESSMENT REPORT

WAMBO COAL MINE Longwall 10A Modification (DA 305-7-2003 MOD 14)

1. BACKGROUND

The Wambo coal mine is located in the Hunter Valley about 15 kilometres (km) west of Singleton, near the village of Warkworth (see **Figure 1**). The mine is bounded by several coal mining operations to the north and east, agricultural activities associated with Wambo Creek and Wollombi Brook to the south and Wollemi National Park to the southwest (see **Figure 2**).

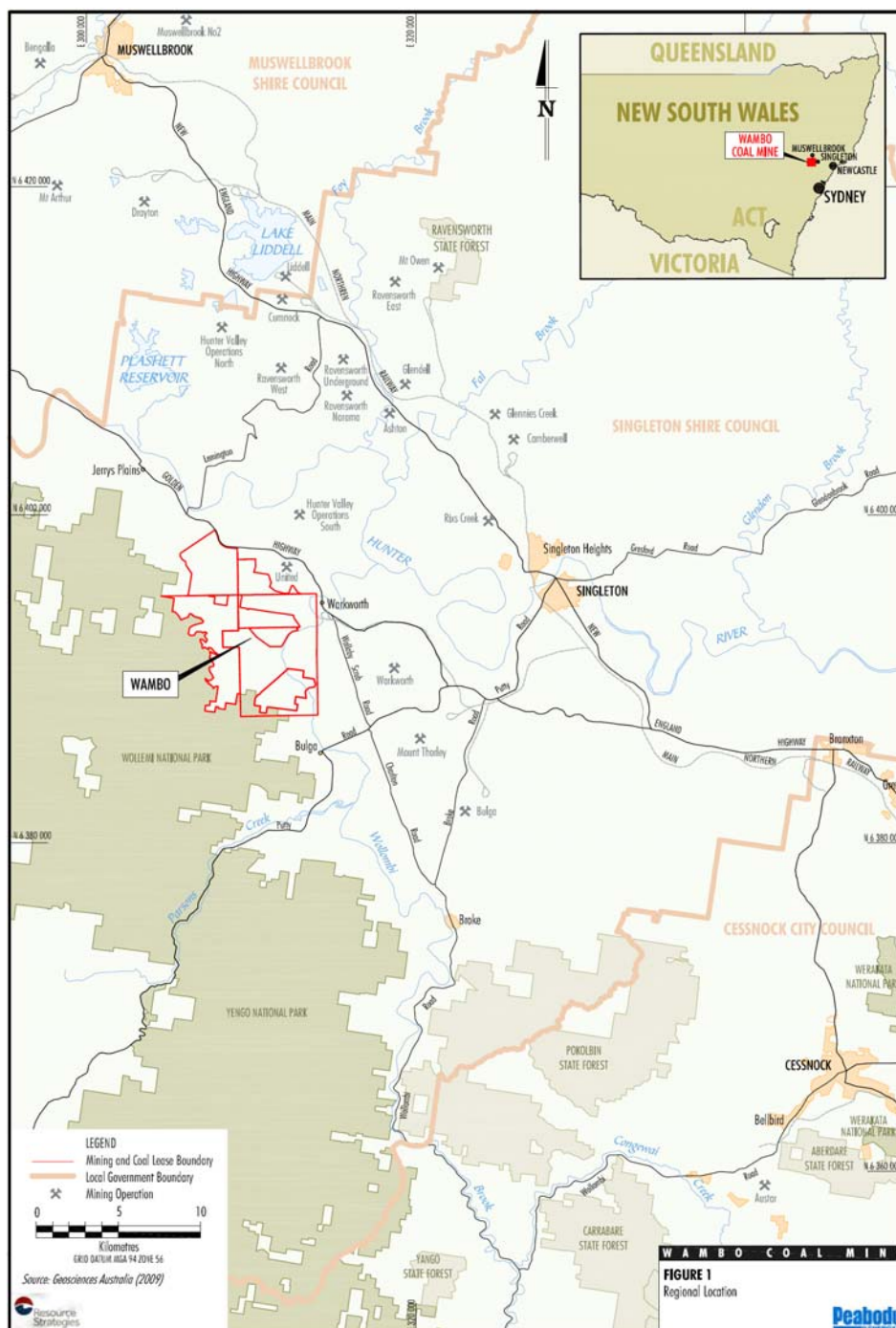


Figure 1 - Locality map

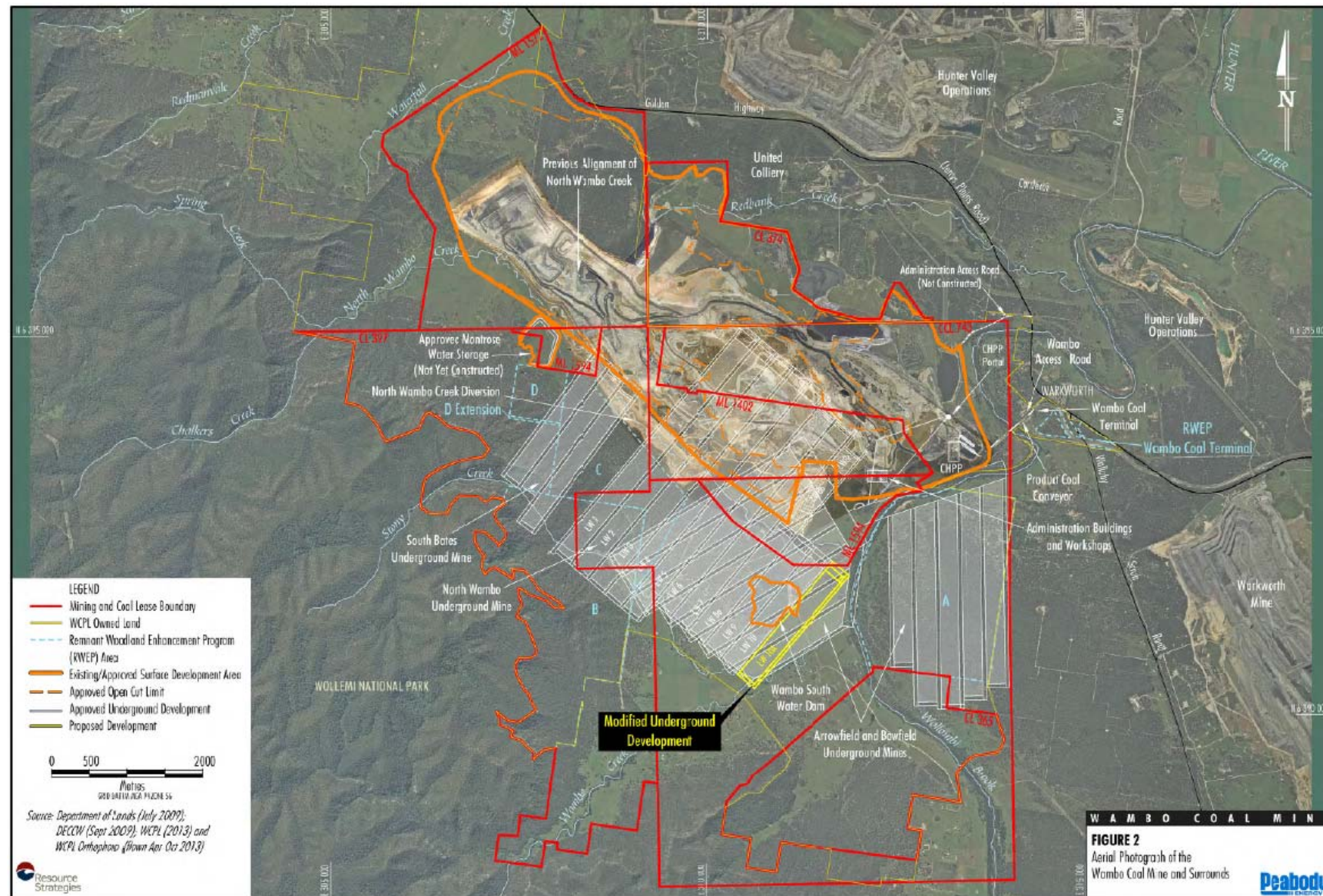


Figure 2 – Proposed modification to the North Wambo Underground Mine showing Longwall 10A

The mine originally commenced operations in 1969 and is currently operated by Wambo Coal Pty Limited (Wambo), a subsidiary of Peabody Energy. The operations currently involve mining in the North Wambo Underground Mine (the subject of the current modification application) and the Wambo Open Cut Mine. Mining is yet to commence in the approved South Bates Underground Mine, Arrowfield Underground Mine and Bowfield Underground Mine.

Current operations at the mine are controlled by two Ministerial development consents: one for the open cut and underground mining operations (DA 305-7-2003 granted on 4 February 2004), and the other for the associated rail operations (DA 177-8-2004 granted on 16 December 2004). Under these consents, Wambo is allowed to:

- extract up to 14.7 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, comprising
 - up to 8 Mtpa ROM coal from its open cut mining operations; and
 - up to 7.5 Mtpa of ROM coal from its underground mining operations;
- process this ROM coal at its onsite coal handling and processing plant (CHPP); and
- transport up to 15 Mtpa of product coal from the mine via rail.

Secondary extraction is currently occurring in Longwall 10 of the North Wambo Underground Mine and mining is scheduled to commence at the South Bates Underground Mine in January 2016.

2. PROPOSED MODIFICATION

With extraction in the North Wambo Underground Mine scheduled for completion in late June 2015, Wambo has identified an opportunity to optimise its existing operations through the development of an additional longwall panel - Longwall 10A (see **Figure 2**). In addition to the recovery of 1.9 million tonnes of ROM coal, this longwall panel would extend the life of the North Wambo Underground Mine by six months and provide continuity of operations with the South Bates Underground Mine.

The proposed longwall panel would be 2 km long, with a 1,745 m extraction length, 26 m wide chain pillars, 253 m wide extraction face and 2.6 m extraction height. Due to the south-westerly dip of the coal seam, the depth of cover to the surface would increase from a minimum of about 120 m in the northeast to around 220 m in the southwest. At this depth, Longwall 10A would be located about half way between the former workings of the Homestead Mine (in the overlying Whybrow seam) and approved longwall panels in the deeper Arrowfield and Bowfield Seams (see **Figure 3**).

In effect, the modification would be a continuation of mining in the Wambo seam and would utilise the existing underground workforce and equipment fleet. No changes are proposed to the approved mine life, extraction rate, coal processing and transport arrangements, operating hours or surface infrastructure. Further, as the existing underground ventilation, gas management and dewatering systems would be extended from the existing Longwall 10 to service Longwall 10A, the modification would not require any additional surface disturbance for these activities.

As the modification only relates to the underground workings for the North Wambo Underground Mine, all other aspects of the approved mining operations at the Wambo coal mine would remain the same.

A further detailed description of the modification is provided in the Environmental Assessment (EA, see **Appendix C**).

3. STATUTORY CONTEXT

DA 305-7-2003 was granted in 2004, under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As such, in accordance with Clause 8J(8) of the *Environmental Planning and Assessment Regulation 2000* and the transitional arrangements under Schedule 6A of the EP&A Act, the modification is to be determined under the former section 75W of the EP&A Act.

The Department is satisfied the proposal should be characterised as a modification to the existing development consent as the additional coal to be recovered is a small fraction of the mine's annual and overall production, the disturbance footprint occurs within an area of approved underground mining, and the proposal could be achieved with minimal environmental impact (see Section 5).

The Minister for Planning is the approval authority for the application. However, the Executive Director, Resource Assessments and Compliance, may determine the application under the Minister's delegation of 16 February 2015, as Wambo has not made any reportable political donations, Council does not object to the proposal, and there were less than 10 public objections.

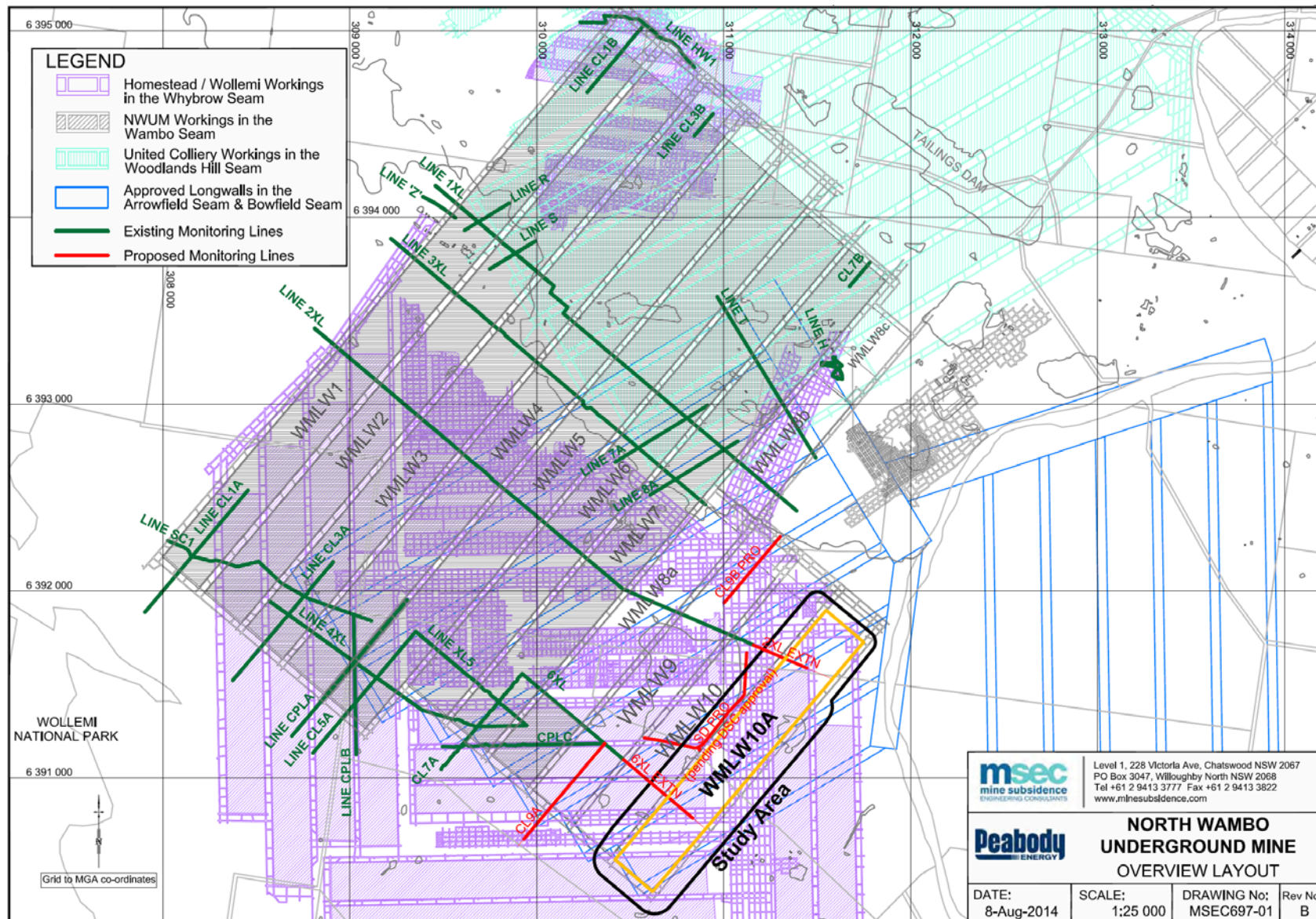


Figure 3 – Layout of proposed Longwall 10A and approved North Wambo Underground Mine workings

4. CONSULTATION

The Department exhibited the modification application from 3 October 2014 until 17 October 2014 and made the accompanying EA publicly available on its website and at the Department's Information Centre, Singleton Council and the Nature Conservation Council.

In response to this exhibition, the Department received 10 submissions from government agencies, and an objection from a nearby landowner. Copies of these submissions and a copy of Wambo's Response to Submissions (RTS) are included at **Appendix D** and **Appendix E**, respectively. A summary of the issues raised in these submissions is provided below.

4.1 Agency Submissions

In accordance with standard practice, the **Department of Primary Industries (DPI)** provided separate responses on behalf of the **NSW Office of Water (NOW)** and the **Office of Agricultural Sustainability and Food Security (OASFS)**. The OASFS did not raise any specific concerns with the modification.

NOW raised initial concerns with the conceptualisation and calibration of the groundwater modelling for Longwall 10A and the implications this could have for minimal impact considerations under the *NSW Aquifer Interference Policy*. NOW's main concerns included the potential impacts of subsidence-induced fracturing and increased hydrological connectivity on post-mining salinity, cumulative groundwater drawdown at private bores, potential impacts on groundwater dependent ecosystems, and the proposed undermining of the Wambo Creek and Stony Creek channels.

Wambo has since provided a range of additional information and worst case modelling to address these specific matters. In addition, the Department commissioned an independent peer review of the groundwater modelling and has addressed each of NOW's concerns in detail (see Section 5.2).

The **Office of Environment and Heritage (OEH)** was satisfied with the proposed management of Aboriginal heritage sites and identified that the likely impacts on these sites could be managed under the existing approval conditions and an amended Aboriginal Heritage Impact Permit.

OEH also noted that the modification would not clear any threatened vegetation, but requested that the Department afford further consideration to the potential effects of increased subsidence on threatened biodiversity overlying the modification area. To address these potential impacts, OEH recommended that Wambo undertake baseline assessments and ongoing monitoring to analyse trends in vegetation communities, and develop appropriate contingency responses, including the provision of additional offsets for any unforeseen impacts on these flora and fauna species.

The **Division of Resources and Energy (DRE)** within NSW Trade and Investment noted that the modification area is located within existing mining leases held by Wambo and identified that, should the modification be approved, Wambo would be required to prepare revised Rehabilitation, Subsidence Management and Mining Operations Plans.

The **Environment Protection Authority (EPA)** noted that it would be able to regulate the impacts of the modified development under Wambo's existing Environmental Protection Licence.

The **Dam Safety Committee (DSC)** noted that Wambo would be required to consult with the DSC prior to mining within the prescribed dam notification area for the Wambo South Water Dam.

Singleton Shire Council (Council) did not express any specific concerns, but requested that the modification ensure it does not impact on private landowner properties and local water resources.

Transport for NSW, the Roads and Maritime Authority (RMS) and **NSW Health (Health)** did not object to the modification and were satisfied that it could be managed under approval conditions.

4.2 Public Submission

A landowner located approximately 750 metres (m) south of the modification area objected to the proposal. This landowner raised concerns with a range of matters including: subsidence impacts on public safety (associated with an existing right of way through Wambo's land and South Wambo Dam); treatment of this right of way access road; impacts on surface and groundwater resources and the classification of agricultural land resources. These concerns have been considered further in Section 5.

5. ASSESSMENT

In assessing the merits of the proposal, the Department has considered the EA, submissions on the proposal, Wambo's RTS and the findings of the independent groundwater peer review undertaken by Dr Hugh Middlemis (see **Appendix F**). The Department considers the key assessment issues to be the potential subsidence and water resource impacts of the proposal. Consideration of these impacts is provided below, with further consideration of other impacts provided in **Table 1**.

5.1 Subsidence

Underground mining commenced at Wambo in 1969 as part of the former Homestead and Wollemi Mines, which used bord and pillar and longwall mining methods to extract coal from the Whybrow Seam (see **Figure 3**). Under DA 305-7-2003, granted in 2004, Wambo is permitted to develop multi-seam mining operations in the Whybrow, Wambo, Arrowfield and Bowfield coal seams. Extraction is currently taking place in the Wambo seam of the North Wambo Underground Mine and has not yet commenced at the South Bates, Arrowfield or Bowfield Underground Mines.

The subsidence assessment accompanying the EA defines the subsidence impact zone associated with the modification, as being the greater of the 20 mm predicted subsidence contour and a 26.5 degree angle of draw from Longwall 10A. As shown in **Figure 3**, this area is located entirely within Wambo-owned land and extends beneath the Wambo and Stony Creek alluvium.

In addition, this subsidence assessment predicts that the modification would not significantly change the approved magnitudes and extents of far-field horizontal movements, relative to the existing operations. In summary, this assessment notes that there is minimal potential for additional far-field movements following the extraction of Longwall 10A, given the stresses in the overlying strata would have already been redistributed following extraction of the approved longwalls.

Accordingly, while some surrounding natural and build features outside the study area are likely to experience low levels of strain and associated far field impacts from the project as a whole, these impacts would be very small and are not expected to materially change under the modification.

Since the modification area is already subject to multi-seam mining, the key factor for consideration is the relative increase in cumulative subsidence associated with the interaction of previous mining in the Whybrow seam, proposed mining in the Wambo seam and future mining in the Arrowfield and Bowfield seams. Under the modification, the cumulative impacts overlying Longwall 10A would include maximum vertical subsidence of up to 9,700 mm and associated tilts of up to 110 mm/m. These impacts are similar to those for the approved Longwalls 1-10 and would be expected where overlapping extraction is scheduled to occur in all four target coal seams.

In accordance with the Department's standard practice for managing mine subsidence, Wambo is already subject to approval conditions which stipulate key subsidence performance measures and require the development of a detailed Extraction Plan, to govern the secondary extraction of approved longwall panels. Key potential subsidence impacts are considered below.

South Wambo Dam

The South Wambo Dam is a large mine water storage which forms part of the Wambo mining operations. The dam overlies the approved Longwalls 8-10 and proposed Longwall 10A (see **Figures 2 and 4**). Given the existing consent already allows for subsidence of this dam, the primary consideration is whether the additional subsidence associated with the modification would further impair its structural integrity or serviceability.

In considering the effects of the proposal on the integrity and operation of South Wambo Dam, the EA notes that while cumulative subsidence would increase in the area above Longwall 10A, the maximum subsidence levels beneath the dam would remain unchanged relative to Longwalls 8-10, with a maximum vertical subsidence of 7,800 mm and conventional tilts of up to 75 mm/m.

The Department notes that subsidence can lead to the loss of stored water from dams, either through the differential lowering of parts of the dam wall and resultant overtopping and scouring, or by cracking at the base of the dam wall potentially leading to a dam breach. To manage this potential risk and related safety concerns, the Department has already imposed conditions requiring Wambo to substantially or fully drain the South Wambo Dam before mining near or beneath this dam. To this end, the Department notes that Wambo has sufficient capacity to accommodate this water in alternative storages on site, including the Montrose Water Storage.

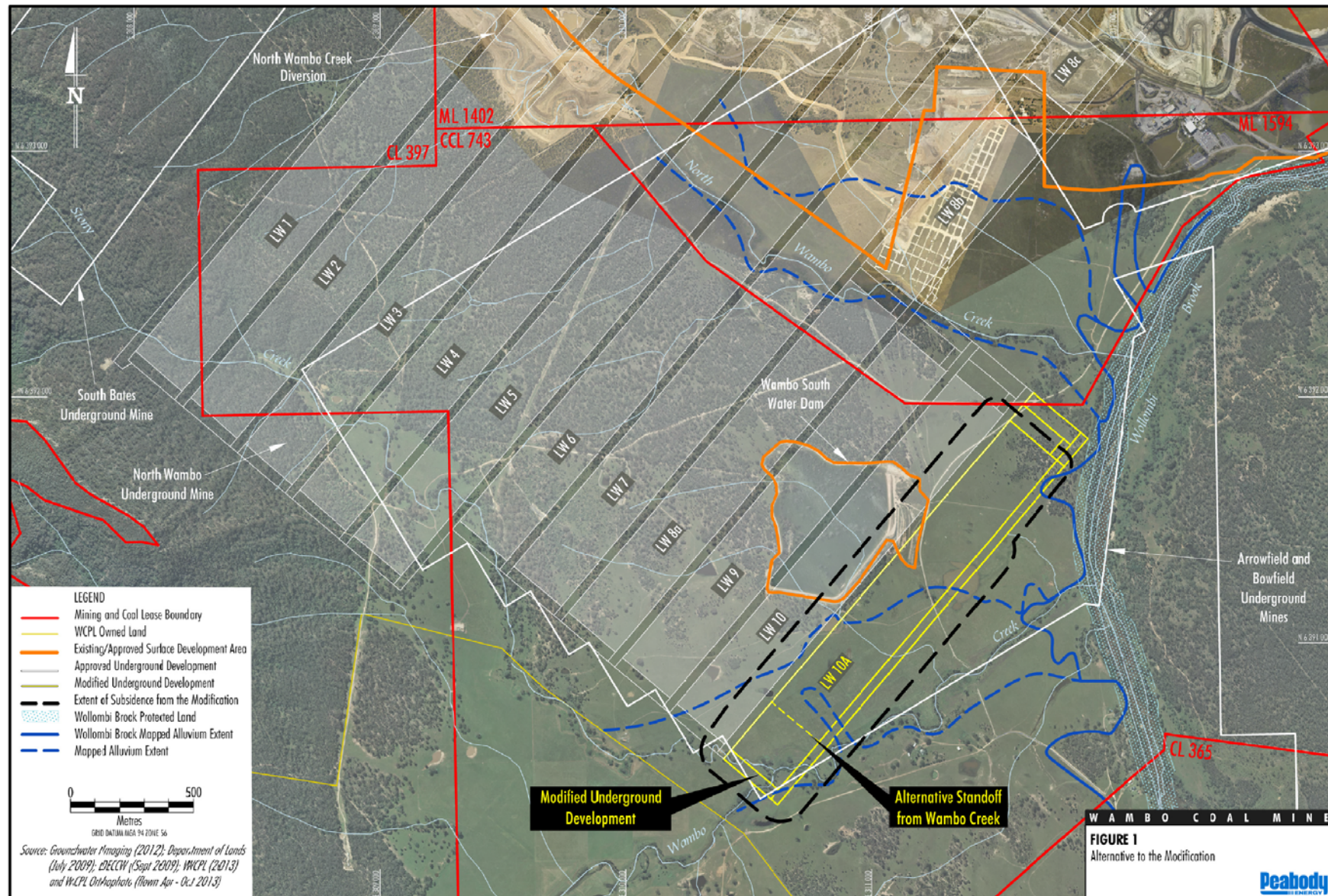


Figure 4 – Major surface water drainage systems and extent of associated alluvium

Under the existing approval, Wambo is also required to design, construct and operate the South Wambo Dam to the satisfaction of the DSC and DRE, comply with subsidence impact performance measures (including maintaining the safety of built features) and has already established a range of measures to manage the subsidence of this dam in its Extraction Plan for Longwalls 8-10.

Further, as South Wambo Dam is a prescribed dam under Schedule 1 of the *Dams Safety Act 1978*, the separate approval of the Dams Safety Committee (DSC) is also required before Wambo can mine within a set distance of the dam (the DSC's 'notification area'). This important approval is required to ensure that underground mining does not present a threat to the integrity of the dam or a risk of uncontrolled loss of water to the surface environment or underground mine workings.

Together, these conditions and the need to obtain DSC approval before mining in the notification area provide a high level of protection for both the environment and public safety. As such, the Department is satisfied that the modification could be managed under these existing arrangements.

Roads

Several unsealed roads traverse the modification area and are expected to experience the full extent of subsidence impacts (see **Figure 4**). While these private roads are used primarily for mining operations, one of the roads that traverses Longwall 10A also provides a right of way in favour of several private properties, the route of which may be varied on reasonable notice.

Predicted subsidence impacts on this right of way, including cracking and heaving of the road surface, were raised as a concern in the public submission. Wambo's RTS noted that the company is already required to maintain these roads to a safe and serviceable condition and would continue to manage subsidence impacts on the right of way, in line with existing management measures and trigger action response plans contained in the Extraction Plan for Longwalls 7-10. These measures include visual monitoring during active subsidence and periodic road maintenance, as required.

Further, should the secondary extraction of Longwall 10A pose any unnecessary risks to public safety, Wambo has committed to vary the route of the right of way (subject to reasonable notice) to ensure compliance with its obligation to cause no additional risk to public safety. With these arrangements in place, the Department is satisfied that the subsidence impacts could be managed to meet the public safety and infrastructure serviceability requirements in the existing conditions.

Other Built Features

Wambo owns a range of additional infrastructure within the predicted subsidence zone, including five small farm dams, an 11 kV powerline and water pipelines. While these infrastructure assets are predicted to experience varying degrees of subsidence impacts, none are predicted to experience significant serviceability impairments as a result of the modification. The Department is therefore satisfied that these mine-owned assets could continue to be managed (and repaired as necessary) to meet relevant safety and serviceability requirements, under an Extraction Plan for Longwall 10A.

Natural Landscape Features

The EA identifies that the extraction of Longwall 10A would not cause any significant subsidence impacts, beyond those associated with the approved operations, on surrounding natural landscape features, including the adjacent Wollombi Brook and the Wollemi National Park to the west.

Having reviewed the predicted effects of subsidence on the surrounding landscape, the Department is satisfied that these impacts would be relatively negligible and could be managed in accordance with the existing approval conditions and amendments to the performance measures, trigger values and impact response plans specified in the Extraction Plan for Longwalls 7-10.

Potential subsidence impact on Wambo and Stony Creeks are considered in detail below.

5.2 Water Resources

The modification area is located within the Lower Wollombi Brook water source, to the south of North Wambo Creek and is traversed at its southern extent by Wambo and Stony Creeks. These creeks drain in a general easterly direction to the nearby Wollombi Brook, which flows northeast to the Hunter River (see **Figure 4**). Local groundwater resources are characterised by two main aquifers, namely a highly productive alluvial aquifer system which interacts with the surrounding surface creeks and a less productive, deeper and more saline Permian porous rock aquifer system.

Hydrological connectivity

The EA identifies that the extraction of Longwall 10A is unlikely to induce connective cracking from the mine workings to the overlying alluvium and surface water catchments. However, the EA acknowledges that the risk of connective cracking is exacerbated by the presence of overlying Homestead Mine workings and future extraction in the underlying Arrowfield and Bowfield seams.

The Department has recently considered the implications of such multi-seam interactions in its assessment of the approved Extraction Plan for Longwalls 7-10 of the North Wambo Underground Mine. This Extraction Plan identifies that secondary extraction of the Wambo Seam is likely to generate localised connective fracturing to the surface or alluvium, in areas where the Homestead and Wambo workings overlap and the depth of cover to the Wambo seam is less than 110 m.

To address this issue and protect the North Wambo Creek alluvium, the Department required Wambo to backfill or grout the former Homestead Mine workings, where these workings would be undermined by Longwalls 7-10 at depths of cover of up to 110m. These measures were considered adequate to mitigate the risk of roof failures, subsidence and flooding of the underground workings.

By comparison, Longwall 10A would have a minimum depth of cover to the Wambo seam of 120 m at the northern end of the longwall panel, where no extraction has occurred in the Whybrow seam. As the local geological strata dip southwest, this depth of cover would increase to a minimum of 140 m above any area where extraction would occur in both the Homestead and Wambo seams, and at least 160 m beneath the mapped alluvial deposits of Wambo and Stony Creeks.

The EA considers that these depths of cover would be sufficient to prevent connective fracturing to the surface and minimise associated hydrological connectivity between the Permian coal measures and the Wambo Creek and Stony Creek alluvial aquifers.

Despite this depth of cover, NOW's submission raised concerns that multi-seam subsidence could induce fracturing above Longwall 10A and increase the risk of long-term salinity impacts associated with the upwelling of saline water from the deeper Permian coal measures into the overlying alluvium and surface water drainages, following re-equilibration of groundwater levels.

In response to NOW's concerns, Wambo provided a range of supplementary information regarding its groundwater model and clarified that, while there was likely to be some localised fluctuations in pressure gradients, the modification would generate an average downward groundwater flux and a slight reduction in the post-mining equilibrium groundwater level. Wambo therefore argued that despite any increase in permeability as a result of fracturing, the recharge from the unconfined alluvium into the underlying rock strata would mitigate any discharge of saline groundwater to the alluvial system.

However, NOW expressed reservations with the adopted modelling parameters and the implications this may have on the potential for long-term salinity impacts. Accordingly, Wambo prepared an "extreme scenario" which incorporated NOW's recommended modelling factors (including full connective cracking to the surface and significantly higher permeability rates) to provide a conservative estimate of the reasonable worst case impacts of the modification.

To ensure the accuracy of this modelling and provide greater certainty to the assessment process, the Department (in consultation with NOW) commissioned Dr Hugh Middlemis of Hydrogeological to undertake an independent peer review of the groundwater modelling for the modification and the resulting impact considerations. A copy of this peer review is contained in full at **Appendix F**.

This independent peer review found that "the modelling studies have been undertaken consistent with best practice, with demonstrably careful model design that allows for future aquifer system changes and a valid evaluation of cumulative impacts"¹. Specifically, Dr Middlemis noted that "the parameter values and fluxes are plausible and consistent with site specific testing and literature values"¹ and "the model has sound calibration performance"².

¹ H Middlemis, *Independent review of groundwater model for Wambo longwall panel 10A expansion*, prepared for the NSW Department of Planning & Environment by Hydrogeological, 20 March 2015, p. 1.

² Ibid, p. 2.

Dr Middlemis also acknowledged that the preparation of an “extreme scenario” model with conservative parameters to test higher permeability in the fracture zone was “a recommended best practice method to address the key issue of structural or conceptual model uncertainty”³. Given the predicted impacts of this modelling were only marginally (but not materially) different from the original EA model, Dr Middlemis noted that this confirmed the overall low uncertainty of the model.

In considering the implications drawn from this modelling in the EA, Dr Middlemis advised that “the modelling studies support the conclusion that the Longwall 10A Modification would not have a significant impact on water quality in the alluvial water source or the salinity in Wollombi Brook”¹.

NOW has considered the advice provided by Dr Hugh Middlemis and has advised the Department in writing that it accepts the findings of Dr Middlemis’ peer review report. Importantly, with the reduced uncertainty afforded by the preparation of the worst case “extreme scenario”, NOW is satisfied that Wambo’s modelling is consistent with industry best practice and is fit for the purpose of predicting the mining impacts of the proposal.

In addition, Wambo’s RTS confirmed that the modification would be outside the exclusion zone for mining near the Wollombi Brook Alluvial Aquifer, that Wambo holds sufficient groundwater licences to service the predicted take from all water sources and that no nearby private groundwater bores would experience cumulative groundwater drawdown exceeding 2 m as a result of the proposal.

Given of the above, NOW has confirmed it’s satisfaction that the proposed Longwall 10A would be unlikely to significantly impact on water quality in the alluvial water source or the salinity in Wollombi Brook, and that the likely modification impacts would be considered acceptable and meet the Level 1 minimal impact considerations under the *NSW Aquifer Interference Policy*.

In consideration of the groundwater modelling and the technical advice provided by NOW and its independent peer reviewer, the Department is satisfied that the modification is unlikely to significantly increase the risk of long term impacts of the project on overlying alluvial and surface water sources (including Wollombi Brook), beyond that permitted under the existing consent.

Nevertheless, to further mitigate the risk of any unforeseen impacts on water sources, the Department supports NOW’s recommendation that Wambo be required to implement further improvements to its existing water monitoring and contingency response plans. The Department is satisfied that these amendments can be managed to the satisfaction of NOW, through the consent’s requirement to review the existing Surface Water and Groundwater Management Plans following the approval of any modification to the consent.

The Department has consulted NOW regarding the recommended conditions and NOW has confirmed its satisfaction that these recommendations sufficiently address its residual concerns and allow for appropriate updates to Wambo’s existing monitoring and management systems.

Geomorphological Impacts

The existing Wambo and Stony Creek watercourses have been significantly affected and degraded through a combination of historical mining-induced subsidence and agricultural practices. Given the poor geomorphic condition and low recovery potential of these watercourses, NOW initially recommended that Wambo avoid undermining directly beneath the creek channels and associated alluvium, to mitigate the risk of any further degradation.

While Wambo owns the land that would be subject to these impacts, the RTS considered various ways to mitigate the impacts on these creeks, including the implications of shortening the longwall panel by 245 m to avoid undermining of the Wambo Creek channel (see **Figure 4**). This alternative setback at the commencing end of the longwall would significantly reduce the predicted subsidence impacts directly beneath the creek channels and some, but not all, of the associated alluvium.

NOW has since confirmed that this setback provides an acceptable compromise, as it would avoid undermining beneath the channels of Wambo and Stony Creek. Notwithstanding, NOW noted that Wambo should be required to monitor and remediate any subsidence impacts on these channels.

³ Ibid, p. 4.

The Department has considered this alternative setback carefully and notes that it would involve the sterilisation of around 262,000 tonnes of ROM coal, which equates to about \$13.5 million in lost revenue. However, on balance, the Department believes that the protection afforded by this setback has merit and has recommended that it be imposed through a condition of consent.

Groundwater Dependent Ecosystems (GDEs)

The Department notes that the flora assessment identifies the presence of *Central Hunter Paperbark Soak Woodland* in the area overlying Longwall 10 and the associated chain pillars adjacent to Longwall 10A. Considering that this community would already be subject to the full extent of subsidence associated with extraction of Longwall 10 and is only present above the chain pillars for Longwall 10A, the Department considers that the modification is unlikely to materially increase the impacts on this GDE, relative to the approved operations.

Further, with the amended setback for Longwall Panel 10A shown in **Figure 4**, the modification would no longer involve secondary extraction beneath the *River She Oak riparian woodland* and threatened *Hunter Lowlands Red Gum Forest* DGEs known to occur along Wambo and Stony Creeks, and is unlikely to result in material incremental subsidence impacts on these communities.

Given the limited changes to groundwater and alluvial impacts associated with the modification, the Department is satisfied that the modification is unlikely to significantly impact on known GDEs.

Conclusion

The Department recognises that both the existing and modified mine layout will result in subsidence induced fracturing and increased hydrological connectivity. Under the existing consent Wambo is already required to address these impacts through ongoing surface and groundwater monitoring and the development of a Surface and Groundwater Response Plan, including trigger values and impact response plans, as requested by NOW.

The Department is satisfied that the modification would not significantly change the surface and groundwater impacts of the development as approved and that the incremental impacts can be managed through amendments to the existing management and response plans. Further, with the imposition of a condition requiring a setback from Wambo Creek, the Department is satisfied that the geomorphological impacts of the proposal on nearby water courses would be minimised.

5.3 Other impacts

The Department is satisfied that the other impacts of the proposed modification are likely to be minor. The assessment of other impacts is summarised in **Table 1** below.

Table 1 - Assessment of other impacts

Issue	Consideration and Assessment	Recommendation
<i>Biodiversity</i>	<ul style="list-style-type: none"> Three endangered ecological communities (<i>Hunter Lowland Redgum Forest</i>, <i>Central Hunter Grey Box-Ironbark Woodland</i> and <i>Hunter Valley Weeping Myall Woodland</i>), an endangered population of <i>Acacia pendula</i> in the <i>Hunter Catchment</i> and several threatened fauna species listed under the <i>Threatened Species Conservation Act 1995</i> are known or likely to occur within or in close proximity to the modification area. As the modification would not require clearing of any threatened vegetation and the above threatened fauna species comprise highly mobile birds, bats, marsupials and mammals, the potential impacts on these species and communities would be largely restricted to the effects of subsidence on landscape characteristics (eg ponding and surface cracking). Importantly, with the establishment of the alternative standoff from Wambo Creek (shown in Figure 4), the majority of overlying threatened flora would be located above the main headings and first workings of Longwall 10A. Consequently, with the exception of two small stands of <i>Acacia pendula</i>, the modification is unlikely to materially increase the maximum subsidence impacts on threatened flora, beyond that of the approved operations. Nevertheless and in response to OEH's request, the Department has strengthened the existing subsidence impact performance measures for impacts on threatened biodiversity and recommended a condition requiring Wambo to suitably remediate or offset any impacts or environmental consequences arising from exceedances of these performance measures. With these updated conditions in place, the Department is satisfied that the modification would not significantly impact on the biodiversity values of the area and can be appropriately managed through amendments to Wambo's existing Flora and Fauna Management Strategy. 	Strengthened performance measures and conditions requiring Wambo to remediate or offset biodiversity impacts arising from the proposal.

Issue	Consideration and Assessment	Recommendation
<i>Agriculture</i>	<ul style="list-style-type: none"> The modification area underlies areas of Wambo-owned agricultural land, used primarily for beef cattle grazing on unimproved rain-fed pasture. Wambo would manage any potential impacts on agricultural resources, including subsidence, ponding and risks of injury to people or livestock, under an Extraction Plan for Longwall 10A, which would include provisions for the remediation of any significant surface cracking or safety hazard. The Department has also considered relevant provisions of the <i>State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007</i> and notes that the modification area does not contain Biophysical Strategic Agricultural Land and is located over 13 km southeast of the nearest mapped equine critical industry cluster (CIC) land and around 3 km north of the nearest area of mapped viticulture CIC land. Further, the modification would not be considered to significantly impair the ability of agricultural enterprises to access support services, infrastructure or transport routes, or result in the loss of scenic and landscape values. The Department is therefore satisfied that the agricultural impacts of the modification would be consistent with the existing operations and could continue to be managed under the Extraction Plan for Longwall 10A. 	No additional conditions necessary.
<i>Historic Heritage</i>	<ul style="list-style-type: none"> The modification area is located approximately 1 km south of the Wambo Homestead Complex Curtilage, but would remain well outside the Wambo Homestead Exclusion Zone. The Heritage Council has recently granted approval for Longwalls 9 and 10 within the Wambo Homestead curtilage. The Department is satisfied that the modification would have negligible impacts on the heritage values of Wambo Homestead Complex and can be managed in line with the existing Heritage Management Plan. 	No additional conditions necessary.
<i>Aboriginal Heritage</i>	<ul style="list-style-type: none"> A number of Aboriginal objects have been identified in the area overlying and surrounding the proposed Longwall 10A, and would be subject to a range of impacts associated with subsidence of this longwall panel. Wambo currently manages the majority of the modification area under an Aboriginal Heritage Impact Permit (AHIP No 2222) and will seek OEH approval to extend this AHIP to incorporate the entire modification area. OEH was supportive of the proposal to leave Aboriginal sites in situ and monitor these sites during the project, and has indicated that it would vary AHIP No 2222 to incorporate the modification area. The Department is therefore satisfied that potential impacts to Aboriginal objects could be managed by amending Wambo's existing Heritage Management Plan and AHIP No 2222, to reflect the modification. 	No additional conditions necessary.
<i>Surface Infrastructure</i>	<ul style="list-style-type: none"> The Department sought additional information to clarify how Wambo proposed to extend its existing gas management system to monitor and control mine gases, without the need for additional surface disturbance. Wambo confirmed the modification would utilise the existing underground ventilation system to manage mine gases through Longwall Minegate Back Return methods and as such, would not require any additional surface or in-seam drilling for pre-mining or post-mining (goaf) gas drainage. The Department is satisfied that mine gases can be managed through an extension of the existing underground gas management system. 	No additional conditions necessary.
<i>Waste Material</i>	<ul style="list-style-type: none"> The modification would produce an additional 0.2 Mt of tailings and 0.5 Mt of coarse rejects. In line with approved arrangements, these tailings would be pumped as slurry into dedicated emplacement areas and encapsulated in the open cut voids, and the coarse rejects would be co-disposed in the open cut voids or used as bulk fill to cap the tailings emplacement areas. 	No additional conditions necessary.
<i>Air Quality & Noise</i>	<ul style="list-style-type: none"> The modification is not expected to materially change the approved air quality and noise impacts of the mine, which would continue to be managed in line with Wambo's existing monitoring and management plans. 	No additional conditions necessary.
<i>Social and Economic Impacts</i>	<ul style="list-style-type: none"> The modification would utilise the existing operational workforce and equipment fleet to optimise coal recovery from an area already subject to underground mining, with minimal additional impacts on nearby receivers. The modification would recover an additional 1.9 Mt of ROM coal, provide continued employment for 227 underground employees and contractors, continued State and Commonwealth taxes and royalties, and efficiently recover State-owned mineral resources that would otherwise be sterilised. Importantly, this modification would provide continuity of operations with the South Bates Underground Mine, which would reduce operational downtime and potential layoffs of the existing underground workforce. 	No additional conditions necessary.

6. RECOMMENDED CONDITIONS

The Department has drafted a recommended notice of modification (see **Appendix A**) and a consolidated version of the consent as it is proposed to be modified (see **Appendix B**). These conditions strengthen the existing performance measures and monitoring requirements for biodiversity and water resources, require Wambo to update its existing management plans and impose a minimum setback distance for Longwall 10A from Wambo and Stony Creeks.

Wambo does not object to the recommended conditions, including the proposed setback from Wambo and Stony Creeks.

7. CONCLUSION

The Department has assessed the merits of the proposed modification in accordance with the requirements of the EP&A Act. This assessment has shown that, with the implementation of suitable conditions, mitigation measures and amendments to existing management plans, the proposed modification can be carried out with minimal environmental impact.

Importantly, the Department notes that the modification would provide continuity of operations between the existing North Wambo Underground Mine and the South Bates Underground Mine, which is scheduled to commence in January 2016. Ensuring continuity would provide significant economic and social benefits by avoiding any significant operational downtime and potential layoffs of the existing underground workforce.

The Department is therefore satisfied that the proposed modification is in the public interest and should be approved, subject to conditions.

8. RECOMMENDATION

It is recommended that the Executive Director, Resource Assessments and Compliance, as delegate of the Minister:

- **considers** the findings and recommendations of this report;
- **determines** that the modification is within the scope of section 75W of the EP&A Act;
- **approves** the modification application, under section 75W, subject to conditions; and
- **signs** the notice of modification at **Appendix A**.



Mike Young
A/Director
Resource Assessments

2.4.15.



Oliver Holm
Executive Director
Resource Assessments and Compliance

10/4/15

APPENDIX A – NOTICE OF MODIFICATION

APPENDIX B – CONSOLIDATED CONSENT AS PROPOSED TO BE MODIFIED

APPENDIX C – ENVIRONMENTAL ASSESSMENT

Refer to the Department's website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6720

APPENDIX D – SUBMISSIONS

Refer to the Department's website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6720

APPENDIX E – RESPONSE TO SUBMISSIONS

Refer to the Department's website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6720

APPENDIX F – GROUNDWATER PEER REVIEW