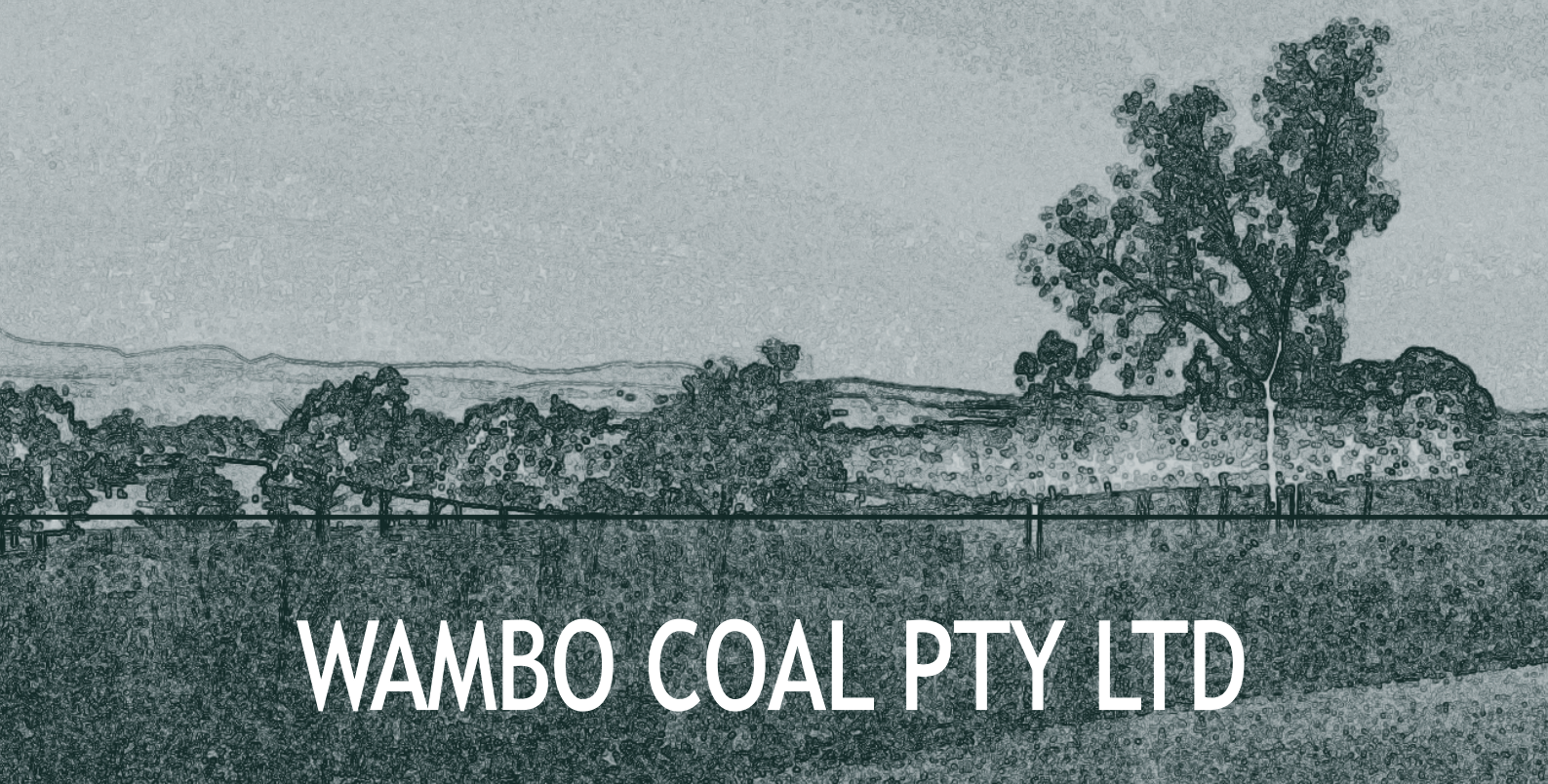




WAMBO COAL PTY LTD

NORTH WAMBO UNDERGROUND MINE LONGWALL 10A MODIFICATION

RESPONSE TO SUBMISSIONS

FOR THE MODIFICATION OF DA 305-7-2003 (MOD 14)
THE ADDITION OF NORTH WAMBO UNDERGROUND MINE LONGWALL 10A

December 2014

WAMBO COAL PTY LTD

**NORTH WAMBO UNDERGROUND MINE
LONGWALL 10A MODIFICATION
RESPONSE TO SUBMISSIONS**

(Modification 14 to DA 305-7-2003)

PROJECT NO. WAM-09-15

DOCUMENT NO. 00638054

DATE: DECEMBER 2014

RESPONSE TO SUBMISSIONS

Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited (Peabody), prepared the *North Wambo Underground Mine Longwall 10A Modification Environmental Assessment* (the EA) (WCPL, 2014a) to support an application to modify the Wambo Development Consent (DA 305-7-2003 MOD 14) under section 75W of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979*.

The EA was placed on public exhibition by the NSW Department of Planning and Environment (DP&E) from 3 October 2014 to 17 October 2014.

Table 1 provides a reconciliation of the submissions received from State and Local Government agencies. Table 2 provides a reconciliation of public submissions.

WCPL has prepared a response to the issues raised in the submissions. Responses to submissions made by Government agencies and the public are provided in Tables 3 and 4, respectively.

Table 1
Reconciliation of Agency Submissions

Agency	Date
Hunter New England Population Health	13 October 2014
Transport for NSW	14 October 2014
NSW Environment Protection Authority (EPA)	16 October 2014
Office of Agricultural Sustainability and Food Security (O AS&FS) within the NSW Department of Primary Industries (DPI)	16 October 2014
Division of Resources and Energy (DRE) within the NSW Department of Trade and Investment, Regional Infrastructure and Services (NSW Trade & Investment)	16 October 2014
NSW Office of Environment and Heritage (OEH)	17 October 2014
DPI (including NSW Office of Water [NOW])	November 2014
NSW Dams Safety Committee (DSC)	5 November 2014
NSW Roads and Maritime Services (RMS)	19 November 2014
Singleton Council	20 November 2014

Table 2
Reconciliation of Public Submissions

Name	Date	Nature of Submission
Mr R Fenwick	October 2014	Objection

FURTHER JUSTIFICATION OF LONGWALL 10A

Following a review of mine planning and exploration results, WCPL identified that the proposed Longwall 10A could be economically mined adjoining the existing North Wambo Underground Mine and allow for ongoing operational continuity.

The Modification for mining the proposed Longwall 10A would allow the recovery of approximately an additional 1.9 Mt of ROM coal.

Mining of the proposed Longwall 10A would also extend employment for the North Wambo Underground Mine workforce by approximately 6 months, until the commencement of the approved South Bates Underground Mine in the Whybrow Seam.

This coal would be mined within the approved Wambo Coal Mine life, would use the existing surface infrastructure of the North Wambo Underground Mine and would require minimal surface disturbance. Therefore, the Modification is a relatively simple extension to the existing approved North Wambo Underground Mine.

If approved, WCPL would continue to apply the existing and approved management measures implemented at the North Wambo Underground Mine.

WCPL has successfully implemented the North Wambo Creek Subsidence Response Strategy at the North Wambo Underground Mine. The monitoring and mitigation measures in the North Wambo Creek Subsidence Response Strategy would be reviewed and revised for Wambo and Stony Creeks above the proposed Longwall 10A during preparation of the Extraction Plan (if approved).

Consideration of Alternatives – Not Mining Longwall 10A

If the Modification was not approved and the proposed Longwall 10A was not mined, approximately 1.9 Mt of ROM coal in the Wambo Seam would be sterilised. The state of NSW would not receive royalties and other taxes associated with extraction of this coal.

In addition, WCPL would be unable to maintain operational continuity of underground mining operations without approval of the Modification. Longwall mining at the approved South Bates Underground Mine is scheduled to commence in approximately January 2016.

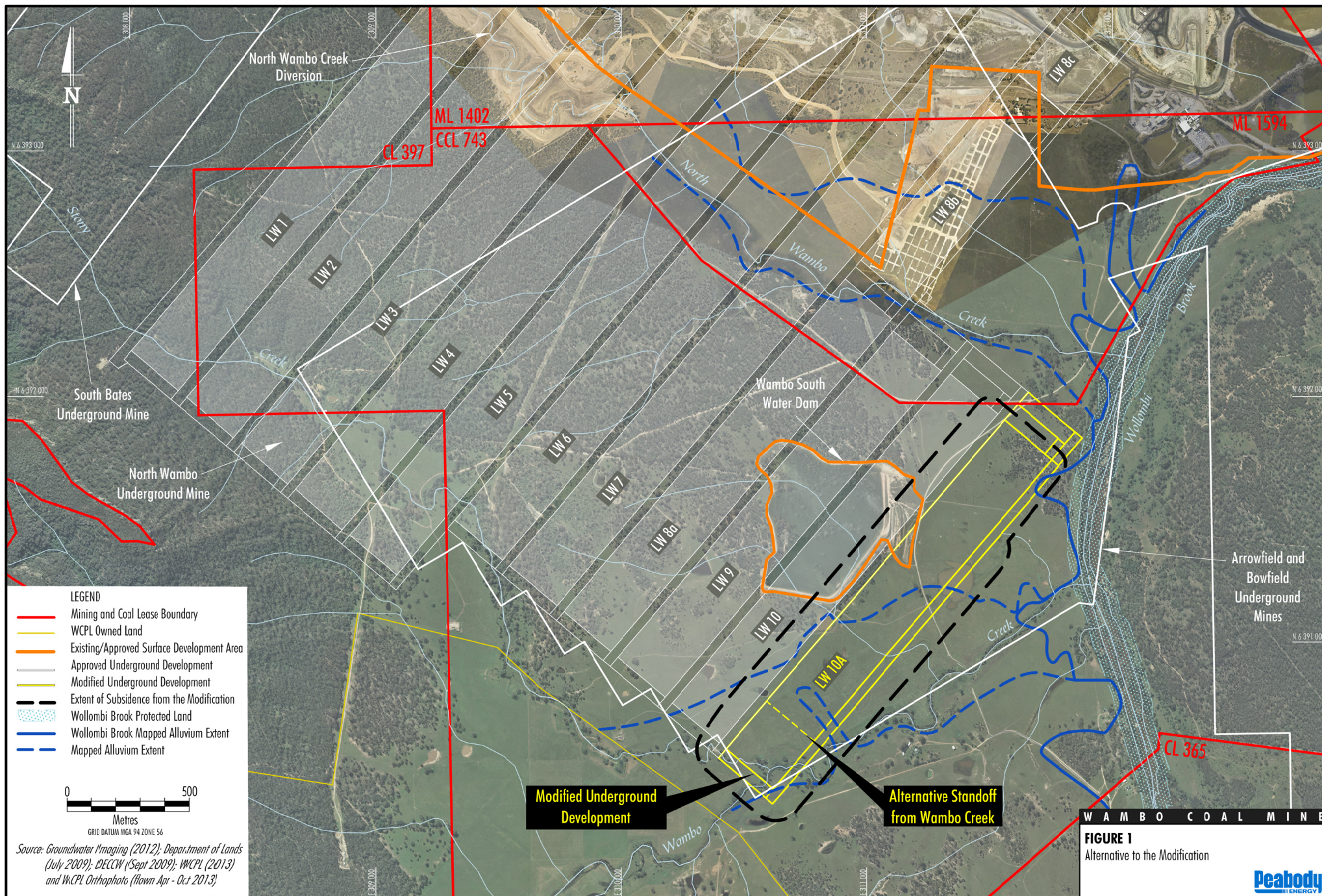
A loss of operational continuity would risk ongoing coal production, employment of the North Wambo Underground Mine workforce, and payment of royalties and other taxes to the state of NSW.

Consideration of Alternatives – Stand-off from Wambo Creek

As an outcome of the submissions, WCPL has considered the costs and benefits associated with implementing a standoff of the proposed Longwall 10A from the Wambo Creek channel.

WCPL has assessed the implications of reducing the length of proposed Longwall 10A by 245 metres (m) to avoid directly undermining the Wambo Creek and Stony Creek channels by the proposed Longwall 10A (i.e. reducing the length from 1,745 m to 1,500 m) (Figure 1). These implications would include:

- Sterilisation of 262,000 tonnes of ROM coal, equivalent to 14% of the total ROM coal that could be recovered from the proposed Longwall 10A.
- Lost revenue to WCPL in the order of \$13.5 million at 2014 pricing.
- Lost royalties to the state of NSW of approximately \$0.9 million.



- Potential for operational discontinuity in the order of 3 weeks.
- Reduction in additional total subsidence on the relevant section of Wambo Creek from 2,400 mm to 1,600 mm (i.e. in addition to the previous subsidence that has already occurred as a result of mining in the Whybrow Seam). This would result in a maximum gradient along this section of Wambo Creek prior to remediation of 2.2% compared to 3.8% with the extraction of the proposed Longwall 10A.
- Reduction in additional total subsidence on the relevant section of Stony Creek from 1,500 mm to 1,000 mm (i.e. in addition to the previous subsidence that has already occurred as a result of mining in the Whybrow Seam). This would result in a maximum gradient along this section of Wambo Creek prior to remediation of 1.7% compared to 2.2% with the extraction of the proposed Longwall 10A.
- Reduced subsidence movement on four artefact scatters (noting these scatters are approved to be impacted by the future mining in the Arrowfield and Bowfield Seams).

WCPL does not consider the above alternative is justified given:

- Wambo Creek and Stony Creek have been previously undermined by the Homestead and Wollemi Mines in the Whybrow Seam, including at this location.
- The section of Wambo Creek and Stony Creek above the proposed Longwall 10A is approved to be undermined in two additional seams by the Arrowfield and Bowfield Underground Mines.
- The assessment by Evans & Peck (2014) concluded that the prompt implementation of any necessary mitigation works would minimise the risk of any change in sediment movement along Wambo Creek or upstream migration of head-cuts along both Wambo Creek and Stony Creek.
- WCPL considers that Modification is within the 'Level 1' minimal impact considerations outlined in the *NSW Aquifer Interference Policy* (NSW Government, 2012) for highly productive groundwater.
- The potential for connectivity to Wambo Creek and Stony Creek was recognised and assessed as part of the Wambo Development Project and the potential for connectivity can be managed through measures described in the *Wambo Development Project Environmental Impact Statement* (WCPL, 2003) and the *North Wambo Creek Subsidence Response Strategy* (WCPL, 2014b).

Further discussion on potential impacts and proposed management measures for Wambo Creek and Stony Creek is provided in the EA and the responses provided below.

REQUEST FOR AMENDMENT TO CONDITION 13, SCHEDULE 6

Condition 13, Schedule 6 of the existing Development Consent (DA 305-7-2003 MOD 14) requires:

Online Communication of Operational Responses and Noise and Air Quality Monitoring

13. *The Applicant shall, by the end of June 2013:*

- (a) make the following information for the Wambo Mining Complex publicly available on its website, on a daily basis and in a clearly understandable form:*
 - *daily weather forecasts for the coming week;*
 - *proposed operational responses to these weather forecasts;*
 - *real-time noise and air quality monitoring data (subject to any necessary caveats); and*
 - *any operational responses that were taken in response to the noise and air quality monitoring data, and*

- (b) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information,*

to the satisfaction of the Director-General.

In addition to Condition 13, the Development Consent includes Conditions 11 and 12, Schedule 6 that requires WCPL to provide access to information on its website. Conditions 11 and 12, Schedule 6 are consistent with Conditions E9 and E12 (respectively) of the Draft Model Conditions for Open Cut mining operations.

WCPL notes that Condition 13, Schedule 6 of the existing Development Consent:

- does not form part of the Draft Model Conditions for Open Cut mining operations;
- has not been included in recent recommended conditions for other mines in the Hunter (for example, the Bulga Optimisation Project [SSD-4960]); and
- is not included in contemporary conditions of neighbouring open cut mining operations (for example, the Hunter Valley North Operations [DA 450-10-2003, modified January 2014]).

WCPL considers the existing Condition 13, Schedule 6 requires significant internal resources and cost for little material benefit. In addition, the condition is impractical to implement within an international company that administers its global website from a head office in the United States of America.

Based on the above, WCPL is applying for the replacement of the existing Condition 13, Schedule 6 with the following condition (consistent with Condition 11, Schedule 6 of the Development Consent and Condition E9 of the Draft Model Conditions for Open Cut mining operations):

The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.

WCPL generally publishes environmental information on its website monthly, and proposes to continue this arrangement.

Table 3
Response to Agency Submissions

Comment	Response
<i>Hunter New England Population Health</i>	
Hunter New England Population Health advised it is satisfied with existing approval conditions due to the Modification having no changes to the life of the mine, production rates, open cut operations, coal handling and transport infrastructure and surface infrastructure.	Noted.
<i>Transport for NSW</i>	
Transport for NSW advised it had reviewed the submitted information and had no further comment.	Noted.
<i>NSW Environment Protection Authority (EPA)</i>	
The EPA advised that no additional Environment Protection Licence conditions would be required for the additional longwall panel, subject to final approval.	Noted.
<i>Office of Agricultural Sustainability and Food Security (O AS&FS) within the NSW Department of Primary Industries (DPI)</i>	
The O AS&FS noted that existing management plans provide measures for the monitoring and remediation of potential impacts on agricultural activities in the vicinity of the proposed Modification. The O AS&FS stated that continued commitment to the implementation of these measures is considered necessary for the protection of agricultural resources in the area.	Noted.
<i>Division of Resources and Energy (DRE) within the NSW Department of Trade and Investment, Regional Infrastructure and Services (NSW Trade & Investment)</i>	
The DRE noted that WCPL would be required to submit a revised MOP to include the Modification if approved.	Noted. WCPL would prepare necessary documentation required under the modified Development Consent (if granted) and relevant mining titles.
The DRE advised that the Modification does not substantially change the overall subsidence risks at the site and should be manageable through the Extraction Plan process/SMP process.	Noted. WCPL would prepare necessary documentation required under the modified Development Consent (if granted) and relevant mining titles.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The DRE recommended amendments to the rehabilitation objectives in the Development Consent.	Condition 94, Schedule 4 of the existing Development Consent (DA 305-7-2003) provides rehabilitation objectives for the Wambo Coal Mine. WCPL notes that no discussion or justification is provided by the DRE for the proposed changes to the existing rehabilitation objectives. WCPL has a number of concerns about the application of the recommended objectives, outlined below. DRE has recommended the following rehabilitation objective: <i>The land capability classification for the relevant nominated agricultural pursuit for each domain is established and self-sustaining within 5 years of land use establishment (first planting of vegetation).</i> WCPL does not consider that the above recommended objective should be included as an enforceable rehabilitation objective in the Development Consent, as rehabilitation performance can be affected by a number of natural events (e.g. drought or bushfire) that are beyond the control of WCPL. The wording of the above recommended objective does not recognise or provide scope for longer timeframes as a result of events that are beyond the control of WCPL. DRE has recommended the following rehabilitation objective: <i>Subsidence impacts are remediated so as not to impact wildlife activity.</i> The wording of the above recommended objective is unclear as to whether the subsidence impacts or remediation activities are required to have no impact on wildlife activity. WCPL considers more appropriate wording would be as follows: <i>Subsidence impacts are remediated such that there is negligible impact to wildlife activity following remediation.</i> DRE has recommended the following rehabilitation objective: <i>Water management is consistent with the regional catchment management strategy.</i>

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
(Continued)	The definition of “regional catchment management strategy” is unclear and therefore the potential implications of the above recommended objective on WCPL’s operations cannot be determined. WCPL considers that the above recommended objective is unnecessary in addition to the other two recommended objectives. In addition, the Site Water Management Plan and Rehabilitation Management Plan are prepared in consultation with the NOW under Conditions 30 and 94C (respectively) of Schedule 4 of the existing Development Consent (DA 305-7-2003) and would address any relevant regional water management objectives. On this basis, WCPL proposes the above recommended objective is not included as a draft condition of Development Consent.
The DRE recommended a condition in relation to progressive rehabilitation.	DRE has recommended the following condition: <i>The proponent shall carry out all surface disturbing activities (eg pre-stripping in advance of mining operations including for example monitoring lines and access for rehabilitation purposes) in a manner that, as far is reasonably practicable, minimises potential for dust emissions and shall carry out rehabilitation of disturbed areas (including subsidence impacts) progressively, as soon as reasonably practicable, to the satisfaction of the Secretary of Department of Trade & Investment, Regional Infrastructure & Services.</i> Condition 94B, Schedule 4 of the existing Development Consent (DA 305-7-2003) relates to progressive rehabilitation. Under Condition 5B, Schedule 4 of the existing Development Consent (DA 305-7-2003), WCPL is required to implement best management practice to minimise the off-site odour, fume and dust emissions from the Wambo Mining Complex to the satisfaction of the Secretary of the DP&E. Under Environment Protection Licence (EPL) 529, WCPL is also required to minimise the emission of dust from the premises to the satisfaction of the EPA. WCPL considers that the additional condition proposed by the DRE is unnecessary duplication of the above regulatory requirements.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The DRE recommended a condition in relation to a Rehabilitation Plan.	DRE has recommended the following condition: 1. <i>The Proponent must prepare and implement a Rehabilitation Plan to the satisfaction of the Secretary of Department of Trade & Investment, Regional Infrastructure & Services.</i> 2. <i>Rehabilitation Plan must:</i> - a <i>be submitted and approved by the Secretary of Department of Trade & Investment, Regional Infrastructure & Service prior to carrying out any surface disturbance activities of the development (including surface expression of subsidence related impacts), unless otherwise agreed by the Secretary...</i> Condition 94C, Schedule 4 of the existing Development Consent (DA 305-7-2003) relates to the preparation of a Rehabilitation Management Plan. WCPL is currently in the process of revising the Rehabilitation Management Plan under Condition 94C of the Development Consent in consultation with the DRE. The recommended condition by the DRE would require the preparation of a Rehabilitation Plan “prior to carrying out any surface disturbing activities of the development (including surface expression of subsidence related impacts)”. Under the Development Consent (DA 305-7-2003), “development” includes all underground and open cut mining activities at the Wambo Mining Complex. WCPL considers this recommended condition should be amended as follows: - a <i>be submitted to the Secretary of Department of Trade & Investment, Regional Infrastructure & Service by the end of July 2015, unless otherwise agreed by the Secretary...</i>
Office of Environment and Heritage (OEH) The OEH recommended a standard condition that WCPL consult with and involve all the registered local Aboriginal parties for the project in the ongoing management of Aboriginal cultural heritage values.	Consultation with Aboriginal stakeholders is conducted in accordance with the approved Salvage and Management Programme (Navin Officer Heritage Consultants, 2005) that formed part of the original AHIP application. In accordance with the approved Salvage and Management Programme, representatives from the local Aboriginal stakeholder community groups are invited to observe and, where appropriate, participate in the salvage works (e.g. recording, collection, storage and replacement of artefacts).

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The OEH recommended a standard condition that the existing Heritage Management Plan for the North Wambo Underground Mine is updated in consultation with the registered Aboriginal parties for managing all cultural heritage values associated with the broader development area.	The Heritage Management Plan for the North Wambo Underground Mine would be updated to include the Modification longwall (Longwall 10A) as part of the Extraction Plan process. The Heritage Management Plan would reflect the management and mitigation measures presented in the Cultural Heritage Impact Assessment for the Modification and the approved Salvage and Management Programme. Consultation undertaken for Cultural Heritage Impact Assessment for the Modification was undertaken in full compliance with the <i>National Parks and Wildlife Regulation, 2009</i> and the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010</i> (Department of Environment, Climate Change and Water, 2010). No additional consultation with registered Aboriginal parties is considered necessary during the revision of the Heritage Management Plan as all of the proposed management and mitigation measures for Longwall 10A have been subject to a comprehensive and contemporary consultation process with registered Aboriginal parties as part of the original AHIP application and the development of the Cultural Heritage Impact Assessment for the Modification.
The OEH recommended a standard condition that in the event that ground disturbance identifies a new Aboriginal object/s within the project area, all works must halt in the immediate area.	Consistent with WCPL's on-site procedures, if any previously unrecorded Aboriginal sites are identified during the course of the Modification, surface works in that area would cease until the site has been recorded (Section 4.6.2 of the EA). Any additional Aboriginal heritage sites (not yet recorded) would be managed in a consistent manner to the existing site types. If a new site type (i.e. a site type not previously recorded at the Wambo Coal Mine or a site type not considered in the development of the approved Salvage and Management Programme) is recorded, appropriate management would be developed by an appropriately qualified archaeologist in consultation with the Aboriginal community.
The OEH recommended a standard condition that if human remains are located in the event that surface disturbance occurs, all works must halt in the immediate area to prevent further impacts to the remains and the NSW Police are to be contacted immediately.	Noted. This is consistent with WCPL's on-site procedures (see Section 4.6.2 of the EA).
The OEH recommended a standard condition that all Aboriginal site impacted by the project must have an Aboriginal Site Impact Recording form completed and submitted to OEH's AHIMS Register within three months of being impacted.	Noted. This is consistent with WCPL's on-site procedures.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The OEH recommended a standard condition that an Aboriginal Cultural Education Program is developed for the induction of all personnel and contractors involved in the construction activities on site, and that records are kept of which staff/contractors were inducted and when. The OEH also recommended the Aboriginal Cultural Education Program is developed and implemented in collaboration with the registered Aboriginal parties.	WCPL's on-site induction includes education on Aboriginal cultural heritage management in accordance with the approved Salvage and Management Programme (Navin Officer Heritage Consultants, 2005).
The OEH recommended the 9 registered Aboriginal sites in the Modification area remain <i>in situ</i> unless any mine impacts are unavoidable.	Noted. This is consistent with WCPL's on-site procedures and consistent with the recommendations presented in the Cultural Heritage Impact Assessment for the Modification.
The OEH recommended that each registered Aboriginal site must be clearly marked and fenced to ensure such sites are protected from any unintended harm.	WCPL's mining leases cover an area of over 7,000 hectares. The Wambo Coal Mine includes: • areas approved for open cut extraction; • areas approved for underground mining with surface disturbance associated with activities such as exploration gas drainage, dewatering, monitoring and subsidence remediation; and • areas that form part of the Remnant Woodland Enhancement Program (RWEPP) areas. No surface infrastructure is proposed as part of the Modification. WCPL's on-site procedures involve the maintenance of a database of site locations and procedures to locate any surface disturbance activities to avoid impacts to Aboriginal sites where practicable (including Surface Disturbance Permits and Ground Disturbance Permits). In the unlikely event that a site is to be impacted by surface activities, the site would be managed and salvaged in accordance with the approved Salvage and Management Programme. WCPL considers that fencing of all sites is impractical, creates unnecessary ground disturbance and is a waste of environmental management resources given the approved Aboriginal heritage procedures that are already in place at the site.
The OEH recommended that Aboriginal sites within the existing Aboriginal Heritage Impact Permit (AHIP) No. 2222 area continue to be managed in accordance with the terms and conditions of that AHIP, and that such works must be undertaken in consultation with the Registered Aboriginal Parties.	Noted. This is consistent with WCPL's on-site procedures.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The OEH recommended that for any vegetation clearing required for the Modification, impacts on threatened species, populations or communities, or their habitats, outside any existing consent be offset in accordance with OEH offsetting policy.	No surface infrastructure is proposed as part of the Modification.
The OEH recommended that any monitoring programme to measure the impacts of mine impacts includes control sites in which data on vegetation composition and structure, soil surface features, and other variables as appropriate are collected in the same vegetation communities and in the same position in the landscape as the areas to be undermined; that data collection in all sites commences more than 12 months prior to undermining of any sites; and that appropriate statistical analysis of the data is conducted.	In accordance with the approved Flora and Fauna Management Plan (WCPL, 2013), WCPL undertakes annual monitoring of Remnant Woodland Enhancement Programme (RWEPP) areas overlying WCPL underground mining areas and an <i>Acacia pendula</i> remnant. The monitoring aims to identify any isolated surface disturbances, assess the level of disturbance to native vegetation and the condition of the vegetation (e.g. health and vigour of species and communities), and assess any changes in drainage lines or watercourses (that may be attributable to subsidence). The current monitoring programme in RWEPP areas includes 34 permanent flora quadrats, which are monitored annually for flora species diversity (including total number of flora species, number and percent of native flora species and number and percent of introduced flora species) and flora species abundance (modified Braun-Blanquet 1-6). In addition, WCPL commenced quantitative monitoring of plant species cover abundance and vegetation condition at three sites above Longwalls 8 and 9 in January 2014. Monitoring results from these sites are compared to monitoring in the RWEPP areas. Results from the flora and fauna monitoring programme are reported in WCPL's Annual Environmental Management Reports. Early indications from the new monitoring sites established in January 2014 are that longwall mining is having no measurable effect on plant species floristics and cover abundance within each of the sites. WCPL proposes that no changes be made to the existing approved monitoring system at this time.
The OEH recommended copies of the Flora and Fauna Management Plan and monitoring reports generated by the flora and fauna monitoring program are placed on the WCPL website.	The Flora and Fauna Management Plan is available on WCPL's website (http://www.peabodyenergy.com/content/422/Australia-Mining/New-South-Wales/Wambo-Mine/Approvals-Plans-and-Reports-Wambo-Mine). Results from the flora and fauna monitoring programme are reported in WCPL's Annual Environmental Management Reports, also available on the website.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
Department of Primary Industries (DPI) (Including NSW Office of Water [NOW]) The NOW stated that a cumulative assessment of the subsidence impacts from the proposed Longwall 10A and the <u>future approved extraction proposed in two underlying seams (Arrowfield and Bowfield Seams) had not been completed.</u> The NOW requested further detail on the fracturing heights from mining the Wambo Seam in Longwall 10A, in particular with respect to whether the proposed extraction was considered as a multi-seam extraction for the purpose of deriving fracture zone extent given the existing approval for the underlying Arrowfield and Bowfield Seams. The NOW requested a series of slices (diagrammatically) in both horizontal and lateral extent for the various model layers displaying how the fracturing heights and hydraulic conductivities have been applied.	
	The NOW's statement that cumulative assessment of the Arrowfield and Bowfield Seams was not considered in the Groundwater Assessment is incorrect. As stated on page 25 of the Groundwater Assessment (Appendix B of the EA): <i>The mine workings represented in the model include:</i> • <i>Homestead and Wollemi Underground (Wambo) (completed prior to steady state calibration period);</i> • <i>South Bates-Whybrow Seam Underground (Wambo);</i> • <i><u>Arrowfield and Bowfield Underground (Wambo);</u></i> ... As requested by the NOW, HydroSimulations has prepared five cross-section slices of the model with the locations of three east-west and two north-south lines shown in Figure A1 (Appendix A). These slices are provided in Figures A2 to A6. These figures show the extent of adopted fracturing in the groundwater model. The upper figure shows host (pre-mining) permeabilities and permanent fracture zones. The lower figure shows fractured zones that grow dynamically as the simulation of mining progresses in the model. Figures A2 to A6 confirm that the fracturing represented in the model is definitely conservative, as it has been assumed that all intervening interburden zones between mined coal seam pairs are fully fractured. Table 8 of the Groundwater Assessment (Appendix B of the EA) listed the permeabilities of fractured zones for the North Wambo, United and Homestead mines. Table A1 (Appendix A) provides the same information for the fractured zones applied in the model above the proposed Arrowfield and Bowfield workings. Therefore, the NOW's concerns as to the lack of consideration of connective cracking have been directly addressed.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The NOW stated there was a post-mining risk of discharge of water with higher than pre-mining salinity from the Permian aquifers to the alluvium as a consequence of enhanced vertical permeability.	HydroSimulations ran a recovery simulation in transient mode for 200 years after completion of mining activities at the North Wambo Underground Mine. The Groundwater Assessment (Appendix B of the EA) concluded the Modification would have minimal impact on the recovery of groundwater levels compared to the approved Wambo Coal Mine: <i>For the hydrographs shown in Figure 48, there was no difference in the rate of recovery between the Approved mine plan and the Longwall 10A Modification. The localised drawdown impacts show that the Modification does not have a significant impact on the regional groundwater regime (Figures 35 to 38). Therefore, the Modification could not be considered to have a significant impact on the recovery of groundwater levels.</i> The numerical model for the Groundwater Assessment showed a net downward flux from the alluvium to the Permian rock following the recovery period. Therefore there would not be expected to be deterioration in water quality from a regional context.
The NOW queried the source of the classification of alluvium as 'highly productive' and 'less productive'. The NOW stated in its submission that Wambo Creek and the alluvium associated with Wambo Creek is understood to be categorised collectively as highly connected and highly productive groundwater source.	The NOW has developed a spatial dataset for 'highly productive groundwater' based on the groundwater source boundaries as defined in the relevant Water Sharing Plans and categorised according to the Aquifer Interference Policy (available at: http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Strategic-Regional-Land-Use). This spatial dataset obtained from the NOW was shown on Figure 9 of the EA and Figure 2a of Appendix B of the EA. The NOW dataset was used in the assessment of potential impacts against the Aquifer Interference Policy (NSW Government, 2012). The latest NOW dataset (June 2013) was confirmed with the NOW on 11 November 2014 as consistent with the information presented in the EA. The NOW dataset does not classify the Wambo Creek alluvium above the proposed Longwall 10A as 'highly productive groundwater'. Therefore, the NOW's conclusion in its submission that the Wambo Creek alluvium is a highly productive groundwater source is inconsistent with its own internal conclusions and policy.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The NOW stated <i>It should also be noted that the impact assessment at the time the underlying Arrowfield and Bowfield Seams were approved did not consider extraction in four seams. It is understood that following previous impacts on Wambo Creek from the Whybrow Seam extraction, <u>extraction was excluded from the Wambo Seam in this location due to elevated risks of interaction with the Wambo Creek watercourse and alluvium.</u></i>	The North Wambo Underground Mine and mining in the Arrowfield and Bowfield Seams was approved as part of the Wambo Development Project (DA 305-7-2003). Section 2.6.2 of the original <i>Wambo Development Project Environmental Impact Statement</i> (WCPL, 2003) states: <i>The Wambo Seam Underground Mine (Figures 2-6 to 2-8) would be limited by the Project open cut to the north-east, fault structures to the north-west, Wollombi Brook to the east and <u>splitting of the seam to the south.</u></i> Following a review of mine planning and exploration results, WCPL has identified that the proposed Longwall 10A can be economically mined and allow for ongoing operational continuity. The NOW's contention that mining was avoided in the Longwall 10A area due to elevated risks of interconnection is not supported by evidence in the 2003 <i>Wambo Development Project Environmental Impact Statement</i>. In addition, it is noted that Section 4.7.1 of the <i>Wambo Development Project Environmental Impact Statement</i> (WCPL, 2003) recognised and assessed the potential for connectivity to Stony Creek and Wambo Creek and outlined a proposed management approach: <i>Although connectivity between the underground workings and Stony and Wambo Creeks is considered to be unlikely (Appendix O), careful monitoring of alluvial groundwater levels via a network of piezometers and stream flows along Wambo Creek would be conducted. Should connectivity of the creek(s) to the workings be detected, a mitigation option would be to grout and seal any crack in the creek bed similar to the remediation undertaken of cracking above existing underground workings at the Wambo Coal Mine.</i>

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The NOW recommended that the remediation of Wambo and Stony Creeks should avoid the use of rip rap and other 'hard' engineered structures in favour of 'flexible' options for rehabilitation. The NOW recommended this should incorporate large woody debris works, which should be embedded in the sand bed to below the depth of activation of scour and incision which is likely to occur. The NOW stated remediation should generally follow: - Brooks <i>et al.</i> (2006a) <i>Design Guideline for the Reintroduction of Wood into Australian Streams</i>. - Brooks <i>et al.</i> (2002) <i>Putting the wood back into our rivers: an experiment in river rehabilitation</i>. - Brooks <i>et al.</i> (2006b) <i>Confronting hysteresis: Wood based river rehabilitation in highly altered riverine landscapes of south-eastern Australia</i>.	WCPL notes that a number of the reference documents referred to by the NOW relate to the creation of habitat, rather than construction of bed control structures. Advisian (formerly Evans & Peck) has advised the most suitable structure in the guidance material referenced by the NOW would be the <i>Log sill +/- abutment jams (sand bed type - version 1)</i> in Brooks <i>et al.</i> (2006a). WCPL would develop the final remediation plan for Wambo and Stony Creeks as part of the Extraction Plan in consideration of the <i>Guidelines for instream works on water front land</i> (NOW, 2012) and the comments provided and in consultation with the NOW. WCPL would investigate the use of large woody debris in remediation, however notes the following limitations: - The long-term effectiveness of woody debris is limited compared to rip rap as woody debris rots and degrades in the longer-term. - The use of large woody debris would require a series of structures over a longer section of creek, resulting in more widely distributed disturbance of the creek.
The NOW recommended that ongoing monitoring and rehabilitation work of Wambo and Stony Creeks must occur.	As described in Section 4.5.2 of the EA, the Extraction Plan would include the following measures: - Longitudinal geomorphological surveys would be conducted along the reaches of Wambo and Stony Creeks affected by subsidence, including prior to commencement of mining of the proposed Longwall 10A; immediately following subsidence; and following the completion of any restoration or remediation works. - Trigger Action Response Plans would be developed with a process to determine appropriate triggers and remedial actions for: - changes in grade and erosion and scour risk, including a process to determine whether instream works, such as a rock ramp, are required; - pool development, including contingency remedial measures should subsidence create a pool that is significantly larger than predicted; and - surface cracking, consistent with erosion and sediment management in the approved Erosion and Sediment Control Plan.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
The NOW noted that any inrush event through connective cracking without appropriate water access licences may be subject to regulatory action under the <i>Water Management Act, 2000</i>.	Noted, WCPL accepts its obligation to comply with the requirements of the <i>Water Management Act, 2000</i>. WCPL conducts inrush risk assessments as a standard component of its operational procedures. In addition, WCPL will implement a Trigger Action Response Plan to monitor the potential for interconnection and inrush risk. As identified in Section 4.7.1 of the <i>Wambo Development Project Environmental Impact Statement</i> (WCPL, 2003), should connectivity of a creek to the workings be detected, a mitigation option would be to grout and seal any crack in the creek bed. This is consistent with the approach adopted in the approved North Wambo Creek Subsidence Response Strategy.
The NOW stated that the distribution of strains would concentrate at the junction points between the Wambo and overlying Whybrow Seam panel boundaries creating greater fracture potential in the overlying strata.	Previous mining at the North Wambo Underground Mine and the associated overlying and underlying workings provides a strong case study of likely future impacts at the proposed Longwall 10A. The North Wambo Underground Mine has undermined the Stony Creek channel and longwalls previously extracted in the Whybrow Seam at the Wollemi Mine. Longwall 5 at the North Wambo Underground Mine was extracted at a depth of cover of approximately <u>220 m</u> beneath Stony Creek and Longwall 10 at the Wollemi Mine. No inrush events occurred during the extraction of Longwall 5. The proposed Longwall 10A would be extracted at a depth of cover between approximately <u>210 m to 220 m</u>. Section 4.7.1 of the <i>Wambo Development Project Environmental Impact Statement</i> (WCPL, 2003) recognised and assessed the potential for connectivity to Stony Creek and Wambo Creek and outlined a proposed management approach: <i>Although connectivity between the underground workings and Stony and Wambo Creeks is considered to be unlikely (Appendix O), careful monitoring of alluvial groundwater levels via a network of piezometers and stream flows along Wambo Creek would be conducted. Should connectivity of the creek(s) to the workings be detected, a mitigation option would be to grout and seal any crack in the creek bed similar to the remediation undertaken of cracking above existing underground workings at the Wambo Coal Mine.</i>

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
(Continued)	WCPL has successfully implemented the North Wambo Creek Subsidence Response Strategy at the North Wambo Underground Mine. The monitoring and mitigation measures in the North Wambo Creek Subsidence Response Strategy would be reviewed and revised for Wambo and Stony Creeks above the proposed Longwall 10A during preparation of the Extraction Plan (if approved).
The NOW requested additional information of the depth and saturation of the alluvium close to the junction of Wambo and Stony Creeks.	Figure 8 of the EA presents the alluvial extent in the vicinity of the proposed Longwall 10A determined by a transient electromagnetic survey interpreted with reference to bore logs and field observations (Groundwater Imaging, 2012). A number exploration and piezometer boreholes have been drilled in the vicinity of the proposed Longwall 10A (Figure 2). The depth of alluvium or weathered material recorded ranged from 7 m to 11.5 m. The locations of the bores are shown on Figure 2. Monitored groundwater levels for piezometers in Wambo Creek alluvium are presented in Figure A5 of the Groundwater Assessment (Appendix B of the EA). P109 had a measured groundwater level of between 56 m and 58 m Australian Height Datum (AHD) between 2003 and 2013, which is approximately 5 m to 7 m depth to water.
The NOW recommended avoiding undermining the Wambo and Stony Creek alluvium and channels given the uncertainty relating to extent of likely fracturing. The NOW states its recommendation is consistent with past regulatory actions and management of mining in the Hunter Valley including the precautionary approach taken to North Wambo Creek and Wollombi Brook.	WCPL considers this recommendation requires review based on the responses and clarification provided above to the NOW's concerns in relation to the Modification. As part of this document, WCPL has outlined the costs associated with avoid undermining the Wambo Creek and Stony Creek channels, which are in the order of \$13.5 million of lost revenue at 2014 pricing and approximately \$0.9 million of lost royalty payments to the state of NSW. The implications of not undermining all alluvium associated with Wambo and Stony Creeks would be substantially greater. WCPL disputes the NOW's statement that avoiding undermining Wambo Creek alluvium is consistent with the approach taken to North Wambo Creek. It is noted that: • The Wambo Development Project was approved for open cut mining of the alluvium associated with North Wambo Creek and construction of a North Wambo Creek diversion.

Table 3 (Continued)
Response to Agency Submissions

Comment	Response
(Continued)	- The Wambo Coal Mine was approved to extract eight longwalls in the Wambo Seam under the North Wambo Creek alluvium, including: approval to directly undermine the North Wambo Creek channel; and approval for extraction in four seams under alluvium associated with North Wambo Creek. - The potential for interconnection between the North Wambo Creek alluvium and mine workings was managed through an approved North Wambo Creek Subsidence Response Strategy. WCPL notes that the NOW has formulated its recommendation for avoidance of mining under Wambo Creek based on an incorrect assumption of 'past regulatory actions'. The NOW's recommendations require review based on the above information.
NSW Dams Safety Committee (DSC)	
The DSC that WCPL have been in discussion with the DSC about the need to apply to the DSC prior to mining within the Wambo South Water Dam Notification Area.	Noted.
NSW Roads and Maritime Services (RMS)	
The RMS noted it has reviewed the information provided and has no objections to the Modification as it is noted that the Modification would have no significant impacts on the State road network.	Noted.
Singleton Council	
Singleton Council noted it had no specific issues of concern. Singleton Council requested the assessment ensure no impact on private landowner properties and local water resources.	Noted. The proposed Longwall 10A is beneath WCPL-owned land. Potential impacts on water resources are described in Sections 4.4 and 4.5 of the EA.

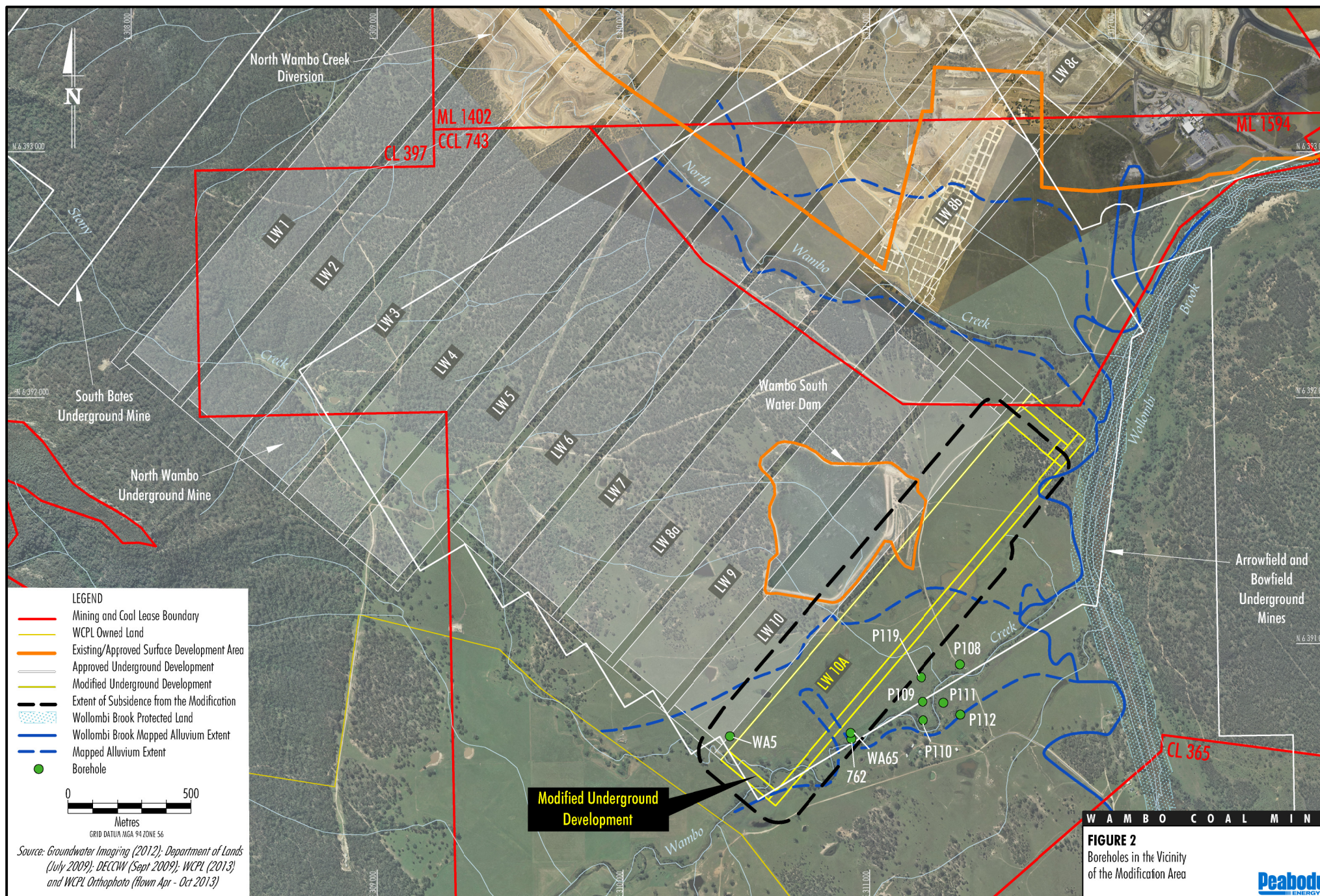


Table 4
Response to Public Submissions

Name	Comment	Response
Mr R Fenwick	Raised concerns regarding subsidence impacts on the right of way.	Mine Subsidence Engineering Consultants (MSEC) concluded that, based on the predicted subsidence impacts, the right-of-way (in favour of several privately-owned properties) could be maintained in safe and serviceable condition throughout the mining period using normal road maintenance techniques (Section 6.2 of Appendix A of the EA) (MSEC, 2014). The approved Extraction Plan for Longwalls 7 to 10 (WCPL, 2014c) includes a Right-of-Way Management Plan (ROWMP) as part of the Built Features Management Plan. The ROWMP includes visual inspections of the road prior to secondary extraction within 100 m of the right-of-way and undertaken at 50 m intervals until the active mining face is 100 m past the right-of-way. The approved ROWMP would be reviewed and revised to include Longwall 10A. WCPL has a demonstrated commitment to safety. It is a requirement of the Development Consent that subsidence at the North Wambo Underground Mine must not cause any additional risk to public safety (Condition 22A, Schedule 4 of the Development Consent DA 305-7-2003).
Mr R Fenwick	Raised concerns regarding potential subsidence impacts on Wambo South Water Dam and the requirement for appropriate monitoring and response mechanisms.	The approved Extraction Plan for Longwalls 7 to 10 (WCPL, 2014c) includes a Prescribed Dam Management Plan as part of the Built Features Management Plan, which outlines management, monitoring and response mechanisms for Wambo South Water Dam. Wambo South Water Dam would be dewatered at a rate such that the water level would remain outside the angle of draw of the longwalls as mining progresses. Wambo South Water Dam would be completely drained (as far as practical) prior to mining directly beneath the dam embankment. These management strategies have been developed in consultation with the Dams Safety Committee. In the event that WCPL decides to refill the dam post-mining, WCPL would be required to follow the requirements of the Dams Safety Committee as outlined in the Prescribed Dam Management Plan. The approved Prescribed Dam Management Plan would be reviewed and revised to include Longwall 10A.

Table 4 (Continued)
Response to Public Submissions

Name	Comment	Response
Mr R Fenwick	Raised concerns regarding the assessment of cumulative impacts on groundwater resources.	The numerical groundwater model included historic and future mining activities in the model domain including: Wambo Coal Mine activities; Lemington Open Cut; Lemington Underground; Riverview; Cheshunt; United Open Cut(s); United Underground; Mt Thorley Warkworth; and Homestead and Wollemi Underground (Appendix B of the EA). Transient calibration against groundwater levels was carried out for the period January 2003 to December 2009 which includes the period when North Wambo Underground Mine Longwalls 1 and 2 were mined (Appendix B of the EA). The Groundwater Assessment assesses potential groundwater impacts associated with the Modification only and the cumulative groundwater impacts associated with mining activities in the region.
Mr R Fenwick	Raised concerns regarding the impacts of the Modification on Wambo Creek (also known as South Wambo Creek) and Stony Creek.	Evans & Peck conducted an assessment of the potential subsidence impacts on Wambo and Stony Creeks that is presented in Appendix C of the EA. Evans & Peck (Appendix C of the EA) recommends an adaptive management approach to manage potential subsidence impacts on Wambo Creek, involving monitoring the development of subsidence and implementation of remediation measures where required. As noted in Section 4.5.2 of the EA, the Extraction Plan would include the following measures: - Longitudinal geomorphological surveys would be conducted along the reaches of Wambo and Stony Creeks affected by subsidence, including prior to commencement of mining of the proposed Longwall 10A; immediately following subsidence; and following the completion of any restoration or remediation works. - Trigger Action Response Plans would be developed with a process to determine appropriate triggers and remedial actions for: - changes in grade and erosion and scour risk, including a process to determine whether instream works, such as a rock ramp, are required;

Table 4 (Continued)
Response to Public Submissions

Name	Comment	Response
	(Continued)	- pool development, including contingency remedial measures should subsidence create a pool that is significantly larger than predicted; and - surface cracking, consistent with erosion and sediment management in the approved Erosion and Sediment Control Plan.
Mr R Fenwick	Raised concerns regarding the accurate prediction of subsidence impacts.	The predicted subsidence effects for the approved and modified mining layout were calculated by MSEC using a calibrated Incremental Profile Method (MSEC, 2014). The Incremental Profile Method was calibrated to local conditions using ground monitoring data from the North Wambo Underground Mine and from other nearby collieries. This has been achieved by comparing the observed mine subsidence movements along monitoring lines with those back-predicted using the standard Incremental Profile Method for the Hunter Coalfield (Appendix A of the EA). Therefore, the Incremental Profile Method used to calculate the Modification subsidence predictions is more likely to be accurate than subsidence prediction methods used for the 2003 Wambo Development Project Environmental Impact Statement.
Mr R Fenwick	Raised concerns that the mapped alluvial extent in Figure 8 of the EA was incomplete and inadequate.	Dr David Allen at Groundwater Imaging Pty Ltd (2012) conducted a transient electromagnetic survey of the extent of the Wollombi Brook alluvium. A transient electromagnetic survey uses electrical current to measure the electrical resistivity of the shallow stratigraphic profile. The data is collected by a towed transient electromagnetic device and is limited by access constraints (e.g. the survey cannot be conducted through dense vegetation). The alluvial boundary determined by the transient electromagnetic survey was interpreted with reference to bore logs and field observations and is largely consistent with the regional geological mapping. The results of the transient electromagnetic survey are considered in conjunction with regional geological mapping where access constraints limited site-specific collection of data.

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- Wambo Coal Pty Limited (2014b) *North Wambo Creek Subsidence Response Strategy*.
- Wambo Coal Pty Limited (2014c) *Extraction Plan for North Wambo Underground Mine Longwalls 7 to 10*.

APPENDIX A
ADDITIONAL GROUNDWATER MODEL INFORMATION

[Source: HydroSimulations]

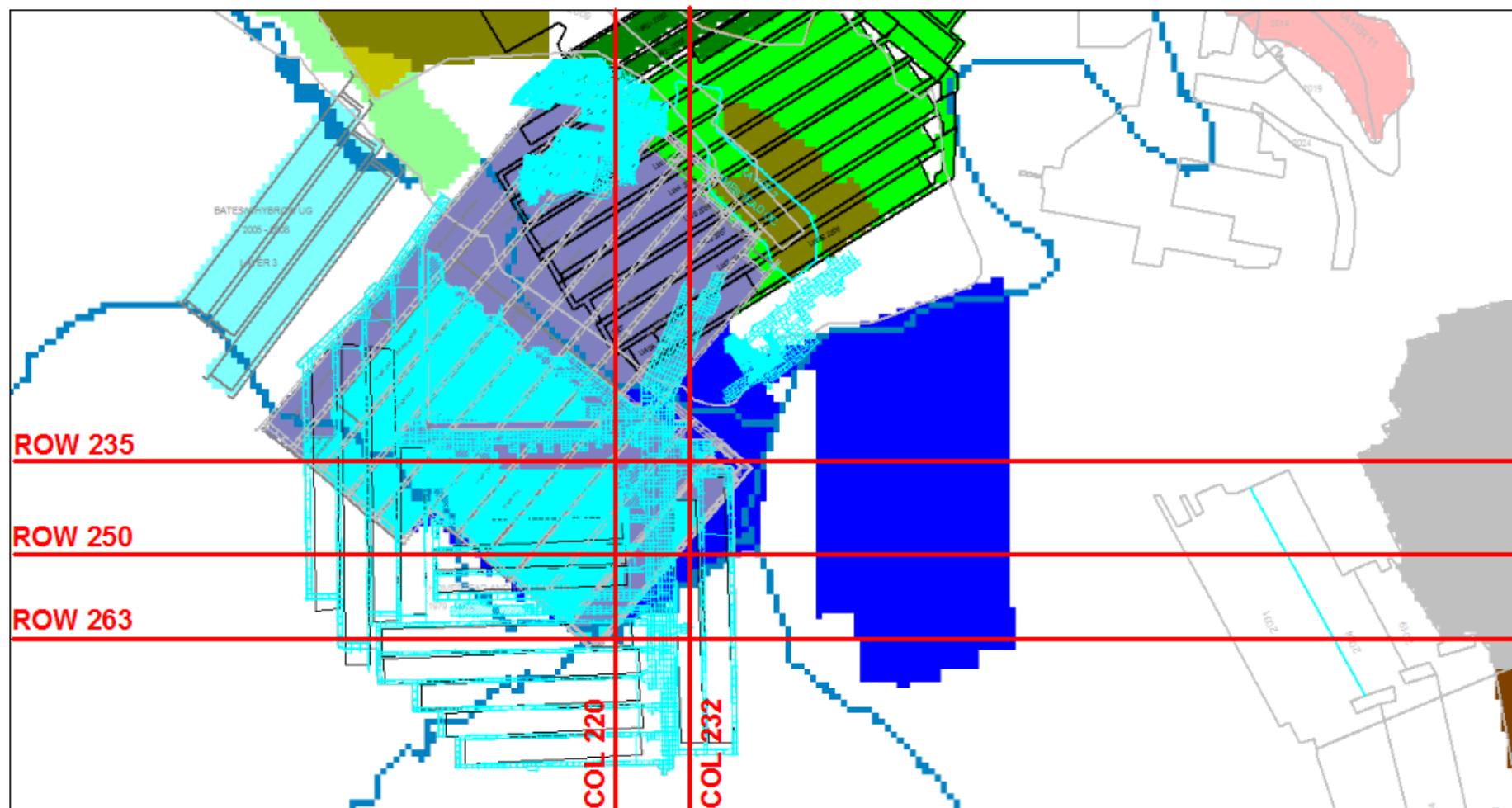


Figure A1. Locations of Cross-Section Lines

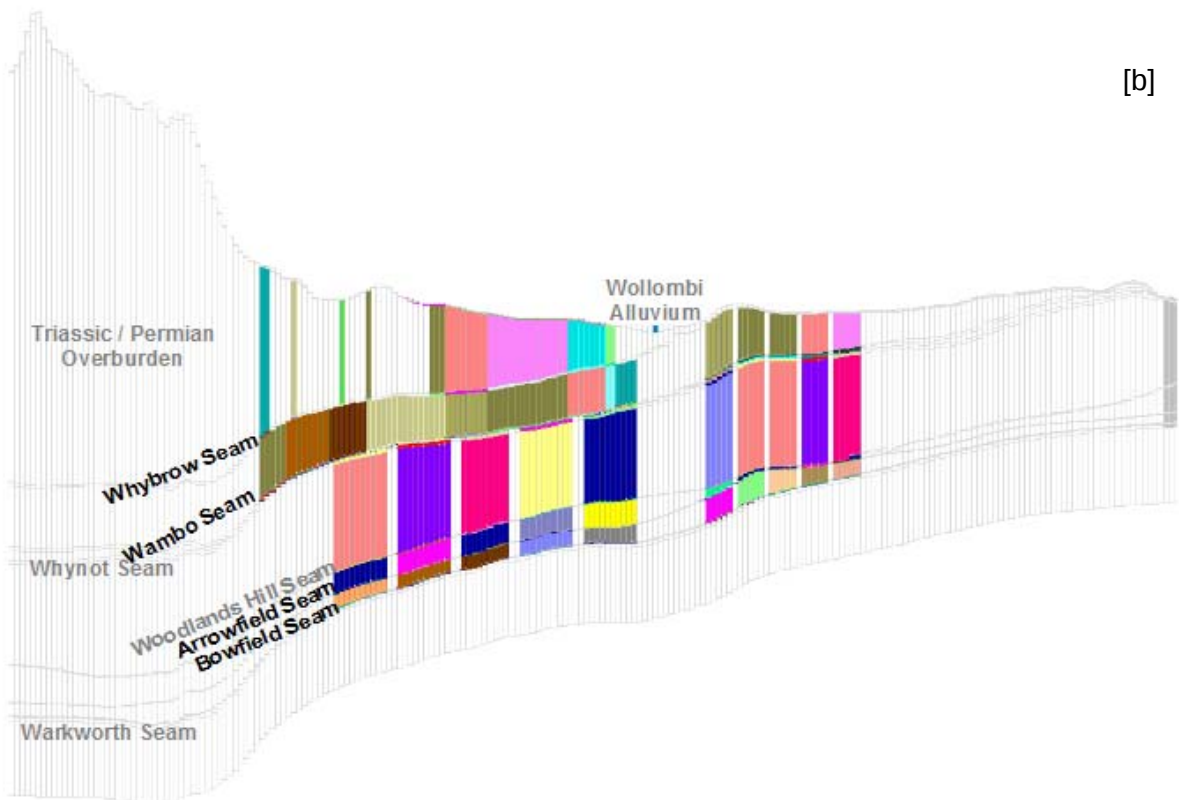
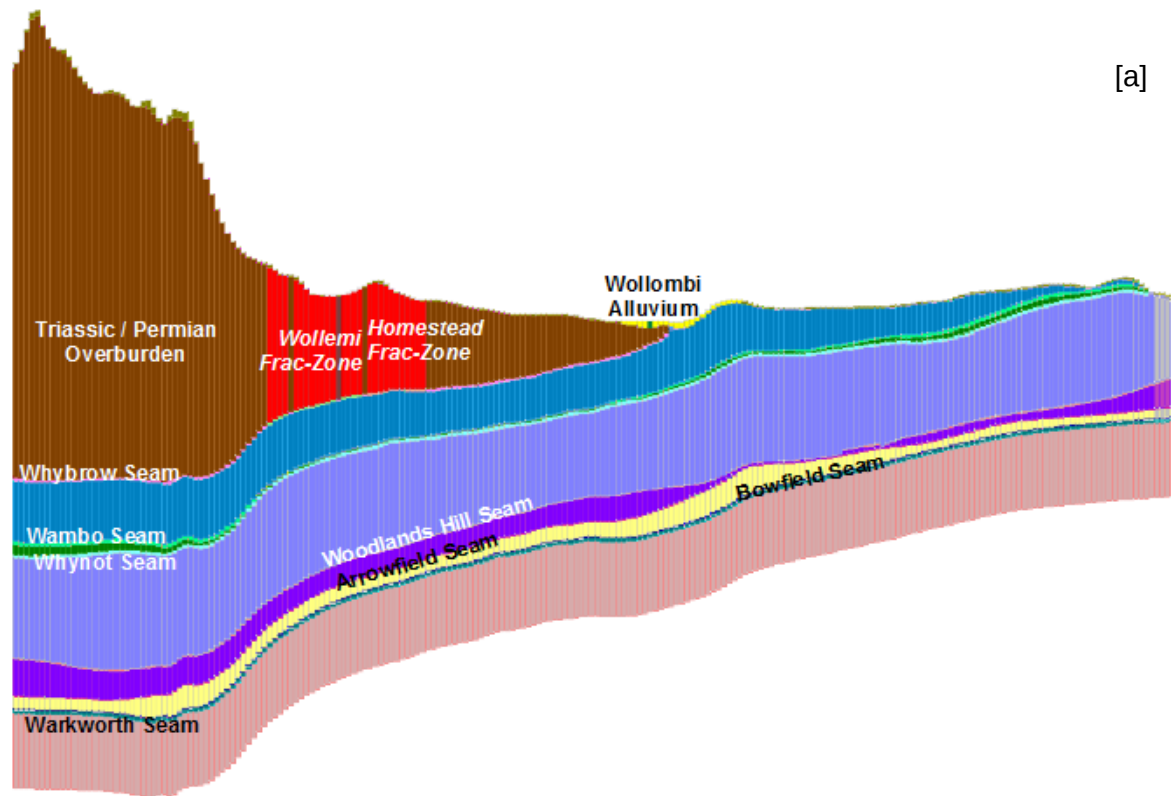


Figure A2. Model Row 235: (a) Hydraulic Conductivity Host Zones and Permanent Fractured Zones; (b) Dynamic Fractured Zones

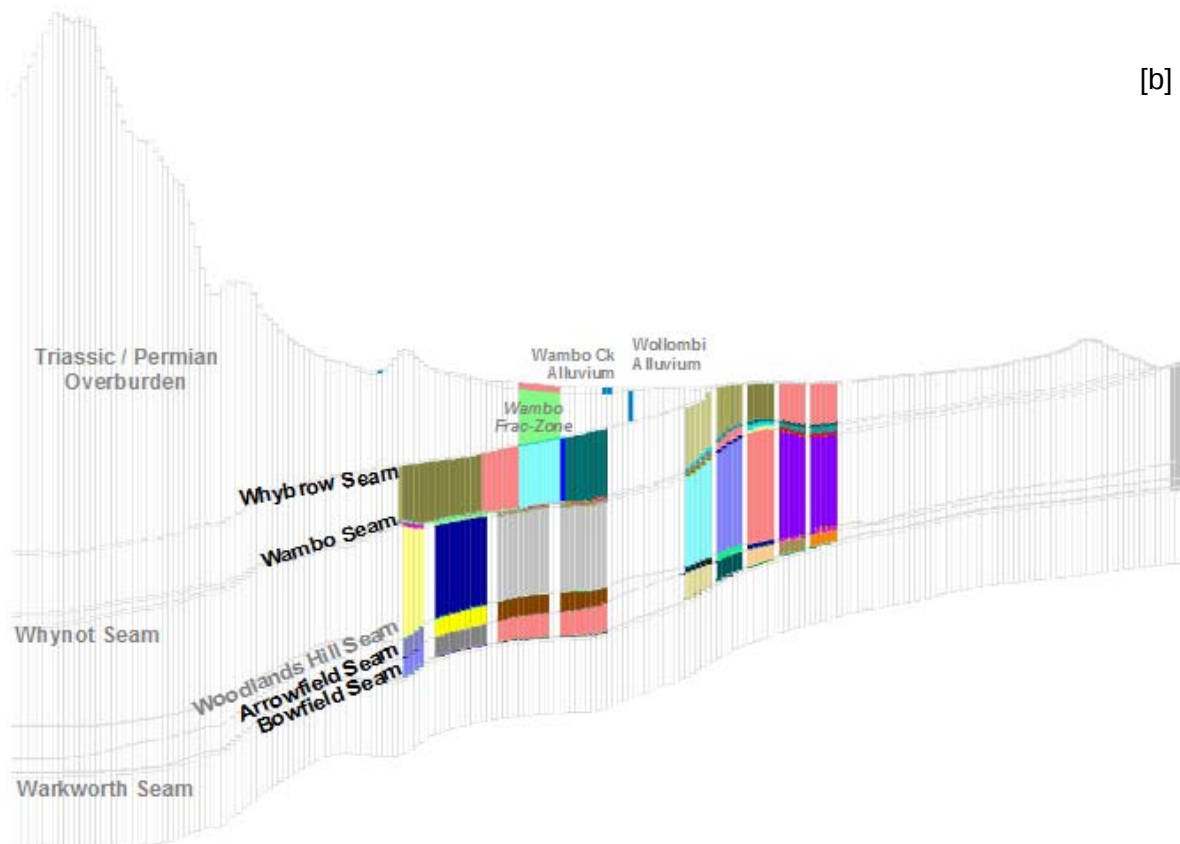
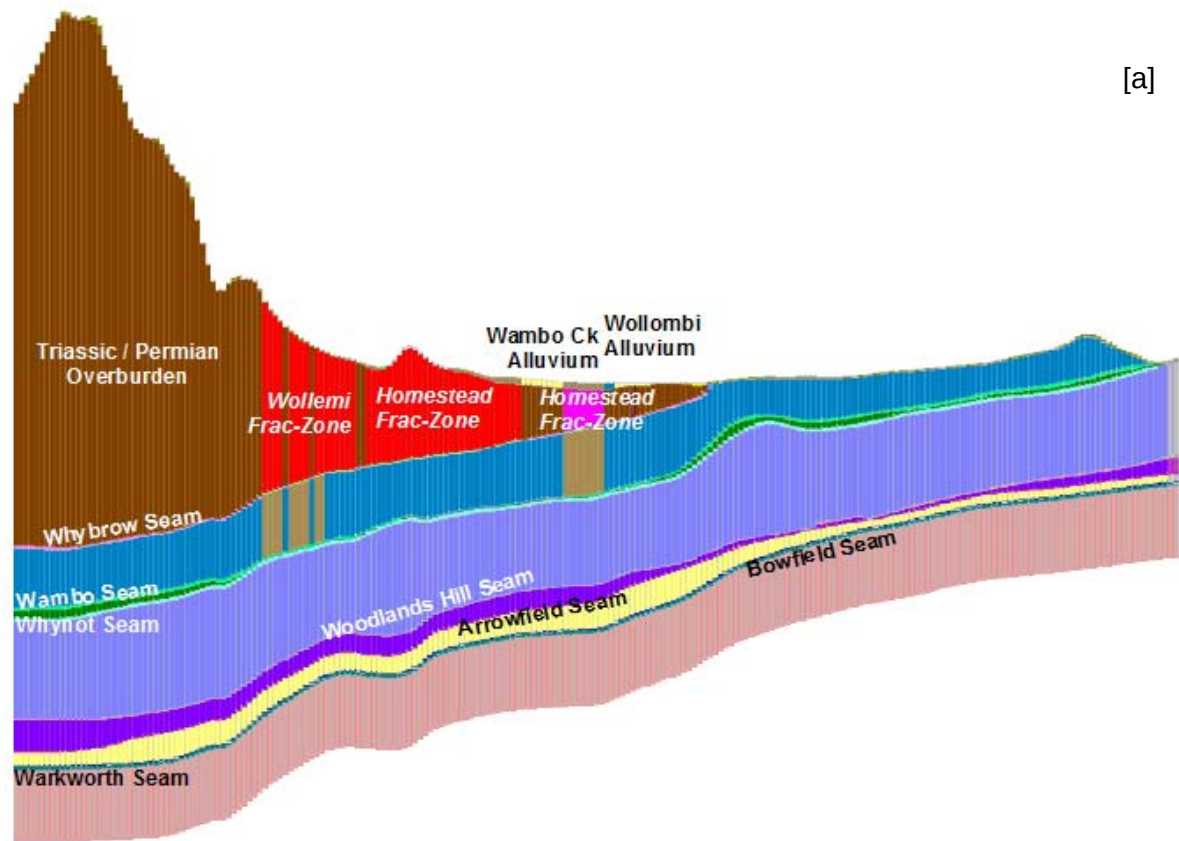


Figure A3. Model Row 250: (a) Hydraulic Conductivity Host Zones and Permanent Fractured Zones; (b) Dynamic Fractured Zones

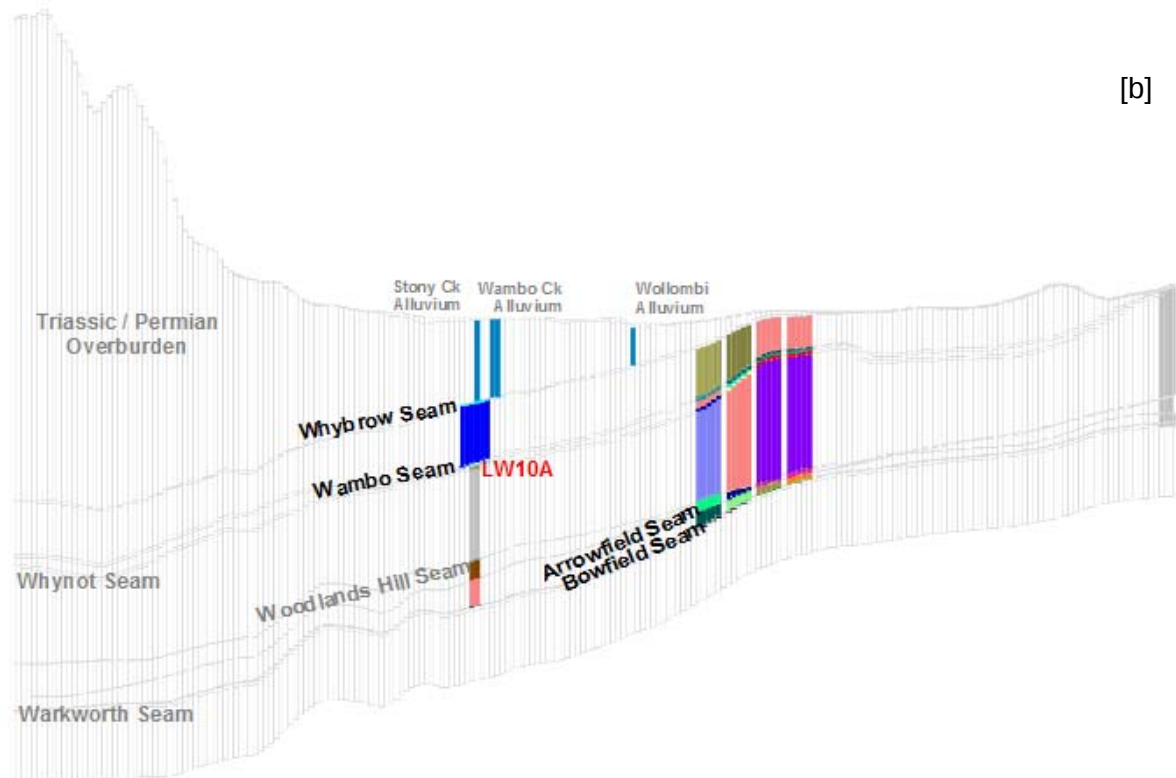
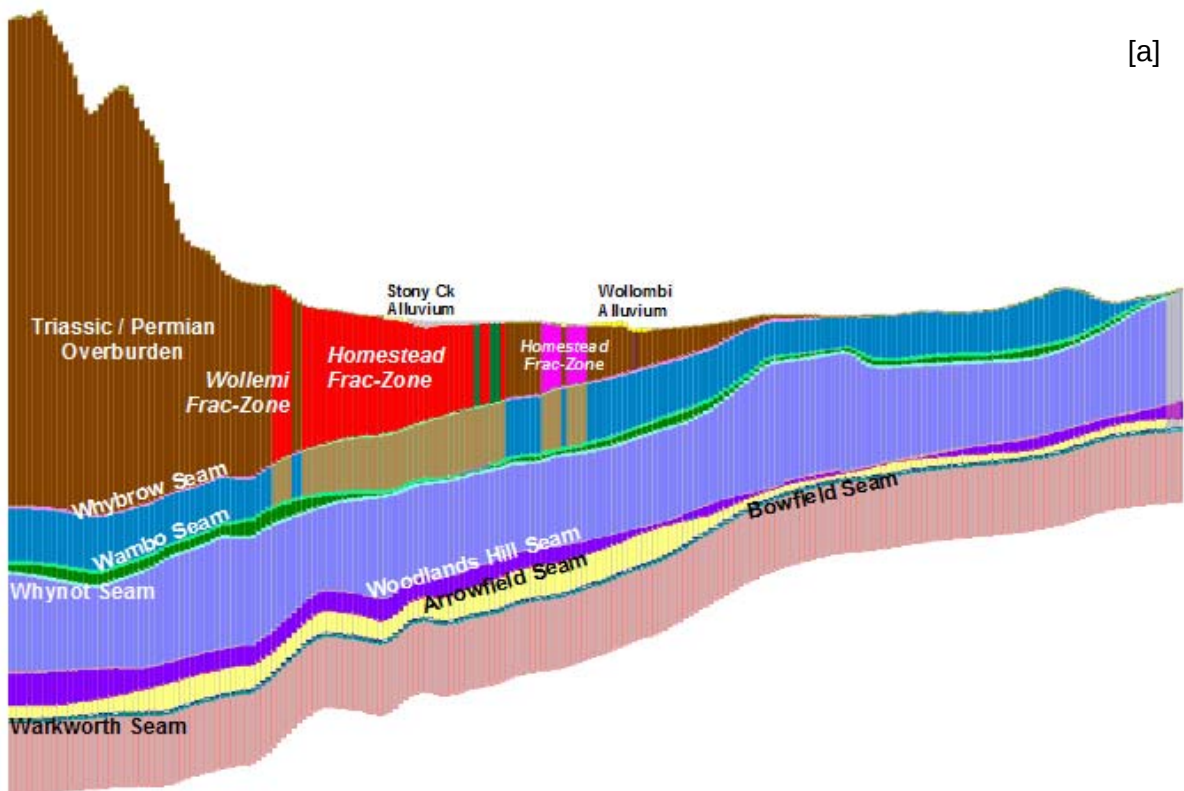


Figure A4. Model Row 263: (a) Hydraulic Conductivity Host Zones and Permanent Fractured Zones; (b) Dynamic Fractured Zones

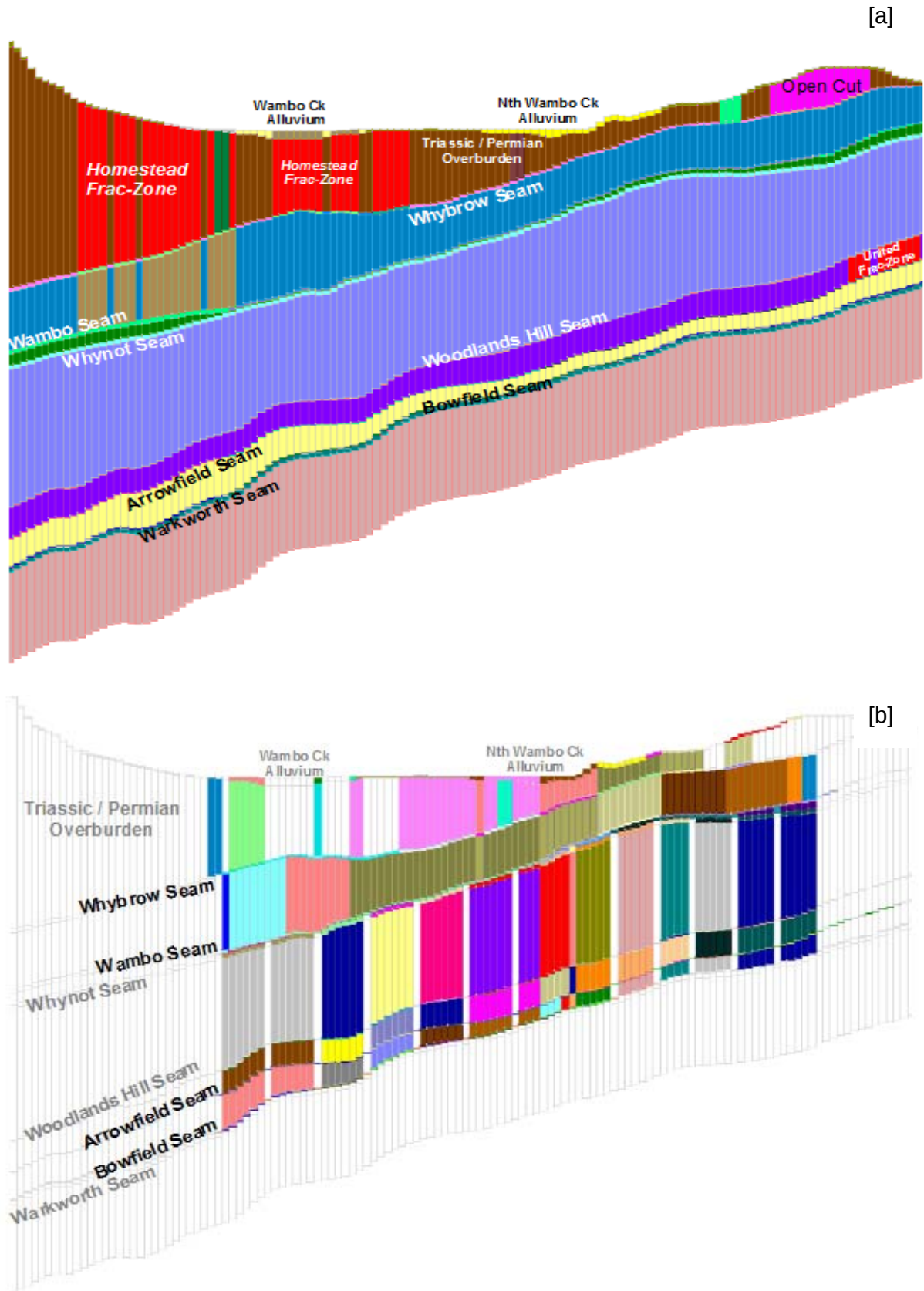


Figure A5. Model Column 220: (a) Hydraulic Conductivity Host Zones and Permanent Fractured Zones; (b) Dynamic Fractured Zones

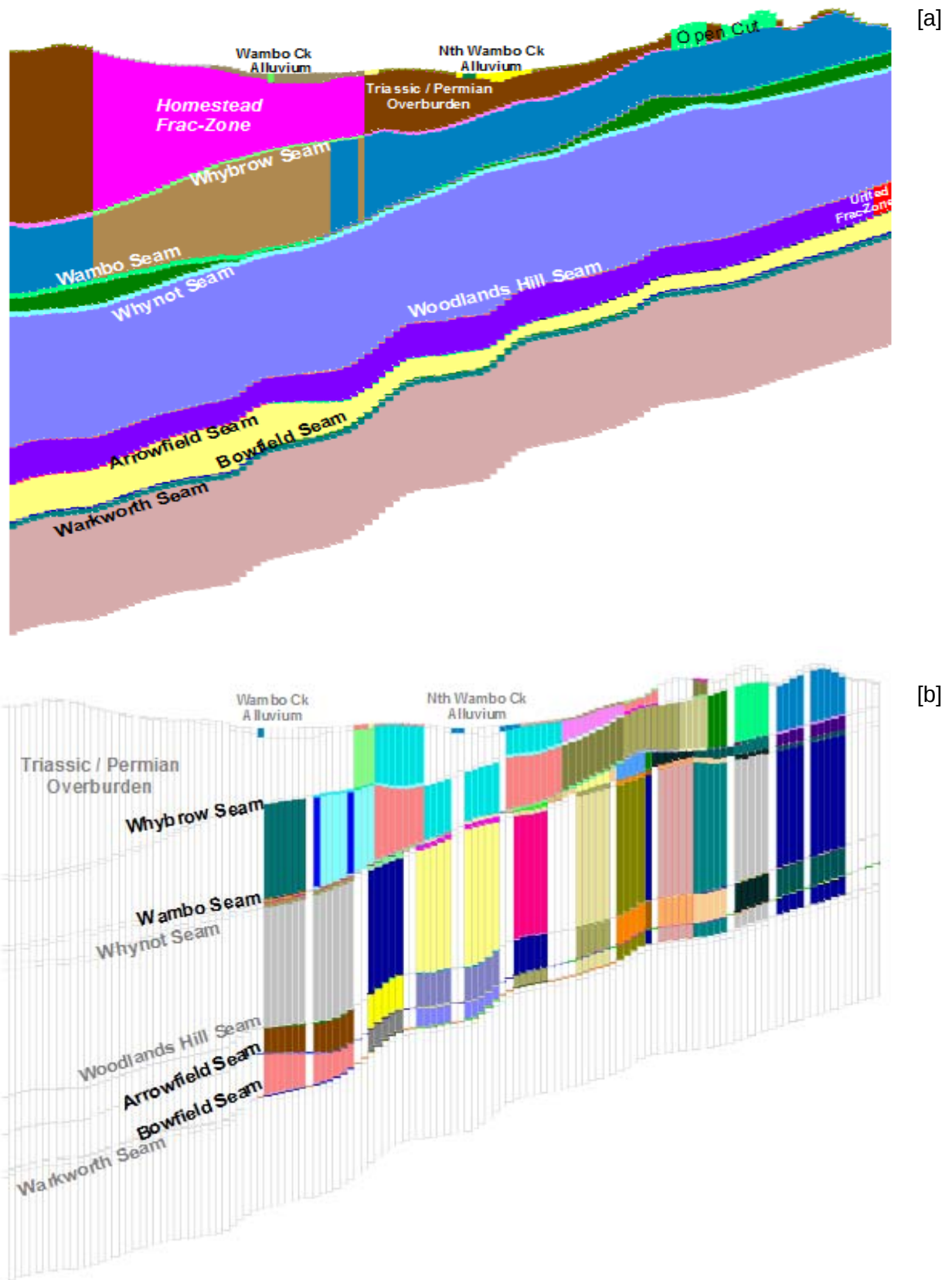


Figure A6. Model Column 232: (a) Hydraulic Conductivity Host Zones and Permanent Fractured Zones; (b) Dynamic Fractured Zones

Table A1
Adopted Hydraulic Conductivities [m/day] - Arrowfield Seam and Bowfield Seam Approved Mining

Layer	Lithology	Host Zone	Host Kx	Host Kz	Arrowfield and Bowfield Fractured HSU Zones	Arrowfield (Layer 11) Underground Fracture Zone Kz	Bowfield (Layer 13) Underground Fracture Zone Kz
1	Alluvium	1	10	1	NA	NA	NA
1	Colluvium/Regolith	17	5.0E-1	1.0E-2	NA	NA	NA
2	Triassic Sandstone, Whybrow Seam overburden	2	1.0E-3	1.0E-5	NA	NA	NA
3	Whybrow Seam	3	2.5E-3	5.0E-5	NA	NA	NA
4	Whybrow Seam – Wambo Seam interburden	4	1.0E-4	5.0E-6	648, 649, 650, 651, 652, 653, 654, 655, 656, 657	1.5E-5	NA
5	Wambo Seam	5	2.5E-3	1.5E-5	638, 639, 640, 641, 642, 643, 644, 645, 646, 647	2.2E-5	NA
6	Wambo Seam – Whynot Seam interburden	6	1.0E-4	3.0E-6	628, 629, 630, 631, 632, 633, 634, 635, 636, 637	2.4E-5	NA
7	Whynot Seam	7	4.4E-3	1.4E-5	618, 619, 620, 621, 622, 623, 624, 625, 626, 627	2.6E-5	NA
8	Whynot Seam – Woodlands Hill Seam interburden	8	1.0E-4	1.5E-6	608, 609, 610, 611, 612, 613, 614, 6115, 616, 617	5.1E-5	NA
9	Woodlands Hill Seam	9	1.2E-3	1.3E-5	600, 601, 602, 603, 604, 605, 606, 607	8.0E-5	NA
10	Woodlands Hill Seam – Arrowfield Seam interburden	10	1.0E-4	1.1E-6	412, 413, 414, 415, 416, 417, 418, 419	8.0E-5	8.0E-5
11	Arrowfield Seam	11	5.1E-3	1.1E-5	585, 586, 587, 588, 589, 590, 591	10	10
12	Arrowfield Seam – Bowfield Seam interburden	12	1.0E-4	1.0E-6	509, 510, 511, 512, 513, 514, 515, 517, 518, 526, 528, 560, 592, 593, 594, 595, 596, 597, 598, 599	3 x Kz host	1.0E-4
13	Bowfield Seam	13	5.0E-3	1.0E-5	662, 663, 664, 665, 666, 667, 668, 669	NA	10
14	Bowfield Seam – Warkworth Seam interburden	14	1.0E-4	1.0E-6	670, 671, 672, 673, 674, 675, 676, 677	NA	3 x Kz host

Table A1 (Continued)
Adopted Hydraulic Conductivities [m/day] - Arrowfield Seam and Bowfield Seam Approved Mining

Layer	Lithology	Host Zone	Host Kx	Host Kz	Arrowfield and Bowfield Fractured HSU Zones	Arrowfield (Layer 11) Underground Fracture Zone Kz	Bowfield (Layer 13) Underground Fracture Zone Kz
15	Warkworth Seam	15	1.0E-3	9.7E-6	NA	NA	NA
16	Basal Layer	16	1.0E-4	6.2E-7	NA	NA	NA

Note: For each fractured layer $K_x = 2 \times K_x \text{ host}$.
 HSU = HydroStratigraphic Unit.